

Effectiveness of Mother Tongue Based (MTB) Instruction in the Performance of Grade I Pupils in Math

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Abstract — Use of the appropriate language in teaching learners greatly contributes to academic performance and success in school. Language plays a vital role in the learning process of the elementary learners. Teachers must ensure that the language to be used in the different subject areas are the language first heard at home (Benson, 2004). In relation to DepEd Order No.16, s. 2012 which provides the guidelines on the nationwide implementation of Mother Tongue-Based Multilingual Education (MTB-MLE) that started in the school year 2012-2013, elementary schools nationwide were prompted to adopt such a system. Mother Tongue Based (MTB) is a subject and as medium of instruction in all subject areas in Grade I except for Filipino and English. With these, teachers and pupils had hard time in translating Mathematics language to Mother Tongue. This is the reason why the researcher conducted this study to evaluate the effectiveness of MTB instruction in the performance of Math in grade I.

It was revealed that the pre-test performance of the Grade I pupils in Math for the experimental group was moderate while in the control group was high. Moreover, the post-test performance of the Grade I pupils in Math for the control and experimental groups were very high. Furthermore, it was also revealed that there is significant difference between the scores in the pre-test and post-test performances of the Grade I pupils in Math for the experimental and control group and there is also significant difference on the scores of the post-test Math performance between the two groups. This means that both MTB and English as medium of instruction in teaching Math for Grade I is effective. It is recommended to implement the formulated Intervention Plan in Mathematics to improve or maintain the performance of the pupils.

Keywords — *Effectiveness, Mother Tongue Based, Instruction, Performance, Grade I Pupils, Math*

I. Introduction

The use of the appropriate language in teaching learners greatly contributes to academic performance and success in school. Language plays a vital role in the learning process of the elementary learners. Teachers must ensure that the language to be used in the different subject areas are the language first heard at home (Benson, 2004). In relation to DepEd Order No.16, s. 2012 which provides the guidelines on the nationwide implementation of Mother Tongue-Based

Multilingual Education (MTB-MLE) that started in the school year 2012-2013, elementary schools nationwide were prompted to adopt such a system. As stipulated in the guidelines, the MTBE shall be implemented in all public schools, specifically in Kindergarten, Grades 1, 2, and 3 as part of the K-12 Basic Education Program.

Mother Tongue refers to the first language (FL), home language, native language or vernacular used by every individual at home. Mother Tongue-based Instruction (MTBI) refers to the language spoken by the pupils in their homes and used as a medium of instruction in school. The utilization of this medium is one of the effective interventions of DepEd which aimed at improving the quality of Philippine education to better prepare individuals to live a successful life after school. It also provides an opportunity for the children to exercise their right to learn in their first language. The MTB-MLE shall be implemented in two (2) modes: as a learning/subject area and as medium of instruction. The Mother Tongue (MT) as a subject focus on the development of beginning reading, and fluency from Grades 1 to 3. The learners' Mother Tongue (L1) shall be used as the medium of instruction (MOI) in all domains/learning areas from Kindergarten through Grade 3 except Filipino (L2) and English (L3). In other word, this will be used in the subjects namely: Mathematics, Araling Panlipunan, Music, Art, Physical Education and Health or MAPEH and Edukasyon sa Pagpapakatao from Grades 1 to 2. The L1 or the Mother Tongue will continuously be used as medium of instruction in the transition or bridging process through Grade 3 with the addition of the Science subject.

Further, the program aims to develop the following areas: language development, which establishes a strong education for success in school and lifelong learning; cognitive development, which focuses on Higher Order Thinking Skills; and academic development of the learners which prepares them to acquire mastery of competencies in each of the areas.

The challenges of every educator for the new curriculum being implemented by the Department of Education contribute benefits to the learning of the pupils. It provides long-term benefits like higher self-esteem, greater confidence and high aspirations for schooling and life (UNESCO, 2006).

In the same manner, the implementation of mother tongue based- multilingual education tend to be drastic in our educational innovations. Though it provides a positive effect towards the academic performance and the pride of our heritage the use of mother tongue, but it advocates an insufficient readiness, trainings and other problems that will be encountered by the concerned authorities such as the implementers and the teachers.

With almost six (6) years of implementation of mother tongue-based instruction, still the teachers find difficulties especially in translating English terms to mother tongue. Since not all learners in the field had their mother tongue it's vernacular, they find difficult in understanding such. In this premise, being the grade I teacher, the researcher challenged herself to conduct this study in order to determine or evaluates the effectiveness of mother tongue-based instruction in

the mathematics performance of the grade I pupils. With the result of the study, an intervention plan was formulated.

It is in the rationale that the researcher who is currently teaching in the above mentioned local, would like to delve worthy research undertaking that will benefit the school she is currently teaching and that of her Graduate Program Institution.

This study evaluates the effectiveness of mother tongue-based instruction in the performance of Grade I pupils in Math of Canbantug Elementary School, Merida District, Leyte Division. The findings of the study were bases for the proposed improvement plan.

Specifically, this study sought to answer the following questions:

1. What is the pupil's level of performance in Mathematics before the exposure to mother tongue-based instruction in the control and experimental groups?
2. What is the pupil's level of performance in Mathematics after the exposure to mother tongue-based instruction in the control and experimental groups?
3. Is there a significant difference between the scores in the pre-test and posttest performances of Grade I pupils in Math before and after the exposure of mother tongue-based instruction to both groups?
4. Is there a significant difference between the scores in the posttest performances of Grade I pupils in Math after the exposure of mother tongue-based instruction to both groups?
5. What improvement plan can be proposed based on the findings of this study?

II. Methodology

Design. This study employed quasi-experimental research design to evaluate the effectiveness of mother tongue-based instruction in the performance of Grade I pupils in Math. Canbantug Elementary School, Merida District, Leyte Division is the main locale of the study. The respondents of this study were the twenty-six (26) pupils enrolled in Grade I under the advisory of the researcher. The research instrument used in this study was the achievement test given to pupils in the pretest and posttest. The researcher crafted a thirty (30) item test questions with 3rd Quarter competencies. Two (2) sets of tests were crafted with the same competencies but of different medium of instruction, the mother tongue and English. This research is focused in evaluating the effectiveness of mother tongue-based instruction in the performance of Grade I pupils in Math and its relationship. A Proposed Improvement Plan based on the findings of the study is the output.

Sampling. There are twenty-six (26) Grade 1 pupils involved in this study. The research was conducted personally by the researcher with consent from the parents of the pupils.

Research Procedure. The researcher prepared the research design and tools to be utilized in the study. Approval and recommendation from the Panel of Examiner of the Graduate Studies and permit from the Schools Division Superintendent of Leyte Division, District Supervisor of Merida District and school head of the said locale 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, District MTB Coordinator and School Head was secured before the actual gathering of data. Validation of the instruments through the School Head, District MTB Coordinator and District Supervisor was sought. Orientation of the participants and administration of the pre-test and post-test was done in the classroom by the researcher. Permission from the parents of the respondents was secured. The present study involved two groups, the experimental group which used mother tongue as medium of instruction in teaching Mathematics and the control group which used English as a medium of instruction in teaching Mathematics. A pre-test and post-test were used to determine the significant difference on pupil's performances in Mathematics. The two classes were taught by the researcher during the period in which they were assigned. Hence, the present locale has only one section for the grade level, teaching using the mother tongue based and English instruction for Mathematics lessons were given on specific date. After given intervention, post-test was conducted. 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 right to conduct the study was strictly adhered through the approval of the Schools Division Superintendent of Leyte Division, District Supervisor, of Merida District and school head of Canbantug ES. Orientation of the respondents with their parents or guardians was done during the parent conference. In the orientation, issues and concerns were addressed and consent to be included in the study were signed.

Treatment of Data. The Simple Percentage and Weighted Mean was employed to determine and evaluate the pretest and posttest performance in Mathematics of the Grade I pupils. t-Test of Mean Difference was used to determine the significant difference between the pretest and posttest pupil's performance in Mathematics before and after the teaching of Mathematics lessons using mother tongue based and English instruction. This formula proved or disproved what was postulated in the hypothesis.

III. Results and Discussion

Table 1
Pre-Test Performance of Grade I Pupils in Math (N=26)

Data	Experimental Group	Interpretation	Control Group	Interpretation
No. of Pupils	14	Moderate	14	High
No. of Items	30		30	
Total Score	254		263	
Mean	18.14		18.79	
MPS	60.47		62.63	

Table 1 presents the pre-test performance of Grade I pupils in Math for the control and experimental group. It was revealed on the table that the pre-test performance of the grade I pupils in Math for the experimental group has a total score of 254 with an average mean of 18.14 and mean percentage score of 60.47 which is interpreted as moderate. This means that the grade I pupils before the exposure of English instruction in teaching Math, their performance is moderate. This implies that these pupils need intervention in order for their performance to improve.

MTB-MLE, however, may cause adverse effects on people's English literacy (Alberto, Gabinete, & Ranola, 2010) consequently affecting their lifelong learning and competitiveness. MTB-MLE reduces individuals' amount of exposure to the English language, thus adversely affecting their English proficiency (Li & Majhanovich, 2010). Yet, English is the language of the academic world. Many scholars write in English. Most books and other sources of knowledge are written in the English language (Hillman, 2015). Furthermore, in countries such as Indonesia and the Philippines, where the number of instructional materials written in the mother tongue is low due to the presence of multiple local languages, students' listening, speaking, reading, and writing skills are in danger of underdevelopment (Alberto, Gabinete, & Ranola, 2010; Wa-Mbaleka (2014b, 2015).

Moreover, the table also shows the pre-test performance of grade I pupils in Math before the exposure of mother tongue-based instruction in teaching Math. It was revealed on the table that the pre-test performance of grade I pupils in Math for the control group has a total score of 263 with an average mean of 18.79 and mean percentage score of 62.63 which is interpreted as high. This means that grade I pupils did not meet the required mastery level for the subject. These pupils need intervention in order for their performance be improved.

Mother Tongue refers to the first language (FL), home language, native language or vernacular used by every individual at home. Mother Tongue-based Instruction (MTBI) refers to the language spoken by the pupils in their homes and used as a medium of instruction in school (DO #16, s. 2012). The utilization of this medium is one of the effective interventions of DepEd which aimed at improving the quality of Philippine education to better prepare individuals to live

a successful life after school. It also provides an opportunity for the children to exercise their right to learn in their first language (DO #16, s. 2012). Teachers must ensure that the language to be used in the different subject areas are the language first heard at home (Benson, 2004).

Table 2
Post-Test Performance of Grade I Pupils in Math (N=26)

Data	Experimental Group	Interpretation	Control Group	Interpretation
No. of Pupils	14	Very High	14	High
No. of Items	30		30	
Total Score	373		338	
Mean	26.64		24.14	
MPS	88.80		80.47	

Table 2 presents the post-test performance of Grade I pupils in Math for the control and experimental group. It was revealed on the table that the post-test performance of the grade I pupils in Math for the experimental group has a total score of 373 with an average mean of 26.64 and mean percentage score of 88.80 which is interpreted as very high. This means that after the use of English as medium of instruction in teaching Math, their performance had increase. This implies that using English as medium of instruction in teaching Math is effective.

Further, globalization is undeniable. In the global perspective, there are certain privileges that are only accessible to people who are proficient in, or at least knowledgeable of, the English language (Hillman, 2015). Tourism, business, and education are among these major privileges (Wa-Mbaleka, 2014b). In Uganda and the Philippines alone, most people who gain employment in international companies are proficient in English (Tembe & Norton, 2011; Wa-Mbaleka, 2014b). In the light of the critical period hypothesis (Hummel, 2014), MTB-MLE may cause many people to miss these privileges and be robbed of the opportunity to be at pace with the globalized world.

Moreover, the table also shows the posttest performance of grade I pupils in Math for the control group. It was revealed on the table that the posttest performance of grade I pupils in Math after using Mother Tongue Based instruction in teaching Math has a total score of 338 with an average mean of 24.14 and mean percentage score of 80.47 which is interpreted as high. This means that their performance had increased after the exposure of mother tongue-based instruction in teaching Math. This implies that using mother tongue-based instruction in teaching Math is effective.

According to UNESCO (2006), the implementation of mother tongue based- multilingual education tend to be drastic in our educational innovations. Though it provides a positive effect

towards the academic performance and the pride of our heritage the use of mother tongue, but it advocates an insufficient readiness, trainings and other problems that will be encountered by the concerned authorities such as the implementers and the teachers.

Table 3

Test of Difference Between the Scores in the Pre-Test and Post-Test Performances of Grade I Pupils in Math

Aspects	Test Scores		Computed T	Critical T	Decision	Interpretation
Experimental Group	Pre	60.47	0.00	0.05	Reject H_0	Significant
	Post	88.80				
Control Group	Pre	62.63	0.00	0.05	Reject H_0	Significant
	Post	80.47				

Table 3 presents the test of difference between the scores in the pre-test and posttest performance of the grade I pupil for the experimental and control group. It was revealed on the table that the pre-test performance of 60.47 and posttest performance of 88.80 for the experimental group had a p value of 0.00 at .05 level of significance, so null hypothesis is rejected. This means that there is significant difference between the scores in the pre-test and posttest performance of the grade I pupils exposed on English as medium of instruction in teaching Math. This implies that using English as medium of instruction in teaching Math is effective.

Moreover, the table also shows the test of difference between the scores in the pre-test and posttest performance of grade I pupils for the control group. It was revealed on the table that the pre-test performance of 60.63 and posttest performance of 80.47 for the control group had a p value of 0.00 at .05 level of significance, so null hypothesis is rejected. This means that there is significant difference between the scores in the pre-test and posttest performance of the grade I pupils exposed on Mother Tongue Based as medium of instruction in teaching Math. This implies that using MTB as medium of instruction in teaching Math is also effective.

Niesche (2009), sees the need to embed children's culture in teaching mathematics. From his research in Western Australia, he found out that children performed better when the native language (Kriol) was used instead of English to teach mathematics to the children. He realized that using children's mother tongue in teaching mathematics can become a powerful tool for learning mathematics (Niesche, 2009).

According to Israel and Thomas (2013), children understand mathematics better when they are taught using their mother tongue. Learning using mother tongue also helps to develop mathematical vocabularies that could be easily used and remembered by students.

Table 4
Test of Difference Between the Scores in the Post-test Performance of Grade I Pupils

Aspects	Test Scores		p value	Level of Sig	Decision	Interpretation
Post Test Scores	Control	80.47	0.03	0.05	Reject H ₀	Significant
	Experimental	88.80				

Table 4 presents the test of difference between the scores in the posttest performance of the grade I pupil for the experimental and control group. It was revealed on the table that the posttest performance of control group had a mean percentage score of 80.47 and posttest performance for the experimental group of 88.80 had a p value of 0.03 at .05 level of significance, so null hypothesis is rejected. This means that there is significant difference between the scores in the posttest performance of the grade I pupils for both groups. This implies that using English and MTB as medium of instruction in teaching Math is both effective it depends upon how the teacher delivered the lesson, what learning materials she used and how the attitude of the learners towards the subject. In addition, there were Mathematics terms in English which were hard to translate to Mother Tongue and its translation is more difficult compared to that of the English as medium of instruction.

According to Cummins (2000), when children continue to develop their abilities in two or more languages throughout their primary school years, they gain a deeper understanding of language, and use it effectively. They have more practice in processing language, especially when they develop literacy in both, and they are able to compare and contrast the ways in which their two languages organize reality. This is true that learning of the pupils should be gradual but continuous. There is no need to force them to absorb the concepts immediately. The gradual introduction of the second or third languages can get better results. In the light of the critical period hypothesis (Hummel, 2014), MTB-MLE may cause many people to miss these privileges and be robbed of the opportunity to be at pace with the globalized world.

Another purpose of MTB-MLE is sustainable national development. Since MTB-MLE develops individuals who have solid mother-tongue foundation, it can prevent the death of many indigenous languages. Further, since language and culture coexist, cultural heritage is also preserved. This fact solidifies the identity of the nation. A country producing intellectually competent learners enjoys high productivity resulting to economic stability (Mohanty, as cited in Malone, 2007; Ouane & Glanz, 2011; SIL International, 2009; Stone, 2012; UNESCO, 2005).

IV. Conclusion

The data revealed that using Mother Tongue Based (MTB) and English as medium of instruction in teaching Math for the grade I pupils is effective. This is effective in the sense that teachers used two languages in teaching the subject for there were Mathematics terms which were hard to understand when it was translated to Mother Tongue. The way the teachers delivered the

lesson, the instructional materials used and the attitude of the pupils and teachers towards the subject were factors that made English and Mother Tongue as medium of instruction in teaching Math is effective.

V. Recommendations

The researcher offered the following recommendations based on the result of the study:

1. The Math intervention plan formulated should be utilized;
2. School Heads should provide technical assistance to the teachers in improving the teaching-learning process;
3. Teachers should enhance their teaching competencies and employing the use of ICT in teaching Math through attending LAC sessions, trainings and seminars;
4. Teachers should encourage parents to support their children by providing materials to be used during teaching-learning process;
5. School Heads should encourage teachers for further learning for the improvement of their teaching and for professional growth; and
6. Future researchers should replicate this study to include different locale, and include different variables aside from the mentioned in this study.

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REFERENCES

1. Alberto, R.P., Gabinete, S. & Rañola, V.S. (2016). Issues and challenges in teaching mother tongue-based multilingual education in grade II and III: The Philippine experience. Retrieved from <https://goo.gl/y17x1S>.
2. Benson, C. (2004). The Importance of Mother Tongue-Based Schooling for Educational Quality, Commissioned Study for EFA Global Monitoring Report 2005, Stockholm University.
3. Cummins, J. (1999). Alternative Paradigms in Bilingual Education Research: Does Theory Have a Place? *Educational Researcher* 28, 26-32.
4. Department of Education Order No. 16 (2012). Guidelines on the Implementation of Mother Tongue Based-Multilingual Education (MTB-MLE). February 17, 2012. Manila, Philippines. DepEd.
5. Hillman, S. (2015). The relationship between English language education policies and economic growth in Asia (Doctoral dissertation). Available from ProQuest Digital Dissertation and Theses database. (UMI No. 10002251).
6. Hummel, K. (2014). *Introducing second language acquisition: Perspectives and practices*. West Sussex, UK: John Wiley and Sons.
7. Israel, O.O and Thomas, O. O (2013). Effect of Mother Tongue and Mathematical Language on Primary Pupils Performance in Mathematics. *Journal of Emerging Trends in Educational Research & Policy Stud*; Jun2013, Vol. 4 Issue 3, p542
8. Li, V.W.L., & Majhanovich, S. E. (2010). Marching on a long road: A review of the effectiveness of the mother-tongue education policy in post-colonial Hong Kong. *Gist Education and Learning Research Journal*, 4(1), 10-29. Retrieved from <http://files.eric.ed.gov/fulltext/EJ1062608.pdf>
9. Malone, S. (2007). *Mother Tongue-Based Multilingual Education: Implications for Education Policy*, SIL International, Presented at the Seminar on Education Policy and the right to Education: Towards More Equitable Outcomes for South Asia's Children Katmandu.
10. Niesche, R. (2009). The Use of Home Language in the Mathematics Classroom. In R. Hunter, B. Bicknell, & T. Burgess (Eds.), *Crossing divides: Proceedings of the 32nd annual conference of the Mathematics Education Research Group of Australasia* (Vol. 1) Palmerston North, NZ: MERGA.
11. Ouane, A., & Glanz, C (Eds.). (2011). *Optimising learning, education and publishing in Africa: The language factor. A review and analysis of theory and practice in mother-tongue and bilingual education in Sub-Saharan Africa*. Hamburg, Germany: UNESCO Institute for Lifelong Learning. Retrieved from <http://unesdoc.unesco.org/images/0021/002126/212602e.pdf>
12. SIL International. (2009). *Multilingual education*. Retrieved from https://www.sil.org/sites/default/files/files/mle_2009_web.pdf

13. Stone, R. P. (2012). A professional development program for the mother tonguebased teacher: Addressing teacher knowledge and attitudes about MTBMLE (Doctoral dissertation). Retrieved from <https://goo.gl/w1a7Mb>
14. Tembe, J., & Norton, B. (2011). English education, local languages and community perspectives in Uganda. In H. Coleman (Ed.) *Dreams and realities: Developing countries and the English language* (pp. 2-24). London, UK: British Council. Retrieved from <https://goo.gl/WiyYSc>
15. UNESCO Bangkok, (2005). *Advocacy Brief on Mother Tongue-Based Teaching and Education for Girls*. Bangkok.
16. UNESCO, (2006). *Challenges of Implementing Free Primary Education in Kenya*: Available from: unesdoc.unesco.org/images/0015/001516/151654eo.pdf.
17. Wa-Mbaleka, S. (2015). Switching to mother tongue-based education: The new trend and its challenges. *US-China Foreign Language*, 13(4), 257-264. doi:10.17265/15398080/2015.04.005
18. Wa-Mbaleka, S. (2014b). Two Proposed Perspectives on Mother Tongue-Based Education in the Philippines. *International Journal of Academic Research in Progressive Education and Development*, 3(4), 302-312.

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She is currently a Teacher III of Canbantug Elementary School – Merida District, Division of Leyte. She handled grade 1 class for three years and currently handling grade 4 class for almost 4 years and enjoyed her job in making a difference in her pupils' life. She also attended series of National and Division Levels of webinars/seminars and trainings to increase her professional growth as a teacher.