

Performance of the Grade IV Pupils in Science Tests Using English Language and Mother-Tongue

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Abstract— The transitions from utilizing the mother tongue for science instruction in Grade 3 to using English as the primary language for science in Grade 4 elicited varied reactions among people in the Philippines. Some appreciate the emphasis on English proficiency while others are concerns in the potential challenges for young learners accustomed to learning in their native language. This study, therefore, determined the performance of the grade 4 pupils in science tests using English language and mother-tongue. Quantitative and qualitative research design was employed in the collection of data from 24 grade 4 pupils. Two open-ended tests (one for English and one for Bicol dialect) was administered to describe its contributions in academic performance of the pupils in science. Interview guide was also utilized for qualitative data to support the results of the tests. The study revealed that there is no significant difference between the academic performance of the pupils in science when taught in English and in Mother-tongue. This implies that the use of two media of instruction in teaching science did not affect the academic performance of the pupils in science. In the open-ended test, pupils obtained a mean performance of 11 with an equivalent description of average using English, while in using mother-tongue, pupils obtained mean performance of 14 with a descriptive level of good. The result signifies that pupils tend to gain more understanding of science concepts, and more confident in processing and writing their ideas in answering science questions using mother tongue.

Keywords— Academic Performance, Localized Instructional Material, Medium of Instruction, Mother-tongue

INTRODUCTION

The elementary education establishes the foundation from where educational learning, growth and development of the individuals takes place (Kapur, 2021). It is recognized as the period of free and compulsory schooling. It is the first core foundation in which learners are introduced in basic reading and arithmetic to develop fundamental skills in preparation to higher levels of education. One of the essential subject areas in elementary education is science, and learning it is important particularly for school-age learners (Das, Amrita, & Singh, 2014). Science allows students to discover new things and explore their world. The methodologies and concepts of science are of great importance to individual's personal lives, civic lives and economic lives.

One of the factors affecting the teaching strategies and learning style of the students in learning science is the language used as medium of instruction in the delivery of content. Kadlong (2017) stated that language is one of the most important variables affecting education. An effective and clear medium of instructions enhance students' engagement and comprehension, communication, and understanding various concepts, and influences the students to have a positive connection

with scientific ideas, ensuring a meaningful learning experiences. However, Ojoo and Moyi (2022) noted that the choice of medium of instruction has remained a bone of contention in many countries of the world throughout history.

Under the DepEd Order No. 43 s. 2013 or the Implementing Rules and Regulations (IRR) of Republic Act No. 10533 otherwise known as the Enhanced Basic Education Act of 2013, stated from Rule II Curriculum, Section 10.2 Standards and Principles, letter F, that curriculum shall adhere to the principles and framework of Mother Tongue Based- Multilingual Education (MTB-MLE) which starts from where the learners are and from what they already know proceeding from the known to the unknown; instructional materials and capable teachers to implement the MTB-MLE curriculum shall be available. And under Section 10.4 Medium of Teaching and Learning of the same act, basic education shall be delivered in languages understood by the learners as language plays a strategic role in shaping the formative years of learners. And stated for kindergarten and the first three years of elementary education, instruction, teaching materials, and assessment shall be in the regional or native language of the learners.

In the Philippine education system, science as one of the major subjects is introduced as a separate learning area in Grade 3 and to be taught through MTB-MLE instruction as stated under DepEd Order No. 21 s. 2019 or the Policy Guidelines on the K to 12 Basic Education Program. It includes that though Science is not taught as a separate area in Grades 1 and 2, Science concepts are integrated in other learning areas. And from the same memorandum, Science in Grade 4 should have English as the medium of teaching and learning.

The use of MTB-MLE has carved niche as an effective approach and very practical in the educational landscape (Cabansag, 2016). Khushnuma, Choudhary and Durrani (2020) note that communication mode can hinder student's learning when they are not habitual with the instructional language of the school and affects negatively on their development. The mother tongue is a link language to assists the abilities of learning. MTB-MLE allows the students to express better ideas, better retention, building self-confidence, and promoting friendly environment. Meanwhile, there are also challenges that hinder the implementation of the MTB-MLE such as the multilingual environment, inadequacy of instructional materials, difficulty in translation, and mandatory compliance to the Department of Education order. On the other hand, the use of English language is extremely important in learning science concepts (Alisha, 2021). English is a global language, and the world's second-largest native language. It can help the people in knowing and understanding issues that happening in the world particularly the scientific trends or relevant concepts. However, grade 4 students also experienced challenges in science classroom towards the use of English language as medium of instruction in the delivery of content. The use of two local languages, Filipino and Bicol, in primary science could have potential benefits for students especially in the provinces of the Bicol region (Vela, 2015).

This study therefore determined the performance of Grade 4 pupils in science tests using English language and Mother Tongue, how pupils deal with these two media of languages and how learners' performance engaged to learning progress in science.

METHODOLOGY

This study employed the quantitative and qualitative research design in the collection of data from the population. This study assessed the performance in science test using english language and mother tongue of grade 4 pupils for academic year 2022-2023. It also determined the difference between the performance of the pupils in Science based on the MTB and English test Furthermore, this study also determined the academic performance of Grade 4 pupils in Science in their Grade 3 mother tongue instruction and Grade 4 English language. Total enumeration was used in selecting the participants of the study. The participants are 24 grade 4 pupils from Jagusara Elementary School of Juban I District, Sorsogon.

Two open-ended tests were administered considering same competencies in mother tongue and english instruction accompanied with rubrics in giving points. After the test an interview was conducted for qualitative data. The results were analyzed and interpreted with the use of appropriate statistical tools such as mean and paired t-test.

RESULTS AND DISCUSSIONS

Academic Performance Of The Pupils In The First Quarter Of The School Year 2021-2022 And The School Year 2022-2023

Twenty-four (24) learners during their Grade 3 level as a class in the school year 2021-2022 has a mean performance of 83.13 which is describe as satisfactory.

Table 1

Academic Performance of the Pupils

Criteria	n=24 Grade 3 (S.Y. 2021-2022)		n=24 Grade 4 (S.Y. 2022-2023)	
	f	%	f	%
Outstanding (90-100)	0	0	2	8
Very Satisfactory (85-89)	13	54	8	33
Satisfactory (80-84)	9	38	5	21
Fairly Satisfactory (75-79)	2	8	9	38
Mean Performance	83.13		82.29	
Description	Satisfactory		Satisfactory	

Table 1 shows a good indication of their performance in science amidst the crisis during pandemic wherein Jagusara Elementary School adopted modular distance learning modality in which learning activity sheets (LAS) were crafted in mother-tongue based instruction. The pupils now in the current school year 2022-2023 in Grade 4 level has a mean performance of 82.29 which is also satisfactory.

The instructions from mother tongue to English, considering learning activity sheets were crafted in English instruction, is an accepted challenge by the learners as required by the curriculum.

The first quarter of the school year 2022-2023 was under the mandate of DepEd Order No. 34 s. 2022 also known as School Calendar and Activities for the School Year 2022-2023 that stated no inspection, tools, or any additional requirements to re-open school and to implement 5 days in-person classes shall be required. The transition from distance learning modality to 5 days in-

person class took effect last November 2, 2022, after the first quarter examination.

Though both first quarters showed academic performances in science satisfactorily, with interconnected learning competencies as presented in the K-12 Curriculum Guide and were in distance learning modality, the mean of 82.29 to the academic performance under English language is slightly lower from the academic performance of 83.13 under mother tongue instruction which explains of higher academic performance using the mother tongue.

Difference Between The Academic Performance Of The Pupils During The First Quarter Of The Previous And Current School Year

This section compared the academic performance of the pupils in Science in their Grade 3 (SY 2021-2022) and Grade 4 (SY 2022-2023), both taken from their grades in science during the 1st grading period. The difference was determined using a two-tailed paired t-test shown in Table 2.

Table 2

Difference between the academic performance of the pupils

Statistical Bases	Results
Level of significance	0.05
Degree of freedom	23
t critical-value	2.069
t computed value	1.00
Decision on null	Do not reject
Conclusion	Not significant

The results indicate that the t computed value of 1.00 lies within the t critical value of 2.069 at 0.05 level of significance and 23 degrees of freedom.

With these, the null hypothesis cannot be rejected. Hence, there is no significant difference between the academic performance of the pupils in science when taught in English and in MTB.

Further, the Cohen's d effect size of 0.2 indicates that the magnitude of the difference between the average of the differences and the expected average of the differences is small.

In De Guzman's and De Vera's study on English Language Performance and Difficulties of Pupils in Mother Tongue-based (MTB) Medium of Instruction (2018) findings revealed that the academic performance level of pupils in mother tongue appears to have exactly the same pattern as to the characteristics of their academic performance in English. In general, the pupils can understand, analyze, and comprehend the competencies in each lesson using both mother tongue and English language.

They can perform tasks and activities in which directions are in the form of either of two mentioned instructions in learning science.

The Performance Of The Pupils In Science Based On Their MTB And English Test

Table 3
Performance of the Pupils in Science Test using Mother Tongue and English Language

Competencies	Mother Tongue						English					
	CU		PU		NU		CU		PU		NU	
	f	%	f	%	f	%	f	%	f	%	f	%
1. Classify objects as solid based on some observable characteristics	20	83	2	8	2	8	13	54	3	13	8	33
2. Classify objects as liquid based on some observable characteristics	7	29	15	63	2	8	12	50	1	4	11	46
3. Classify objects as gas based on some observable characteristics	6	25	16	67	2	8	9	38	3	13	12	50
4. Describe changes in materials based on the effect of temperature: solid to liquid	20	83	2	8	2	8	15	63	4	17	5	21
5. Describe changes in materials based on the effect of temperature: liquid to solid	10	42	12	50	2	8	8	33	7	29	9	38
6. Classify materials based on the ability to absorb water	14	58	8	33	2	8	13	54	2	8	9	38
7. Classify materials based on the ability to float or sink	9	38	13	54	2	8	15	63	5	21	4	17
8. Classify materials based on the ability to undergo decay	7	29	15	63	2	8	0	0	6	25	18	75
9. Describe changes in properties of materials when exposed to certain conditions such as temperature	20	83	2	8	2	8	13	54	6	25	5	21
10. Describe changes in properties of materials when exposed to certain conditions such as temperature	14	58	8	33	2	8	16	67	3	13	5	21
Mean Performance	11						14					
Description	Average						Good					

Table 3 shows the result. With the given data, it showed that from 24 pupils who take the 10-item test in both instructions answered in confidence with their ideas in Science. In mother tongue language item 1, 20 pupils got complete understanding (83.33%), 2 with partial understanding (8.33%) and 2 have no understanding (8.33%). For item 2, 7 pupils got complete understanding (29.17%), 15 with partial understanding (62.5%) and 2 have no understanding (8.33%). For item 3, 6 pupils got complete understanding (25.00%), 16 with partial understanding (66.67%) and 2 have no understanding (8.33%). For item 4, 20 pupils got complete understanding (83.33%), 2 with partial understanding (8.33%) and 2 have no understanding (8.33%). For item 5, 10 pupils got complete understanding (41.67%), 12 with partial understanding (50.00%) and 2 have no understanding (8.33%). For item 6, 14 pupils got complete understanding (58.33%), 8 with partial understanding (33.33%) and 2 have no understanding (8.33%). For item 7, 9 pupils got complete understanding (37.5%), 13 with partial understanding (54.17%) and 2 have no understanding (8.33%). For item 8, 7 pupils got complete understanding (29.17%), 15 with partial understanding (62.5%) and 2 have no understanding (8.33%). For item 9, 20 pupils got complete understanding (83.33%), 2 with partial understanding (8.33%) and 2 have no understanding (8.33%). And for item 10, 14 pupils got

complete understanding (58.33%), 8 with partial understanding (33.33%) and 2 have no understanding (8.33%).

More pupils have correctly answered the items in both tests. However, there are some pupils who answered differently on the same item though it has the same questions. In item 8, 7 out of 24 got complete understanding using mother tongue but 0 out of 24 have not answered it correctly using English language.

Using English as language in the open-ended test, it shows a mean performance of 11 with an equivalent description of average based on researcher-made scale. Learners can comprehend the questions and answer in English at an average level. Moreover, In the use of mother tongue as language of the open-ended test, it shows a mean performance of 14 with a descriptive level of good based on the same scale. Pupils can explain and answer in mother tongue at a good rating. This shows that pupils are more confident and surer in processing and writing their ideas in answering science questions using mother tongue.

Difference Between The Performance Of The Pupils In Science Based On The MTB And English Test
Meanwhile, Table 4 showed the difference between the performance of the pupils in science based on Mother

Tongue and English test. The results indicate that the t computed value of 3.486 lies beyond the t critical value of 2.069 at 0.05 level of significance and 23 degrees of freedom. With these, the null hypothesis is rejected. This means that the sample difference between the averages of the two tests is big enough to be statistically significant. Hence, there is a significant difference between the performance of the pupils in science when taught in English and in MTB.

Further, the Cohen's d effect size of 0.71 indicates that the magnitude of the difference between the average of the differences and the expected average of the differences is medium. This means that the use of English and/or MTB in science test has a medium effect on pupils' learning in the said subject. After an interview conducted to the pupils, it shows supporting data on their

performance in science test using the mother tongue and English language. When they are asked if how they find answering the open-ended questions written in English, 22 out of 24 pupils said that they find it difficult with the following reasons: most of pupils cannot understand some science terms or words in English, some pupils cannot read and get confused on how to pronounce the words correctly, and words are likely seemed as the same to be read. There are 2 pupils who find it easy with the reason that the questions are shorter to read in English and one transferee said he already has ideas on the questions since it is already discussed to them in his previous school. Asking the pupils on how they find the questions using mother tongue, 20 out of 24 pupils said it is easy to understand, to read, and to answer questions in Bicol.

Table 4

Difference between the performance of the pupils in Science based on Mother Tongue and English test

Statistical Bases	Results
Level of significance	0.05
Degree of freedom	23
t critical-value	2.069
t computed value	3.486
Cohen's D	0.71
Decision on null	Reject
Conclusion	Significant

But there are 4 pupils who find it difficult in understanding science in Bicol: two pupils are having hard time reading long words in Bicol, the other two is confused in reading Bicol words knowing their first language is Filipino. And there were another two manifesting learning disability and learning difficulty respectively and both have hard time reading and writing using either of the two media of instructions. And lastly, asking them which they prefer to use as instruction in science. 20 out of 24 prefer mother tongue since words were easy to read. 4 out of 24 preferred English with reasons of they want to learn more using English language, find it interesting when reading science terms in English, words were shorter than to use mother tongue, and they find themselves slow in reading mother tongue words because of long pronunciation of words. In general, pupils tend to gain more understanding of science concepts in mother tongue- they participate and engage more but are opted to learn science using English instruction. From the data and responses presented, using English language make them slow in understanding science since some words are not

familiar to them and hard to pronounce, in relation to their thinking ability, learning styles and the distance learning modality due to pandemic, they are having difficulty in expressing their ideas and thoughts. Unlike using mother tongue, they are confident and precise on the words that they are going to use, and ideas are thoroughly expressed since they knew, and they are sure of what words in Bicol-Juban they are going to use whether in written or oral responses.

Localized Instructional Materials in English for Science (LIMES)

The use of mother tongue in learning Science created barrier in understanding the language of science in English since pupils have mastered and had been used of it in their four-year course in primary level (K-3). With the presented, analyzed and interpreted data, unlocking difficulties, strengthening reading in English and frequent utilization of science vocabularies in English are some of solutions to help bridging concepts from mother tongue to be translated and presented in English language. Formulation and conceptualization of

localized instructional materials in English with Bicol-Juban translation is proposed by the researcher to address link gaps in learning Science from mother tongue to English contexts. First quarter competencies from Science 4 were the subject for the proposed output to assist pupils in delivering science ideas in mother tongue to English language. Though the results revealed that there is no significant difference between the first quarter academic performance of the pupils during the previous and current school years, it showed from their results after the open-ended tests that there is a significant difference between the performance of the pupils in science test using English language and mother tongue.

CONCLUSIONS AND RECOMMENDATIONS

The academic performance in science of the grade 4 pupils in the first quarter during the previous school year 2021-2022 and the current school year 2022-2023 is both satisfactory while their academic performance during the first quarter of the previous and the current school year did not differ significantly. Their performance in science test using mother tongue and English language differ significantly. The use of mother tongue influenced pupils' understanding science in terms of constructing sentences in written or oral, understanding science concepts and expressing science ideas in English language.

Pupils should maintain their good learning habits in science to attain satisfactory rating and they can exert more efforts for academic improvement. They are advised to exercise and to practice more of reading science books and materials in English to get self-familiarized with English science words and concepts that are learned from mother tongue instruction. Pupils must practice more of using English in expressing science ideas in written or oral to persuade learning bridges to connect mother tongue concepts to be delivered in English language. The teacher should use and develop localized instructional materials in English with Bicol-Juban translation to aid pupils in connecting ideas from the two utilized languages of instruction.

REFERENCES

- [1] Alisha, S. (2021). The importance of learning English for science student. Conference: Class Conference. At: Sidoarjo
- [2] Cabansag, J. (2016). The implementation of mother tongue – based multilingual education: seeing it from the stakeholders' perspective. *International Journal of English Linguistics*, 6(5). p 43.
- [3] Das, N., Amrita, & Singh, A. (2014). Importance of Science in school curriculum. *WE School Knowledge – Builder – The National Journal*, 2, 15 – 18.
- [4] De Guzman, W. G. L and De Vera, P. V. (2018) *English Language Performance and Difficulties of Pupils in the Mother Tongue-based (MTB) Medium of Instruction*, English Language Education Publishing. Site Skills Training - Clark, Centennial Road, Clark Freeport Zone, Clark, Pampanga 2023, Philippines. Retrieved from <https://eric.ed.gov/?id=EJ1247323>
- [5] DepEd Order No. 43, s. 2013
- [6] DepEd Order No. 21, s. 2019
- [7] Enhanced Basic Education Act (RA 10533).
- [8] Kadtong, M.L. (2017). Pupils' performance Of the mother tongue based and non- mother tongue based grade I class in the pioneer schools at region XII. *Proceedings Journal of Education, Psychology and Social Science Research*, 4(1).
- [9] Kapur, R. (2021). Elementary education: foundation of learning, growth and development of individuals. Retrieved April 28, 2023, from https://www.researchgate.net/publication/356555392_Elementary_Education_Foundation_of_Learning_Growth_and_Development_of_the_Individuals
- [10] Khushnuma, Choudhary, F. R., and Durrani, R. (2002). Mother tongue as medium of instruction for effective communication and science learning of elementary level. *Global Educational Studies Review* 2 (12) 42-50. Retrieved from <https://gestjournal.com/article/mother-tongue-as-medium-of-instruction-for-effective-communication-and-science-learning-at-elementary-level>
- [11] Vela, J. D. (2015). Primary science teaching to bicolano students: in bicol, English or Filipino?, *International Journal of Evaluation and Research in Education (IJERE)* 4(1). 8-15. Retrieved from <https://ijere.iaescore.com/index.php/IJERE/article/view/4486>