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Effectiveness of The Contextualized Self-Learning Modules Using Mother Tongue-Based Multilingual Education to The Performance of Multi-Grade Pupils in Mathematics

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Abstract — This study evaluated the effectiveness of the contextualized self-learning modules using mother tongue-based multi-lingual education to the performance of the Multi-grade pupils in Mathematics. The findings of the study were the bases for a Proposed Improvement Plan. The study utilized the Quasi Experimental type of research Design to validate the effectiveness of the intervention. The researcher utilized Universal Sampling in identifying the respondents of the study. The test of difference between the test scores in the pretest and posttest in Mathematics of Multi-grade learners Before and After integration of the different topics using Contextualized Self-Learning Modules using the MTB-MLE. it can be gleaned that in the pretest performance of the Multi-grade learners is lower than the posttest performance So, the verdict for the null hypothesis which states that there is no significant difference between the pretest and posttest performance of the Multi-grade learners in Mathematics before and after the integration of Contextualized Self-Learning Modules using Mother tongue multi lingual education is rejected.

The result of this study which focuses on the significant difference in the pretest and posttest scores of Multi-grade learners before and after the utilization of the contextualized self-learning modules using MTB-MLE in Mathematics implies that the new intervention is significantly effective in improving the performance of the multi-grade learners considering that the pretest scores is lower than the posttest scores which means that utilizing the said intervention in the delivery of the most essential learning competencies in mathematics subject for the first grading period is significantly effective and help the learners in improving their performances. Other reasons also why learners have significantly improving their performances its because they are really eager to learn using the face to face technique which somehow they can easily ask for any help if ever they will find any difficulties in learning the topics.

Keywords — Effectiveness Contextualized Self-learning Modules Multigrade Mathematics

I. Introduction

Mathematical methods pervade literally every field of human endeavor and play a fundamental role in economic development of a country. Among all approaches aimed at reducing poor Mathematics achievement, adaption of appropriate methods of teaching appears to be more rewarding. The Department of Education had employed a solution for the deteriorating academic performance of pupils. As stipulated in the DepEd Order No. 39, s. 2012, interventions have to be made in order to address learning gaps.

In the world of Adler, Mathematics is the handmaiden of science, is also the art which expresses beauty through a system of definitions, axioms and theorems. It is one of the most important tools man has forged in his quest to understand control his environment. Since Mathematics is an indispensable tool for technology age, it is the role of mathematics teachers to provide opportunities to pupils to learn materials which may be considered new or modern.

The best approach for teaching Mathematics is the Discovery Approach. In this new normal scenario of teaching-learning, these SLMs will be utilized on the context as learning materials in Geography, Cultural Diversity, and Individuality that will help teachers and learners comprehend concepts by relating and presenting lesson on the context of prevailing local environment. This will provide opportunities of organizing awareness and sequences of experiences to reflect special interest to learners; thus allowing teachers to focus on learner's deficiencies on the subject matter.

Using contextualized SLMs has been implemented by DepEd for an effective delivery of lesson. As a teacher, myself, I can never dispute the advantages and benefits of having a contextualized SLM. It is essentially creating a narrower void between the learner the lesson, hence, contextualization. Having this type of material helps to minimize the gap between the learner and lesson. Moreover, it brings the learner to relevant and perceivable lesson experience. In the case of multilingual approach, it is nonetheless a good and essential factor since it can help the learner to get acquainted with a wide variety of learning mediums thus, widening the learner's opportunity to take advantage of more learning materials. Having a multilingual contextualized SLM removes the limiting factor a monolingual one can give. The benefits of having such material can only be realized and or achieved if a teacher is well equipped in its implementation, of course.

Learning Mathematics is very important to the students. It is important in a sense that this will help in their day-to-day living. Since the start of the pandemic, the modular distance learning was introduced in lieu of the face-to-face learning. Giving of self-learning modules and activity sheets to the pupils was made and their parents or guardian serve as their teacher or facilitator. The medium of instruction used in the Self-Learning Module for Kindergarten to Grade 3 is the Mother

Tongue. Using mother tongue as medium of instruction helps the parents to understand and easily comprehend the topic or discussion which is very beneficial when they will facilitate their children.

The problem encountered in using Mother Tongue as medium of instruction in the Self-Learning Module in the performance of the Multigrade pupils in Mathematics is that the pupils will find it hard to understand when shifting words from Mother Tongue to English. Specifically in teaching numbers, more pupils opt to memorize the numbers in English than numbers in Mother Tongue. Mother Tongue Based Multilingual Education only focused from kindergarten to grade 3 pupils. So, by the time that they will be promoted to grade 4, a new medium of instruction will be used which is the English. Teaching a lesson to the children using the first language is good but we need to know that children are already exposed to other language which is English.

With the aforementioned details, the researcher as Elementary School Teacher wanted to know whether the contextualized self-learning materials with the use of mother tongue based multi-lingual education is really effective in improving the performance of the multi-grade pupils in Mathematics and at the same time will help the learners help them improve their understanding on the different competencies in the Mathematics subject. This is the premise why the researcher is motivated to focus on her study based on the two (2) variables stated.

This study aimed to determine the Effectiveness of Contextualized Self-Learning Modules using Mother Tongue Based Multilingual education to the performance of the Multi-grade pupils in Mathematics. The findings of the study were the basis for a proposed Improvement plan.

Specifically, this study sought to answer the following questions.

1. What is the pretest performance of the multi-grade pupils in Mathematics before the integration of the Contextualized Self-Learning Modules using Mother Tongue Based Multilingual education to the performance of the Multi-grade pupils in Mathematics?
2. What is the posttest performance of the Contextualized Self-Learning Modules using Mother Tongue Based Multilingual education to the performance of the Multi-grade pupils in Mathematics?
3. Is there any significant difference on the pretest and posttest performance of the multi-grade pupils before and after the integration of the Contextualized Self-Learning Materials using Mother Tongue Based Multilingual education?
4. What improvement plan can be proposed based on the findings of the study?

Statement of Null Hypotheses

Ho.: There is no significant difference on the pretest and posttest performance of the multigrade pupils in Mathematics before and after the integration of the Contextualized Self-Learning Materials using Mother Tongue Based Multilingual education.

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II. Methodology

Design. This study used the quasi-experimental method of research to determine the Effectiveness of Contextualized Self-Learning Materials using Mother Tongue Based Multilingual education to the performance of the Multi-grade pupils in Mathematics. The results were the basis for an improvement Plan. The researcher utilized universal Sampling in selecting the respondents of the study. This determine how effective is the Contextualized Self-Learning Modules using Mother Tongue Based Multi-lingual Education based on the Self-Learning Modules coming from the Central Office that was crafted and validated by the different level of expert personnel from the school, district and to the Schools Division Office particularly to the Learning Resource section which was validated by gathering Performance of the Multi-grade pupils in Mathematics.. In the Quasi- experimental research design, the researcher prepared different validated Contextualized Self-learning Materials that were utilized in the implementation of the intervention was prepared by the researcher and were subjected whether the intervention is significant in the study. . In the Quasi- experimental research design, the researcher prepared the different contextualized self-learning materials using Mother Tongue Based Multilingual education of the Multi-grade pupils for them to read that focuses on the reading materials to validate their performance or skills. Some of the skills focus in this study are the least learned learning competencies as well as facilitating in the giving of pretest and posttest to the identified respondents in order to gather necessary data that will be significant in the study. This is to determine how effective is the Contextualized Self-Learning Materials Mother Tongue Based Multilingual education materials that were crafted and validated by the different level of expert personnel from the school, district and to the Schools Division Office particularly to the Learning Resource section which was validated by gathering Performance of the multi-grade pupils in the delivery of the most essential learning competencies in 1st grading period. In the Quasi- experimental research design, the researcher prepared different validated different Contextualized Self-Learning Materials Mother Tongue Based Multilingual education to augment in the delivery of the identified reading intervention. The aforementioned materials must still be based on the different most essential learning competencies Which could be based Learners Activity sheets, teacher-made learning materials based on the self-learning modules that were utilized in the implementation of the Contextualized Self-Learning Materials Mother Tongue Based Multilingual education based on the prepared activity matrix prepared by the teacher and later those results were subjected whether the intervention is significant in the study. The main local of the study is in Can-andan elementary school in the Division of Leyte in the Isabel District. The main respondents that was chosen by the teacher-researcher was the multi-grade learners which are composed of 20 total number of respondents which were underwent series of evaluation prior to the implementation of the different Teacher-made Activities in teaching Phonics on the subject of the kindergarten that was based on the approved activity matrix. This study is mainly focus on the results of the different tests to be given to the multi-grade learners to gather data: The pretest performance of the multi-grade learners before the giving of the different validated reading materials based on the Contextualized Self-Learning Materials Mother Tongue Based Multilingual education which most probably crafted based on the different

needs of the multi-grade learners. The Posttest performance of the multigrade learners after the implementation of Contextualized Self-Learning Materials Mother Tongue Based Multilingual education in teaching Mathematics, as well as the significant difference of the pretest and posttest before and after the implementation of the Contextualized Self-Learning Materials Mother Tongue Based Multilingual education in teaching Mathematics as Learning Approach in the delivery of the most essential learning competencies in teaching the subject for the First Grading Period. The researcher prepared different validated Contextualized Self-Learning Materials Mother Tongue Based Multilingual education that were validated by the different experts from the school such as but not limited to the Mater Teacher, Department Head or the School head, then the crafted reading materials were forwarded to the office of the Schools District Supervisor for possible refinement of the materials and if the materials followed the norms or standard in crafting reading materials based on Teacher-made Activities in teaching Phonics those were forwarded to the School Division office for possible approval from the Learning Resource management Team and those materials being approved were utilized in the implementation of the intervention based on the prepared activity matrix prepared by the teacher as well as facilitating in the giving of pretest and posttest to the identified respondents in order to gather necessary data that were subjected for decision making whether the results are significant in the study. The proposed Improvement was taken based on the findings of the study.

Sampling. There are 20 total number of respondents who were chosen using universal sampling technique. In Grade 3, there were 8 female respondents of the study while the males are composed of 8 also. In the Grade 4 level, there were 2 females and 2 males with the total of 4 respondents and the primary means of reach is through Facebook account of their parents if there are times that during the gathering of data, they are in their respective homes. Another way of contacting them are through cell phones of their respective parents as well as during limited face to face.

Research Procedure. The researcher prepared the research design and tools to be utilized in the study. The different tools prepared by the researcher were the ff: validated Summative Test Questionnaire in the subject of the multi-grade learners from the Self Learning Modules that were focused on the different competencies in the 1st grading period based on the approved activity matrix that covers 4 weeks or 1 month which is usually composed of 20 items. The test questions that were approved by the Learning resource experts such as the school head and the school Principal or Administrator were being used before the utilization of the Contextualized Self-Learning Materials Mother Tongue Based Multilingual education and other reading materials that could augment in the delivery of the identified intervention as the chosen Intervention to be given to the multi-grade learners in the delivery of the most essential learning competencies. The 40 test item test questionnaires was prepared to validate the performance level of the multi-grade respondents. After one month in the implementation of the Contextualized Self-Learning Materials Mother Tongue Based Multilingual education in the delivery of the most essential learning competencies in Mathematics; posttest was given to the Multi-grade learners with the same test

questionnaire including the Table of Specification that follows the norms or standard in crafting the learning assessment. Prior to the preparation of all validation tools which were used by the teacher-researcher in determining their performances before and after the integration of the Contextualized Self-Learning Materials Mother Tongue Based Multilingual education in teaching Mathematics which were utilized for the identified approach in teaching, The Approval and recommendation from the Office of the Schools Division Superintendent, as well as to the Assistant Schools Division Superintendent being the Chairman of the Schools Division Research Committee through the Senior Education Program Specialist in Planning and Research. After the Approval of the Schools Division Research Committee, the Approved or endorsement letter from the body together with the approved letter of intent were forwarded to the Office of the Public School District Supervisor as well as to the office of the School principal in order to get full support on the conduct of the study as well as to get also approval from their end. The proposed title and design was submitted to the School Division Office for approval. Upon approval, the Division released endorsement to the District Office. When the research was approved by the Schools Division Office and District Office, the researcher began the process of data gathering. Validation of the instruments through Experts such as the Master Teacher and or School Heads and in coordination with the Learning Area coordinator was sought. Orientation of the participants was done. Answering and retrieval of the research tool followed. Tallying of results and treatment of data. Analysis and Interpretation of Data. Making of Proposed Improvement Plan.

Ethical Issues. The right to conduct the study was strictly adhered through the approval of the Schools Division Superintendent, Public School District Supervisor as well as the approval of the School Principal where the study was conducted. Orientation of the respondents both the learners and the teachers including the School Principal were done. . In the orientation, specially to the parents and or guardian, the process of the study were being discuss in order for them to know how and why the study will be done and to reiterate that this study is purely focus on the improvement of the performance of the kindergarten learners. The need for other data that were needed in the study such as the performance of the school in general based on the different performance indicators, a written permission was sought to the principal confidentiality and anonymity was discussed requiring them not to write names on the tools and will have to writer pseudonym instead.

Treatment of Data. The Effectiveness of Contextualized Self-Learning Materials using Mother Tongue Based Multilingual education to the performance of the Multi-grade pupils in Mathematics which focuses on the pretest and posttest performances gained by the multi-grade pupils were treated through a Simple percentage, weighted mean and T-Test of Mean Difference respectively.

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III. Results and Discussion

Table 1
PRE-TEST PERFORMANCE OF MULTIGRADE PUPILS IN MATH

Score Range	Description	PRETEST	
		Frequency	%
33-4O	Excellent	0	0
26-32	Very Good	0	0
17-24	Good	6	33
9-16	Fair	5	28
1-8	Poor	7	39
Total		18	100
Weighted Mean		**12.0**	**Fair**

Table 1 shows the Pretest Performances of the Multi-grade learners to one of the major subjects to be taken by the learners which is Mathematics utilizing the contextualized Self-Learning Modules based on the most essential learning competencies for the first grading period. The results of the performance above is based on the stock knowledge of the learners before they are not yet exposed to the strategies or interventions given to them or maybe they experience another intervention which is very different to the official intervention given by the researcher in learning the different learning competencies in Mathematics.

Based from the results shows in table 1 on the pretest performance of the Multigrade learners in Mathematics subject, from the Excellent level and very good level of performance which have scores ranging from 33-40 and 26-32 respectively, it was found out that there are none of the students belong to the 2 highest class internals having highest pick in terms of performance of the learners. In the good level of performance which the score ranging from 17-24, there were 6 total number of respondents who took the pretest examination or 33 percent from the 18 total number of respondents or 100 percent overall percentage of respondents. Furthermore on the fair level of performance which has 9- 16, there were 5 total number of respondents or 28 percent out of the 100 overall total number of respondents who took the pretest examination and lastly, on the poor level of performance having a score ranging from 1-8, it shows that there are still learners who are belong to this bottom level of performance which has an equivalent percentage of 39 percent or 7 out of 18 total number of respondents.

The results in table 1 on the pretest performance of the multi-grade learners in Mathematics before the integration of contextualized Self-Learning Modules using the mother tongue multi-lingual education from the different learning competencies in the first grading period based from the timelines set by the researcher for the purpose of conducting this study. The multi-

grade learners have gained little knowledge regarding the different topics presented by the teachers as if the learners have already prior knowledge from the subject. In other words, they already learn the topics presented maybe because some of them if not all, are already expose to the gadgets which could help them search the topics specially those topics which are enticing them to learn and it has great manifestation that learners really embracing the new different types of techniques pertaining to learning giving the results that the weighted mean is fair. The result could further explain that though the students are gaining good level of performance, let us also consider those multi-grade learners who are belong to general weighted mean of fair level of performance in which they really need favorable attention and help them improve their performances. Those students who ate belong in the fair level of performances have the chance to improve their ratings when someone could lean their helping hand and fell their needs particularly in learning the subject, thus the researcher is very confident that through the contextualized learning modules to be given to the learners, it could give them the assurance that it can help them improve their performances.

Table 2
POST-TEST PERFORMANCE OF MULTIGRADE PUPILS IN MATH

Score Range	Description	POST-TEST	
		Frequency	**%**
33-4O	Excellent	11	61
26-32	Very Good	6	33
17-24	Good	1	6
9-16	Fair	0	0
1-8	Poor	0	0
Total		18	100
Weighted Mean		**33.89**	**Excellent**

Table 2 shows the Posttest Performances of the Multi-grade learners to one of the major subjects to be taken by the learners which is Mathematics utilizing the contextualized Self-Learning Modules based on the most essential learning competencies for the first grading period. The results of the performance above is based on the learners learning performances after they already exposed and learned the strategy or intervention given to them in learning the different topics in Mathematics based on the timeline set by the researcher.

Based from the results shows in table 2 on the posttest performance of the Multigrade learners in Mathematics subject, from the Excellent level and very good level of performance which have scores ranging from 33-40 and 26-32 respectively, it was found out that majority of the learners are belong to the 2 highest class internals. In the excellent level of performance, there were 11 total number of respondents which is dominant in terms of number compared to other level of performance which has an equivalent of 61 percent while in the very good level of

performance has a 6 total number of respondents out of the 18 total number of respondents tested or 33 percent. In the good level of performance which the score ranging from 17-24, there was only 1 total number of respondent who took the posttest examination or 6 percent from the 18 total number of respondents or 100 percent overall percentage of respondents. Furthermore there were none of the respondents belong to the fair level of performance as well as in the poor level of performance.

The results in table 2 on the posttest performance of the multi-grade learners in Mathematics after the integration of contextualized Self-Learning Modules using the mother tongue multi-lingual education from the different learning competencies in the first grading period based from the timelines set by the researcher for the purpose of conducting this study implies that they gained more knowledge or increased their skills regarding the different topics presented by the teachers which means that they really love the new interventions introduced by the teacher. In other words, they can easily learn the topics presented because majority of them can easily understood the topics using their own dialect or version of learning mathematics which could help them embrace the new different topics which resulted to the weighted mean of 33.89 which is belong to the excellent level of performance. The result could further explain that the students improve their performances because aside from they can use their dialect during discussion, they can also asked directly to the teacher in tier own version of asking questions just for the sake of learning the subject specially those topics which are difficult to understand.

Table 3
Test of Difference Between the Scores in the Pre-test and Post-test of
Multigrade Pupils in Math

Aspects	Test Scores		Computed T	Critical T	Decision	Interpretation
Multigrade Pupils in Math	Pre	12.00	4.224	0.673	Reject H_o	Significant
	Post	33.89				

Table 3 presents the test of difference between the test scores in the pretest and posttest in Mathematics of Multi-grade learners Before and After integration of the different topics using Contextualized Self-Learning Modules using the MTB-MLE. In this table, it can be gleaned that in the pretest performance of the Multi-grade learners is lower than the posttest performance which is equal to 12.00 and 33.89respectively which resulted to the results in the computed t value of 4.224 and critical t value of 0.673. So, the verdict for the null hypothesis which states that there is no significant difference between the pretest and posttest performance of the Multi-grade learners in Mathematics before and after the integration of Contextualized Self-Learning Modules using Mother tongue multi lingual education is rejected.

The result of this study which focuses on the significant difference in the pretest and posttest scores of Multi-grade learners before and after the utilization of the contextualized self-learning modules using MTB-MLE in Mathematics implies that the new intervention is significantly effective in improving the performance of the multi-grade learners considering that the pretest scores is lower than the posttest scores which means that utilizing the said intervention in the delivery of the most essential learning competencies in mathematics subject for the first grading period is significantly effective and help the learners in improving their performances. Other reasons also why learners have significantly improving their performances its because they are really eager to learn using the face to face technique which somehow they can easily ask for any help if ever they will find any difficulties in learning the topics.

IV. Conclusion

Based on the findings of the study, it showed that the Contextualized Self-Learning Modules using the Mother Tongue Based Multi-lingual education is significantly effective in improving the performance of the Multi-grade learners in the different learning competencies of the Mathematics subject. Moreover utilizing or integrating the intervention in the delivery of the most essential learning competencies in teaching the topics in Mathematics is highly suggested.

V. Recommendations

1. That contextualized Self-Learning Modules through the use of mother tongue based multi-lingual education should be utilized by the teachers handling Multi-grade learners in order for them to be more motivated in learning the subject and not afraid of the different topics to be delivered by the teacher.

2. The CID personnel should monitor the teachers regarding their different learning activities given to the learners specially the mathematics subject in order to properly giving of Technical assistance to those teachers who are struggling in the delivery of the most essential learning competencies specially those newly hired teachers and not major in mathematics.

3. Lr personnel should religiously evaluate Contextualized Self-Learning Modules basing the Most Essential Leaning Competencies if the teachers really following the standards set by the BLR.

4. The School Principal should check the activities during LAC Sessions and focus their activities on the improvement in crafting contextualized SLMs based on the needs of the learners specially those learners specially the multi-grade pupils.

5. Furthermore, the researcher allows future researchers to conduct the same study to validate the results of the study whether the contextualized self-learning modules using mtb-mle really effective in increasing the skills or performance of the multi0grade learners in mathematics.

ACKNOWLEDGMENT

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