

The Use of Mother Tongue in Teaching Elementary Mathematics

Tess P. Englis^{1*}, Helen B. Boholano²

¹Department of Education, Cebu Province, Philippines

² Cebu Normal University

* tessenglis33@gmail.com; boholanoh@cnu.edu.ph

ABSTRACT

Objectives: This study determined the preparation level of the teachers in teaching Mathematics using Mother Tongue-Based instruction and also explores the teachers' feedback in the implementation of MTB instruction. The Philippine curriculum in kindergarten to Grade 3 emphasize the used of mother-tongue in teaching and learning. Elementary Mathematics is very important in the life of the learners. The teacher performs a vital position within the coaching and gaining knowledge of process. Educationists were locating sensible answers to the sensible issues within the Philippine Educational System particularly on literacy and comprehension of students.

Methods: This study utilized mixed methods of quantitative and qualitative design. Mean was utilized to determine the level of preparations of the teachers in teaching MTB. Thematic analysis was also used in determining the teachers' feedback about teaching mother tongue in Mathematics.

Results: Findings revealed that the teachers are well-prepared in terms of content and instructional materials in teaching Mathematics using MTB. Contextualization and innovation are the core strategies in teaching Mathematics. In contextualized teaching, it connects the learning of basic skills that focuses teaching and learning on the concrete applications in a specific context that is of interest to the student.

Conclusion: Thus, contextualized and innovative model in teaching Mathematics using mother-tongue based instruction is essential in the delivery of instruction.

Keywords

mother tongue, elementary Mathematics, contextualization, learning competencies

Introduction

Educationists have been finding realistic solutions to the realistic problems in the Philippine Educational System especially on literacy and comprehension of students. Based on recent survey, Filipino students have low literacy and comprehension rate especially in English. Since most of the subjects except Filipino are taught using English language students also perform poorly in the other subject areas like Mathematics.

Based on recent survey, Filipino students have low literacy and comprehension rate especially in English. Since most of the subjects except Filipino are taught using English language students also perform poorly in the other subject areas like Mathematics.

However, some experts contended on these ideas of the delivery of instruction and would just have worsened the problem of literacy and comprehension. The aforementioned opposing statements and issues on Mother tongue instruction are the baseline in the conduct of this study. Moreover, this is also triggered by the pandemic that is also confronting the traditional way of conducting classes. This study would look into the teachers' perspectives on the mother tongue-based instruction as used in mathematic modules since modular instruction is the most suited type due to the unavailability and inaccessibility of internet.

In the study of [1] "teacher-child interactions are an integral factor influencing the quality of early childhood education, and multilingualism is increasingly prevalent in many contexts". Thus, based on the experienced of the researchers, there is a need conduct an extensive study about the use of mother tongue in teaching elementary mathematics.

Purpose of the Study

The purpose of this study determine the preparation level of the teachers in teaching Mother Tongue-Based Mathematics instruction, explore the teachers' feedback in the implementation of MTB in teaching Mathematics and proposed an emergent model in teaching Mathematics using MTB.

Literature Review

As established by Cummins, the Linguistic Interdependence Hypothesis suggests that during the process of second language (L2) learning, some first language (L1) information may be positively transferred. For the development of corresponding skills in the L2, the L1 linguistic awareness and abilities that a child possesses may be highly instrumental. An integral component of these facilitative aspects of language

influence is that the L1 is adequately established prior to prolonged exposure to the L2, as is observed, for example, in an educational context [2].

In addition, the linguistic, or developmental, hypothesis of interdependence says that when their primary language is developed, students will learn a second language [3]. It proposes that to the degree that education in a minority language is successful in the creation of academic competence in a minority language, due to sufficient exposure and incentive to learn the majority language, the transition of that competence to the majority language would take place [4]. [4] asserts that learning the same content in the second language will be better for language minority students who have solid roots in their first language. Students wouldn't need the material to re-learn. This is undoubtedly supportive of bilingual education because in order to achieve the target of majority language proficiency sooner, it needs sponsorship and valorization of the minority language.

This theory upholds the principle of instruction based on the mother tongue, which helps to facilitate the development of competent and well-rounded people. It ensures that educators can start where the students are and learn new information from what they already understand. They think more efficiently and perform better when students are taught in their mother tongue. On the other hand, Walberg's theory of academic productivity indicates that individual pupils' psychological characteristics and their immediate psychological environments impact educational performance (cognitive, behavioral and attitudinal) [5]. In addition, Walberg's research identified nine main variables influencing educational outcomes as: student ability/previous achievement, motivation, level of age/development, amount of instruction, quality of instruction, atmosphere in the classroom, home environment, peer group, and exposure to mass media outside of school [6].

The three theories above are the bases of formulating the variables in this study which includes the entry and exit performance of the students to determine whether or not the use of mother-tongue based instruction has helped and influenced the learners' ability in learning the required competencies in Mathematics. Furthermore, grade 3 students were chosen as main respondents to determine whether or not MTB is effective strategy in teaching the primary level.

On the other hand, another variable included is the teachers' knowledge in the implementation of this kind of teaching strategy. Regardless of how effective the strategy is if the teachers have no knowledge on how to implement it accordingly then it would be out of context. Furthermore, it is also very important that teachers' perspective will also be gathered to address

issues regarding the implementation of MTB in the teaching of Mathematics for the purpose of improvement.

Mother-Tongue in Teaching Mathematics

Many studies on the use of mother-tongue suggest that it is effective. [7] said that "various elements have been suggested to interact with online learning motivation in an effort to address the problems of attrition and participation". Learners experience lower levels of motivation when they skip classes or do not participate in the activities because of lack of motivation to language and subject matter. Moreover, if students do not understand the language and eventually cannot actively participate in the class, it will lead to discouragement and dropping out. He added that this leads to poor quality education that frequently has unequal effect on the vulnerable clusters and results to school and resource lost as pupils stop from schooling or end up repeating the same level.

[8] proposed that the education of students should start with the language they are used to and understand well, because it will provide a strong foundation and encouragement for school attendance. As the medium used in teaching, Mother Tongue would enable primary school learners to directly create and clarify, express their thoughts and formulate new concepts to what they already learned without fear of making grammatical errors.

[9] meanwhile, emphasized the advantages of teaching in schools in the language of the mother tongue. He emphasized that the use of MTB-MLE increases female enrollment, increases active parental engagement, decreases teacher sexual harassment, enhances learning, and encourages more girls to become teachers.

Modular approach is a by-product of the learning theories like of David Kolb's experiential learning and John Dewey's learning by doing. It guides students to learn or rehearse data. Exercises are offered following the progression of learning exercises from simple to progress in order to achieve mastery of the concepts. These ideas supporting Mother Tongues-Based instruction are presumed to be few of the reasons MTB-MLE was introduced and implemented in the Philippine Education System as a major part of k-12 curriculum where MTB MLE is an inclusion in the instruction from Kindergarten to Grade 3 with the R.A. 10533 mandate, or the 2013 Basic Education Act.

Republic Act No. 10533 clearly mentioned that the curriculum should observe the MTB-MLE concepts and frameworks starting from where the students are and from what they already knew going from the known to the unknown; and that there should be access to

instructional instruments and resources and capable MTB-MLE curriculum teachers.

The said shift of educational policy and its implementation have brought several concerns and issues. In fact, this has been the subject to many arguments and debate in the academe. This has also led to the conduct of many researches around the archipelago proving and disproving the effectiveness of MTB-MLE. This part of this chapter presents relevant and related studies on MTB-MLE.

In Phelindaba Primary School, where learners use English as the language of learning and teaching, this qualitative case study was carried out. In partnership with the Home Language Initiative, Phelindaba Primary School worked to encourage the learning of mathematics employing the native tongue of the students as the source. It was revealed that learners cooperate better with classmates, teachers and their activities when they speak their home language. The study also found that in order to gain conceptual comprehension, procedural fluency, adaptive reasoning and strategic competence, learners used home languages, which in return would hone their prolific character.

In the North West Region of Cameroon, Walter and Chuo researched the impact of employing mother tongue education between grades 1-5 in the Boyo Division. Experimental approaches are used by researchers. The research included twelve experimental schools and twelve comparative schools. The results show that in favor of mother-tongue students, there is a small disparity in test scores. Nonetheless, the researchers stipulate that this decrease might be the result of exit model of multilingual education. This model happens when learners end their mother tongue-based education which happens in the experimental schools that participated. The paper further recommends to continue the mother tongue education up to grade 6 level which is also known as late exit models.

[10] are researching the effect of the MTB-MLE curriculum on school pupils in Lubuagan, Kalinga. A longitudinal study is initiated by the researchers using an experimental approach to monitor the progress and outcomes of test scores between the experimental and controlled groups. The findings indicate empirical evidence supporting the value of education focused on the mother tongue in improving second and third language learning and acquisition. The data also revealed that the cognitive skills of the students continue to build when learners learn in their home language which enabled greater ability in handling cognitively demanding activities in school and strengthened the learning.

[11] scrutinized the way teachers and parents comprehend and enact MTB-MLE by assessing their knowledge, beliefs and practices to determine the way the national policy is implemented at the local level employing a case study method. It was found out that the short-term benefits of the Policy and the long-term shortcomings were the focused of the teachers and parents based on their views. The two groups were both very happy with the enhancement of student comprehension, but were also mindful of the potential implications for studying the mother tongue rather than English.

Advantages of Mother-Tongue Based Instruction

It was found that the respondents considered that implementation was not met, especially on most of the objectives of MTB-teaching MLE, such as grammar awareness, development of vocabulary and understanding of reading. In addition, the grade 1 teachers use another language accessory to the mother tongue. It was also noticed that the attendance of suitable training courses and the availability of evaluation tools were some of the serious problems encountered and control group are those pupils who were exposed to English Instruction. It was found out that the performance of the pupils who belong to experimental was significantly higher than the performance of the pupils who belong to the control group both in post and retention tests.

[12], using an experimental research design, calculated the consequences of the introduction of mother tongue as used in teaching pre-service teachers in mathematics and science to Bukidnon State University Laboratory School grade 3 pupils during the academic year 2014-2015. For either the experimental or the control group, the respondents were randomly chosen. The outcome showed that students performed well when English was the medium of instruction in teaching mathematics and science.

[13] attempted to determine the impact of MTB-MLE as used as the medium in the teaching of Mathematics to improve learners' performance. The descriptive method research is focused on the use of researcher-made Mathematics Achievement Tests, supported with document analysis of relevant school forms, and interview with teachers as sources of data. Purposive sampling was employed considering only the big primary public schools, with fifteen grade three Mathematics Teachers (n = 15) and seven hundred forty-six grade three pupils (n = 746) as participants. Results revealed that the mathematics pupils when exposed to either English or Filipino language exhibited "good" performance on items in the remembering and understanding levels while "fair" performance was noted in items where applying skills were required. Whereas, pupils tend to perform better in

Mathematics when Filipino is the medium of teaching and learning. Results provided evidence that the pupils' first language positively affect their Mathematics achievement.

Culture and Cultural Competency in the Use of Mother-Tongue in Teaching

The Philippine culture must be given consideration in planning instruction. "The meaning of culture and cultural awareness must first be defined in order to understand the significance of cultural competency in occupational therapy education and practice" [14]

[15] added that pupils' performance and learning are improved and strengthened when Mother tongue is used as an instructional language in the class. [16] likewise stated that the teaching of Mathematics employing mother tongue has brought myriad benefits such as solving the restricted awareness of unfamiliar words in mathematics and getting the subject close to the learners. They subsequently mentioned that during the early stage of learning, children outside urban areas learn better using their local language. These concepts uphold that the result of the entry exam of the pupils is reliable and valid; likewise, it suggests that in the learning of pupils, mother tongue-based teaching is effective.

To further discuss, [17] argues that thinking that developing sound knowledge content can improve teaching practices is a major drawback. Teachers lose sight of their teaching strategies and believe that learners are having trouble because the material (what needs to be taught and delivered) is challenging or not of their interest, rather than understanding that the teaching approach (how to teach and deliver) should be more efficient and adapted to their requirements and needs in order to create interest and better learning outcomes. To reiterate, it is not only all about the teachers' preparedness of the content or what is to be delivered but it is more on how to deliver the content.

Significance of Teaching Mathematics using Mother Tongue

The study on the implementation of MTB instruction by the elementary school teachers provided some insights to school officials and serves as an information data on the level of effectiveness on the implementation of MTB and served also as the basis for the improvement on the implementation for teachers to attain their targeted content and instructional delivery. Data gathered on the implementation also served as inputs on the teachers' feedback in relation to their preparation and formulation of learners' home task, using learners' module and curriculum guides as references. In the addition, this study provided more knowledge to the teachers on the strengths and weaknesses of MTB instruction and gave the teachers' opportunity to impart greater knowledge to their students

on the correct usage of MTB instruction. Moreover, learners can acquire greater thinking skills and in depth knowledge in Mathematics. Through this present study, the pupils can be trained well especially in the field of Mathematics. And lastly, students and teachers shall be ultimately benefited because they easily learned the content through the use of MTB.

The Essence of Teaching Elementary Mathematics

The essence of mathematics teaching may be seen to lie in three domains according to Jaworski (1992):

- a. the management of learning (ML);
- b. sensitivity to students (SS); and
- c. mathematical challenge (MC).

Management of learning (ML) concerns the creation of a learning environment. It is important to look into the learning environment. Based on the researchers' interview to the Elementary teachers; these are their narratives:

"My students are comfortable when they are in a group. I have an idea that management is very important" (T5).

"As a teacher, I am concern about motivating my learners. This is the first activity that I usually give before discussing the lesson" (T10).

This implies that the role of the teacher in managing the learning scenario is important.

Sensitivity to students (SS) involves the developing both of a knowledge of students, their individual characteristics and needs, and of an approach to working with students, consistent with these needs. In the Philippines, learners are very sensitive in involving themselves in the different activities.

Mathematical challenge (MC) involves stimulating mathematical thought and enquiry, and motivating students to become engaged in mathematical thinking. The teachers may give extra challenging Mathematics activities in order for the students to be more productive. One of the teachers' narratives includes:

"I like to give challenging activities to my students" (T1).

"This is very important, giving activities that will stimulate the learners' mind is essential so that they can apply Math in real life" (T3)

This implies that the teachers have very importance role in the teaching learning process. The importance of professional development as a means of improving mathematics instruction like training teachers how to contextualized and teach mathematics using the mother

tongue is very important. “When teachers’ beliefs about the nature of learning and teaching mathematics shifted to be more reform-minded, their students demonstrated better problem solving abilities” (Franke & Kazemi, 2001) as cited in Linder (2011).

Methodology

This study employed mixed method of quantitative and qualitative design. There were 30 elementary public school teachers who participated in this study. They answered the survey questionnaires sent to them via google forms in their respective emails and messenger account.

The student score was categorized with the following interpretations: (40.00-31.19) above average; (31.20) average; and (31.19 and below) below average. The weighted mean was to assess level of preparation among teachers in the teaching of MTB instruction in Mathematics. A three point Likert scale was utilized to describe the level of preparation of the teachers in the implementation of Mother Tongue Instruction with the following interpretation 3- well prepared; 2- prepared; and 1- less prepared.

Data Analysis

T-test analysis was utilized to assess the mean difference between the entry and exit performance in Mathematics. The second test of hypothesis was the Pearson test analysis to assess between the learner’s performance and preparation of teachers in the teaching of MTB Mathematics. To treat the qualitative data of the study, a thematic analysis model was adopted. The verbatim

responses of the participants were analyzed on commonalities that will be identified. Then, themes were extracted.

The researchers also validated their answers through focus group discussion. The questionnaires utilized are researcher made which was subjected for content validity by Mathematics and Language experts. Informed consent was distributed to the teachers. This is purely academic and the results of this study will help the Department of Education in the use of Mother-Tongue in teaching Elementary Mathematics.

Ethical Considerations

The paper was sent to the Research Ethics Committee of the University for evaluation. Permissions from the respondents were sought before conducting the study in their respective schools. Informed consent are asked from the participants, indicating the study procedure, descriptions, compensation, risks and benefits, confidentiality, contact information, and their voluntary participation in the study. The names of the schools and teachers remain confidential, and the data obtained are kept private, including the recorded interview.

Results and Discussion

Based on the data gathered, tables are presented below.

Table 1
Preparation Level of the Teachers in Teaching Mother Tongue Based Mathematics in terms of content

Content	Category	Mean	Interpretation
The teacher ---			
1. The teacher is equipped with the teaching strategies, classroom activities and instructional materials in imparting the Most Essential Learning Competencies in Mathematics (MELC) using MTB.		2.49	Well Prepared
2. The teacher is able to prepare set of inquiries related to the upcoming lesson that would promote pupil engagement and enhance their MELC in Mathematics using MTB instruction.		2.52	Well Prepared
3. The teacher is able to select relevant and specific content of the lesson that will motivate the pupils to do practice solving in Mathematics using		2.55	Well Prepared

MTB.		
4. The teacher is able to prepare specific and organized lesson plan with MELC emphasis as his/her guide in a smooth facilitation of the lesson in Mathematics using MTB instruction.	2.52	Well Prepared
5. The teacher is updated and prepared with the changes or shifts in instructional practices in teaching MELC in Mathematics using MTB instruction.	2.49	Well Prepared
6. The teacher is prepared with the necessary knowledge and skills in teaching the MELC in Mathematics using MTB instruction.	2.52	Well Prepared
7. The teacher integrated current and relevant issues in teaching the MELC in Mathematics using MTB instruction.	2.52	Well Prepared
8. The teacher utilized current research in teaching the MELC in Mathematics using MTB instruction.	2.47	Well Prepared
Over-All Average Weighted Mean	2.52	Well Prepared

Legend:

- 2.34-3.00 - Well Prepared
- 1.67-2.33 - Prepared
- 1.00-1.67 - Less Prepared

It can be observed that all items in this aspect of teachers' preparedness are rated more than 2.34 and are verbally described as well-prepared. In fact, it got an overall weighted mean of 2.60. Item number 3 got the highest weighted mean of 2.55 which means that teacher-respondents are really well prepared in this aspect of content. Hence, they believed that they are really well-prepared in selecting relevant and specific content of the topics that will motivate the pupils to do problem solving in Mathematics using MTB. Item 8 though has 2.47 weighted mean yet it is still an overwhelmingly described as well-prepared. This item is believed to be the lowest since research is not that engaged or even exposed to the teachers that much.

Table 2

Preparation Level of the Teachers in Teaching Mother Tongue Based Mathematics in terms of instructional delivery

Category	Mean	Interpretation
Instructional Delivery		
The teacher ---		
1. The teacher is prepared and well-organized to use appropriate strategies in teaching Mathematics using MTB instruction.	2.61	Well Prepared
2. The teacher is confident and effective to communicate the Mother Tongue instruction and can generate pupils' enthusiasm in teaching Mathematics.	2.55	Well Prepared
3. The teacher demonstrated pedagogical approach in teaching Mathematics using MTB instruction.	2.67	Well Prepared
4. The teacher prepared a simplified and effective instructional material that can generate the students to make inquiries in Mathematics using MTB instruction.	2.58	Well Prepared
5. The teacher is prepared to impart the lesson in Mathematics effectively that can engage pupils and facilitated class discussion in Mathematics using MTB instruction.	2.58	Well Prepared
6. The teacher is equipped on effective and collaborative learning techniques in teaching Mathematics using MTB instruction.	2.61	Well Prepared
7. The teacher is prepared to use technology effectively to enhance pupils learning in teaching Mathematics using MTB instruction.	2.55	Well Prepared
8. The teacher is able to organized and systematize in the presentation of the lesson that help pupils to clearly understand the topic in Mathematics using MTB instruction.	2.64	Well Prepared
Over-All Average Weighted Mean	2.60	Well Prepared

Legend:

2.34-3.00	-	Well Prepared
1.67-2.33	-	Prepared
1.00-1.67	-	Less Prepared

In this aspect of teachers' preparedness in teaching of mathematics using the mother tongue-based instruction, it can be observed that all items were rated high. In fact, item 3 got a weighted of 2.67 as its highest while items 2 and 7 got the lowest yet a very satisfactory 2.55 weighted mean. In entirety, there was an overall average weighted mean of 2.56 which is much higher than the "content".

The data on the preparedness of the teachers in terms of the content imply that the teacher-respondents are very well-equipped with the necessary knowledge, instructional materials and organized lesson plans for the subject matter in hand and are very much prepared in imparting them to their pupils to promote effective and relevant teaching-learning process. This result is very much evident in the exit performance of the pupils where there was a significant increase or improvement on their scores. Teachers' preparedness has been seen effective in the performance of the pupils. [18] believed that if teachers are consistent in setting goals and checking for understanding of learning, they would become more effective in the classroom.

[19] emphasized that it is imperative for the teachers to be adequately prepared especially for the learners from kindergarten to the 8th grade since these stages of learning are considered critical for it is the formative years of the learners and are highly vulnerable, and teachers' role and preparation is critical. Monitoring the progress of effective education and learning of students depends on the accountability of the teacher's preparation.

Teachers' feedback in the implementation of Mother Tongue – Based Instruction in Mathematics

Based on the data gathered and their narrative during the focus group discussion, the following themes emerged:

Theme 1: Using MTB in the teaching of Mathematics facilitates pupils' understanding

The proponents on the inclusion of MTB instruction in primary education believed that pupils would understand better if lessons are discussed using Mother Tongue. One teacher said: *"My students are learning well with the use of MTB in some mathematical expressions (T1)"*.

Some of the surprising claims made by some of the respondents represent the minority of teachers who believe that using native language as a medium of instruction the quickest and easiest way to impart knowledge to students. Another respondent backed up the first respondent's claim, claiming that *"because Mother Tongue is used as a medium of instruction, students can easily learn and understand mathematical concepts (T4)"*.

When students know the language and can use psycholinguistic techniques, learning to read is most successful. This means that students can quickly read, comprehend, and answer questions in their mother tongue. There is still uncertain overall efficiency, however, affected by the students using a variety of incompetence of Mother Tongue teachers in the use of local language and inadequate curriculum and instructional materials.

Another teacher said: *"I like to teach Mathematics using our own dialect because most of my learners understand it well" (T14)*.

Thus, the perspective of these study participants subconsciously refers to the idea of Fishman (2010), who argued that their first language, their mother tongue, was the best way for students to learn.

Theme 2: Using contextualized MTB based enrichment activities in teaching Mathematics improved pupils' performance

Based on the interviews conducted among the grade three teachers in Mathematics, using contextualized based enrichment activities is of a great help to pupils in learning lessons and improved their performance.

The effects of MTB to the learners' performance in Mathematics, the results of Saint Louis University, Baguio City, Philippines' [20] indicated that the use of Mother Tongue in teaching multiple language environments influences the way students learn. According to one of the teachers *"contextualized teaching in Mathematics increases the performance of my students" (T6)*. A few of the teachers who responded stated that the students' mathematics performance has improved noticeably. This is clear throughout the post tasks and assessment.

In the Philippines, one of the improvements made by the K-12 program to the Basic Education Curriculum is the implementation of MTB-MLE at the primary level to help the "Every Child-A Reader-and-A Writer" objective. The above DepEd order specifies that the use of the same language spoken in early grades at home helps enhance the language and cognitive performance of the pupils. Local and international students have shown that early use of Mother

Tongue produces stronger and quicker learners within the classroom.

This implies that Mathematics teachers must be prepared to undergo extensive trainings and seminars on the aspects of vocabulary enrichment, writing a contextualized instructional materials and mother tongue proficiency.

THE EMERGENT MODEL: CONTEXTUALIZED AND INNOVATIVE MODEL (CI MODEL)

A. Model and Its Validation

A model illustrates sets of connections between factors that are believed to provide link and impact to a desired situation. With the given motion, the emergent model for this study is taken to present relationships between MTB implementation comprising of contextualization and innovation as factors that affect the acquisition of the Most Essential Learning Competencies (MELCs) of the students in Mathematics. Furthermore, the existing relationships were presented in the findings of the study as a validation for the emergent model. In the context of this study, the pertinent data were taken through administering the pre post-test of the pupils and survey questionnaires in determining the level of preparation of the teachers in teaching Mathematics using MTB instruction.

Upon conducting the survey, the entry and exit performance of the pupils and teachers level of preparation in teaching

Mathematics using MTB instruction was determined in the significant mean difference between the two.

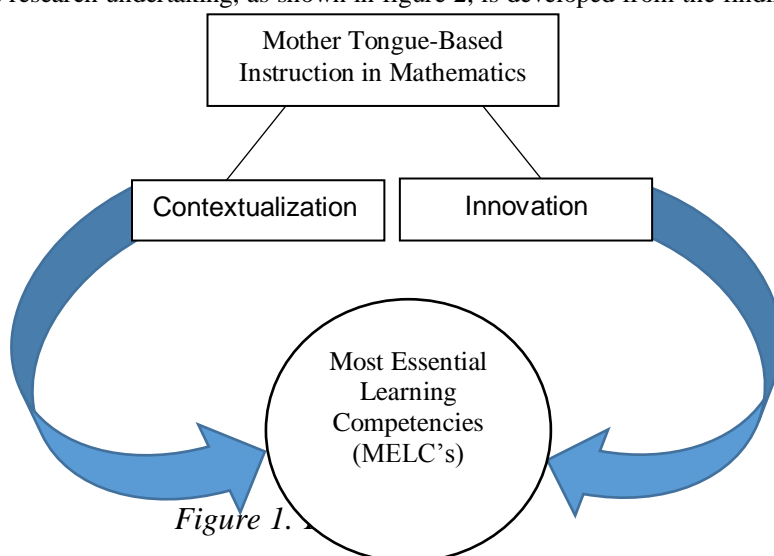
As an outcome, there existed a significant correlation between the entry and exit performance of the pupils in Mathematics which signifies the implementation of MTB using contextualized and innovative teaching strategies tend to correlate higher pupils' entry and exit performance. Second, the correlation between the pupils' entry and exit performance and teaching level preparation in terms of content is not significant while for the instructional delivery is significant.

This implies that no matter how intelligent the teacher is, if there's no enough preparation with his/her lesson, one can never expect a better pupils' performance. The teachers' preparedness in terms of delivery has a great impact on the performance of the pupils. Likewise, the delivery of instruction is vital and significant in the learning of the pupils since it is in the delivery that the use of mother tongue instruction is implemented and also it is where pupils understand more on the lessons prepared by the teachers.

B. Emergent Model Generated

THE CONTEXTUALIZATION AND INNOVATION MODEL

The model generated in this research undertaking, as shown in figure 2, is developed from the findings of the study that had been discussed and validated.



This model illustrates that in order to develop the Most Essential Learning Competencies of the grade three pupils in Mathematics, the Mathematics teachers.

This model illustrates that in order for the elementary learners to acquire the Most Essential Learning Competencies in Mathematics the teachers are expected to be provided with seminars and trainings in MTB to enhance their teaching competencies. The CI model assumes that MTB is a medium of instruction not a subject. Second the teachers are provided ample time to prepare and sufficient supply of instructional materials to be given to the learners. If these requisites are met, the CI model will serve as instructional tool in teaching-learning process.

In contextualized teaching the pupils engage in active learning while assisting them to make meaning of the information they are obtaining. Through contextualized teaching using MTB instruction, the pupils easily understand the lesson, as the lesson continues, the vocabulary terms are naturally improved and refined, inspiring students to actively engage in class discussions and enrichment events. Another strategy in teaching is the utilization of innovation. The use of innovative teaching for teachers allow them to discover and devise new methods and content to ensure that pupils always get the best learning experiences especially attaining the targeted basic skills in Mathematics. Without these two core strategies in teaching,

Acknowledgement

The authors would like to thank the Department of Education teachers in Cebu Province Division for the participation of this study and also to the Graduate Studies faculty of the College of Teacher Education, Cebu Normal University, Philippines for evaluating this academic paper.

References

- [1] O'Brien, B., Yussof, N. T., Vijayakumar, P., Mohamed, M. B. H., & Leong, X. E. R. (2020). Exploring characteristics of quality in language teaching & learning: The Mother Tongue Adapted Coding Scheme (MACS). *Early Childhood Research Quarterly*, 53, 586-600. <https://doi.org/10.1016/j.ecresq.2020.07.003>
- [2] Vrooman, M. (2000) The Linguistic Interdependence Hypothesis and the language development of Yucatec Maya -Spanish bilingual children.
- [3] Baker, C. (2001) Foundations of Bilingual Education and Bilingualism. Third Edition. Bilingual Education and Bilingualism 27.
- [4] Cummins, J. (1986). Empowering minority students: A framework for intervention. Harvard Educational Review Department of Education. (2009). Order No. 74. Institutionalization of the Mother Tongue-based Multilingual Education as a Fundamental Educational Policy and Program in the Department. July 14, 2009. Manila, Philippines.
- [5] Reynolds, A. R., and Walberg, H. J. (1992). A process model of mathematics achievement and attitude. *Journal of Research in Mathematics*, 23, 306- 328.
- [6] Walberg, H. J., Fraser, B. J., and Welch, W. W. (1986). A test of a model of educational productivity among senior high school students. *Journal of Educational Research*, 79, 133-139.
- [7] Meşe, E. & Sevilen, Ç. (2021). Factors influencing EFL students' motivation in online learning: A qualitative case study. *Journal of Educational Technology & Online Learning*, 4(1), 11-22.

- [8] Ricablanca, J. (2014) Effectiveness of Mother Based-Instruction on Pupils' Achievement in Mathematics. Master's Thesis. Central Mindanao University. Maramag, Bukidnon, Philippines.
- [9] Benson, C. (2005). Girls, educational equity and mother tongue-based teaching. [S.l.]: UNESCO.
- [10] Duguang, N., and Dekker, D. (2010). Mother tongue-based multilingual education: The Lubuagan experience. A collaborative effort between DepEd Kalinga and SIL International Philippines. Manila: SIL International Philippines. Retrieved from mlephil.files.wordpress.com/2010/03/mtbmle-lubuagan-experience.doc
- [11] Burton, L.A. (2013). Mother Tongue-Based Multilingual Education in the Philippines: Studying Top-Down Policy Implementation from the Bottom Up. A Dissertation. University of Minnesota.
- [12] Sumbalan, E., Caterial M., Jimeno, R., and Balane C. (2017). The Utilization of Mother Tongue in Teaching Young Learners: Its Implications to Pre-Service Teachers. *Journal of Educational and Human Resource Development* 5:15-22.
- [13] Aliñab, J., Aguja, S., Prudente, M. (2018). Improving Pupils' Mathematics Achievement Through Mother Tongue Based-Multilingual Education. *American Scientific Publishers*. 24(7).
- [14] Grady, S., Brungardt, K., & Doll, J. (2018). The impact of classroom instruction on cultural awareness and sensitivity in occupational therapy students. *Journal of Occupational Therapy Education*, 2(2), 1-13.
- [15] Gorio, D., Galino, A., Morales, J., & Palileng, J. (2014). Factors affecting the implementation of the mother-tongue based multilingual education as perceived by teachers in Baguio and Benguet. *Unpublished doctoral thesis*, Benguet State University, Philippines. Retrieved from <https://sites.google.com/site/languageandmothertongue/home/research-on-mt-mle-implementation>.
- [16] Omoniyi, M. B. I. (2013). The role of education in poverty alleviation and economic development: A theoretical perspective and counselling implications. *British Journal of Arts and Social Sciences*, 15(2), 176-185.
- [17] Jalbani, L. N. (2014). The impact of effective teaching strategies on the students' academic performance and learning outcome. *Munich: GRIN Verlag*. Accessed November, 23, 2018.
- [18] Marzano, R. J., Carbaugh, B., Rutherford, A., & Toth, M. D. (2013). Marzano center teacher observation protocol for the 2014 Marzano teacher evaluation model. *Palm Beach Gardens, Florida: Marzano Center/Learning Sciences International*.
- [19] Schleicher, A. (2012). *Preparing teachers and developing school leaders for the 21st century: Lessons from around the world*. OECD Publishing. 2, rue Andre Pascal, F-75775 Paris Cedex 16, France.
- [20] Becker, J.M. (2013). Attitudes towards Mother Tongue Education in Uganda: You Try to Make Sure that Our Children Remain Backward. Africa: Centro de Estudos Internacionais do Instituto Universitario De Lisboa.