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Research Article

Effectiveness on the Use of Mother Tongue in Teaching the Concepts of Fraction Among Second Grade of Elementary School Pupils

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Abstract

This study evaluated the effectiveness on the use of Mother Tongue in teaching the concepts of fraction among second grade of elementary school pupils. It adopted a pre-test post-test quasi-experimental design with 82 pupils in the second-grade elementary school as samples. The test from the District Office of the Department of Education was used to collect data from the subjects. Data collection tools using pre-test and post-test evaluation, with using SPSS for data analysis. Findings showed that the use of Mother Tongue Language (MTL) is more effective than the Non-MTL in teaching the concepts of fractions. It resolved that MTL could be used as the medium of instruction in teaching lessons in grade two. It recommended that relevant and updated instructional materials be available to carry out effective teaching-learning process.

Keywords:

Mother tongue, non-mother tongue language, concepts of fraction, effectiveness

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Introduction

Language is one of the valuable gifts which has been passed to children. The first language is significant and builds the basis for all later communication progresses. Parents, family members, and early childhood professionals have very important role in the development and maintenance of the first language. Study of UNESCO (UNESCO, 2005) found that knowing one language can assist the child to comprehend how other languages work. First or home language is particularly important for the child's development of a positive self-concept and well-being. Children who have the chance to maintain their first language can extend their cognitive development while learning English as a second language. Their level of competence in the second language has relationship to the level of skill they have achieved in their first language (Garcia & Baker, 2007).

According to Besa (2013), Mother Tongue Based Language (MTBL) Education was implemented in basic education system of the Philippines as a result of the positive effect of multilingualism among the learners. In the DepEd Order No. 74, the former Secretary Jesli Lapus states that Mother Tongue-Based Multilingual Education, referred to as MLE, is the effective use of more than two languages for literacy and instruction (Oyzon V. e., 2009). Henceforth, it shall be institutionalized as a fundamental educational policy and program in the Department in the whole stretch of formal education, including pre-school and in the Alternative Learning System (ALS) (Besa, 2013).

The National Policy on Education (NPE) affirmed that the Government recognizes the importance of language as a means of promoting social interaction, national cohesion, and preservation of our culture (Espiritu, 2012). The policy endorsed the need for every child to learn the language of the immediate environment (Thomas & Collier, 2013) (Indriani, Sahid, Bachri, & Izzati, 2019) (Janina & Mark, 2011)

As stated by Ediger (2010), the knowledge of arithmetic is not enough for the learners to think reflectively and creatively. There is a need for the mastery of mathematical language and verbal ability, which might best be taught with appropriate objectives, methods of instructions and assessment procedures possible in the teaching-learning situation. Improving quality of mathematics instruction is always possible. Innovative ways must be found to provide for the growth and development of mathematical instruction and with the pupils, as well.

As one of the researchers is a teacher handling mathematics in grade two, she is required to teach the subject using the Mother Tongue of the pupils, which is Tagalog. She noticed that children were seemingly interested in the subject but found difficulties in translating English terms to Tagalog (Keshavars, 2008). She also encountered problems in finding instructional materials written in the mother tongue. This situation prompted them to conduct this study to find out the

effectiveness of the use of mother tongue in teaching the concept of fraction among pupils in second grade of a public elementary school.

Conceptual Framework of the Study

This study is anchored on the Conceptual Framework of K-10 Mathematics Curriculum taken from K-12 Mathematics Curriculum Guide (2013) as shown in figure 1 whose twin goals are Critical Thinking and Problem Solving. Critical thinking, according to Kolawole (2009) is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by observation, experience, reflection, reasoning, or communication, as a guide to belief and action. To develop critical thinking, mathematics teachers should have initiative, be creative and resourceful in teaching the concepts (Janna & I, 2019). Yet, the mathematics concepts are not enough for the learners to think reflectively and creatively. There is a need for the mastery of mathematical language and verbal ability, which serves as a springboard to attain the objectives of the lessons, methods of instructions and assessment procedures possible in the teaching-learning situation (Obodo, 2009) (Malone, 2011) .

Improving the quality of mathematics instruction is always possible. Innovative ways should be provided for the growth and development of pupils in mathematical education (Ediger M. , 2010). DepEd Order 74, Series 2009 stated that Mother Tongue instruction leads to more effective teaching in Mathematics subject as official language of instruction in teaching the subject (Department of Education P. , 2010). It promotes national identity and greater understanding among learners to the subject taught by their teachers (Hassanzadeh, Shayegh, & Hoseini, 2011).

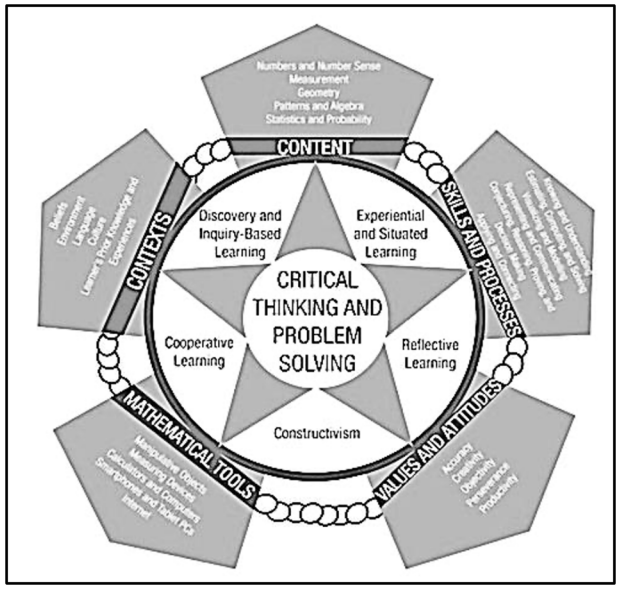

Figure 1.
The Conceptual Framework of Mathematics Education

Research Paradigm

Figure 2 shows that pre-test and post-test were administered, the result of MTBL and Non-MTBL were compared to determine the effectiveness of Mother Tongue instruction in teaching the concept of fractions.

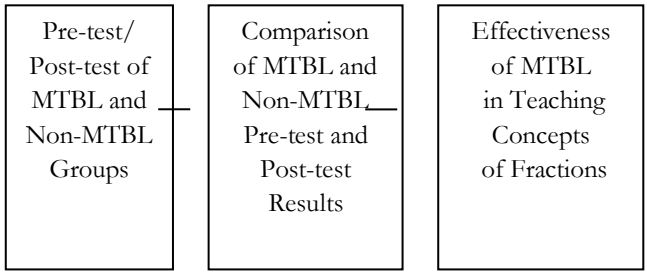

Figure 2.
Research Paradigm

Research Questions

Based on the reality described above, this study attempted to answer the following questions:

- What is the performance of the MTBL group of pupils in understanding concepts of fractions, as shown on the pre-test and post results?

- What is the performance of the Non-MTBL group of pupils in understanding concepts of fractions, as shown on the pre-test and post results?
- Is there a significant difference between the pre-test results of the MTBL and Non-MTBL group of pupils?
- Is there a significant difference between the pretest and posttest results of the Non-MTBL pupils?
- Is there a significant difference between the pre-test and post-test of MTBL group of pupils?
- Is there a significant difference between the post-test results of MTBL and Non-MTBL groups of pupils?

Method

Research Model

The study used a quasi-experimental research design (Wallen, 2009) in which allow the researcher to control the assignment to the treatment condition, but using some criterion other than random assignment.

Participants

The study conducted in an identified public elementary school in the District of Marilao, Philippines. Two heterogeneous groups from Class Two of Elementary School pupils were formed. Section A was exposed to Mother Tongue-Based language instruction while section B was exposed to Non-Mother Tongue instructions.

Data Collection Tools

To measure the learnings of the students, the researcher prepared a 20 –item test taken from the periodical and unit test from Department of Education, Division of Bulacan, Philippines (Department of Education P. , 2010). The test has three parts; Part I – items number one to ten are identification of the concept of fractions, Part II with five questions about the concepts of comparing fractions, and Part III with five articles about the concepts of reading and writing of fractions (Granado, 2009).

Data Analysis

The data that has been obtained from pre-test and post-test result of each group will be analyzed using SPSS version 21.

Procedure

The test questionnaire was administered to the respondents during the pre-test and post-test evaluation to determine the effectiveness of mother-tongue instruction in understanding the concept of fractions. The data gathered were organized, analyzed and interpreted using Statistical Package for Social Sciences (SPSS) version 21.

Ethical considerations of anonymity, confidentiality, and privacy were observed in the conduct of this research.

Results and Discussions

After we gathered the data, organized, analyzed and interpreted the data using SPSS version 21 program, the results are presented as follows:

Understanding Concepts of Fractions

The result of MTBL Instruction Group Performance in understanding the concept of fraction can be seen in table 1.

Table 1

Performance of the Mother Tongue-Based Instruction Group of Pupils in Understanding Concepts of Fraction

MTBL Group	No. of Pupils	No. of Items	LS	HS	$\bar{x}$	SD
Pre-test	41	20	0	10	5.80	3.02
Post Test	41	20	8	19	15.12	2.58

Legend:
LS=Lowest Score HS=Highest Score $\bar{x}$ *= Mean Score SD=Standard Deviation*

Score	*Equivalent*	*Level of Proficiency*
0 - 9	*74 - below*	*Beginning*
10 - 11	*75 - 79*	*Developing*
12 - 13	*80 - 84*	*Approaching Proficiency*
14 - 15	*85 - 89*	*Proficient*
16 above	*90 above*	*Advance*

Table 1 shows the performance of the Mother Tongue instruction group of pupils based on the results of their pre-test and posttest. It reveals that in a twenty (20) item test, the minimum score is zero interpreted as *o-beginning level of proficiency* while the maximum score is ten interpreted as *10-developing level of proficiency*. It also reveals that the mean score among 41 students is 5.80 at *beginning level of proficiency* with standard deviation of 3.02. These data imply that the pupils are at the *beginning level of proficiency*.

Table 1 also reveals that in the post-test results the minimum score is eight interpreted as *8-beginning level of proficiency* while the maximum score is nineteen (*19-advance level of proficiency*). It also reveals that the mean score among 41 students is 15.12 at the *proficient level of proficiency* with standard deviation of 2.58. These data imply that the pupils are in the *proficient level of proficiency*.

Performance of the Non-Mother Tongue-Based Instruction Group of Pupils in Understanding Concepts of Fractions could be seen in table 2 below.

Table 2.

Performance of the Non-Mother Tongue-Based Instruction Group of Pupils in Understanding Concepts of Fraction

MTBL Group	No. of Pupils	No. of Items	LS	HS	$\bar{x}$	SD
Pre-test	41	20	0	10	5.88	2.17
Post Test	41	20	8	20	12.88	3.35

Legend:
LS=Lowest Score HS=Highest Score $\bar{x}$ *= Mean Score SD=Standard Deviation*

Score	*Equivalent*	*Level of Proficiency*
0 - 9	*74 - below*	*Beginning*
10 - 11	*75 - 79*	*Developing*
12 - 13	*80 - 84*	*Approaching Proficiency*
14 - 15	*85 - 89*	*Proficient*
16 above	*90 above*	*Advance*

Table 2 shows the performance of the Non-Mother Tongue instruction group of pupils based on the pre-test result on the understanding of concepts of fraction. It reveals that in the twenty (20) item test, the minimum score is zero interpreted as 0-*beginning level of proficiency*; the maximum score is Ten (10-*developing level of proficiency*). It reveals that the mean score among 41 is 5.88 at the *beginning level of proficiency* with a standard deviation of 2.17. These data imply that the pupils are at the *beginning level of proficiency*.

Table 2 also reveals that in the post-test result, the minimum score is eight interpreted as 8-*beginning level of proficiency* while the maximum score is twenty (20-*advance*). It also reveals that the mean score among 41 students is 12.88 at the *approaching level of proficiency* with standard deviation of 3.25. These data imply that the pupils are in *approaching proficiency level.*

Test of Significant Difference between the Pretest Results of the MTBL Instruction and NON-MTBL Instruction Group of Pupils

Table 3 shows the result of t-test to compare the pre-test results of the MTBL Instruction and NON-MTBL Instruction Group of Pupils. The table reveals that the pretest of MTBL Instruction Group with a mean of 6.34 is at beginning *level of proficiency*, NON-MTBL Instruction with a mean of 5.88 is at *beginning level of proficiency*. They yielded a t-value =1.596, degree of freedom = 80, with p-value = .114. Therefore, the researcher concluded that, there is no significant deference between the pre-test results of MTBL Instruction and NON-MTBL Instruction Group of Class two pupils. This result ascertained that the two groups under study are in

comparable status at the beginning of the intervention. MTBL is slightly better but not significant than the Non-MTBL group.

Table 3.

Test of Significant Difference between the Pre-test Results of the Mother Tongue Instruction and Non- Mother Tongue Instruction Group of Pupils

Pretest	$\bar{x}$	t-value	df	p-value
MTBL	6.34	1.59	80	.11
Non-MTBL	5.88			

Test of Significant Difference between the Pre-test and Post- Test Results of Mother Tongue Instruction Group of Pupils

Table 4 shows the result of the t-test to determine the significant difference between the pre-test and post-test results of MTBL group of pupils. The table reveals that its pretest result with a mean of 6.80 is at the *beginning level of proficiency* while the post-test result with a mean of 15.12 is at *Proficient level of proficiency*. When the result is compared, the t-value of -11.19, degree of freedom of 40, p-value of .000. The decision made was to reject the Ho, and the conclusion was significant. This means that there is a substantial difference between the pre-test and post-test results of MTBL group of pupils from beginner to proficient level.

This result confirms other studies' findings that the effective transfer of cognitive and academic from mother tongue to the second language is possible only when the learners have acquired linguistic and academic competence in their mother tongues language (Oyzon V. , 2012).

Table 4.

Test of Significant Difference between the Pre-Test and Post Test Results of Mother Tongue Instruction Group of Pupils

MTBL	$\bar{x}$	t-value	df	p-value
Pretest	6.80	-11.19	40	.00
Posttest	15.12			

Test of Significant Difference between the Pre-test and Post Test Results of Non-Mother Tongue Instruction Group of Pupils

Table 5 shows that the summary of the t-test result to determine the significant difference between the pretest and post-test of Non-Mother Tongue instruction group of pupils. It reveals that the pre-test means of 5.88 is at *beginning level of proficiency*, post-test mean of 12.88 is at *approaching level of proficiency*. When compared, the t-value of -11.44, degree of freedom of 40, p-value of .000 was derived. The decision made was to reject the Ho, and the conclusion is significant. It means that

there is a substantial difference between the pretest -and post-test of English instruction group of pupils from *beginner* to *approaching proficiency level.*

This result is aligned with the findings that children's mother tongue should be used as the medium of instruction in order for ethnic children to be effective in their studies and balance the teaching of national and international language skills (Omoniyi, 2009).

Teachers who improve the quality of mathematics instruction are one of the innovative ways of teaching. Teachers must provide growth and development of mathematical instruction to the learners. Thus, pupils will achieve well under this implementation (Ediger F. , 2006).

Table 5.

Test of Significant Difference between the Pretest and Post Test Results of Non-Mother Tongue Instruction Group of Pupils

Non-MTBL Instruction	$\bar{x}$	**t-value**	**df**	**p-value**
Pretest	5.88	-11.44	40	.00
Posttest	12.88			

Test of Significant Difference between the Post Test Results of Mother Tongue Instruction and Non-Mother Tongue Instruction Group of Pupils

Table 6 shows that the t-test result is to determine the significant difference between the post-test of Mother Tongue instruction and Non-Mother Tongue instructions. It reveals that the post-test of Mother Tongue with a mean of 15.12 is at *proficient level of proficiency*, Non-Mother Tongue instruction with a mean of 12.88 is at *approaching level of proficiency*. Both have the t-value of -3.46, degree of freedom of 80. P-Value of .00. The decision is to reject the hypothesis and the conclusion made is significant. This means that there is a substantial difference between the post-test results of Mother Tongue instruction and Non-Mother Tongue instruction group of pupils. The MTBL group is at the *proficient level* while the English group is in the *approaching proficiency level* only. The MTBL learned significantly more than those in the non-MTBL group.

Table 6.

Test of Significant Difference between the Post Test Results of Mother Tongue Instruction and Non-Mother Tongue Instruction Groups of Pupils

Posttest	$\bar{x}$	**t-value**	**df**	**p-value**
MTBL	15.12	-3.46	80	.00
Non-MTBL	12.88			

Recommendations

From this study, it can be concluded that both the Mother Tongue and Non-Mother Tongue groups of Pupils are in the beginning level of proficiency before the instruction was done. Moreover, the Non-Mother Tongue group of pupils had significant learning of concepts of fractions and the Mother tongue group of pupils had significant learning of concepts of fractions. Also, there is a significant difference in the learning of the concept of fractions between the MTBL and Non-MTBL group of pupils. The MTBL group significantly learn more than the non-MTBL group, furthermore, the use of Mother Tongue is effective in learning the concepts of fractions.

Based on the findings, the following recommendations for further study could emphasize on curriculum, since curriculum writers may improve the curriculum in using Mother Tongue language as the medium of instruction in teaching Mathematics. Hence, Updated and relevant instructional materials should be developed to enhance the teaching-learning process in Mathematics education.

For applicants, as a Teacher should be open-minded and be patient in adopting the implementation of the K-12 curriculum and the use of Mother Tongue Based instruction. Furthermore, it is necessary that Mother Tongue must be used as a medium of instruction in different subject areas

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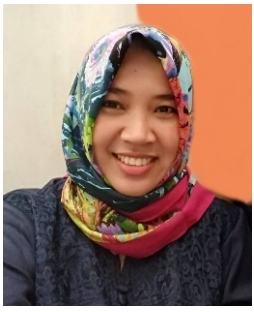

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