Filipino Teachers' and Parents' Perception on the Use of Mother Tongue Language in Science Classroom: Case of Baguio City*

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ABSTRACT: Science in the Philippines was previously taught in English but is now being delivered at the grade 3 level using Mother Tongue-Based Multilingual Education (MTB-MLE) across the country to address the gaps in scientific literacy which are embedded in the K to 12 Curriculum. This study analyzed the perception of teachers and parents on the use of MTB-MLE in science classes in terms of language for learning and implementation, and the perception of teachers on its challenges and its use in science teaching. A modified survey questionnaire was adapted from Burton (2013), Filmore (2014) and Lualhati (2018) and was answered by 54 teachers and 96 parents of Grade 3 students from 6 public and private schools in Baguio City. Mean, standard deviation, ranking and t-test were employed for the statistical treatment of data using SPSS. It was revealed that teachers and parents strongly agreed on the use of MTB-MLE as language for learning and perceived their schools ready for its implementation. Lack of instructional materials in Ilocano ranked first among the perceived challenges by the teachers. The use of Ilocano in science classes was perceived by the teachers to enhance students' academic performance but more preference was given to English as a medium of instruction. This sheds light that there is a misalignment in MTB-MLE policy and implementation. It also implies that parents' and teachers' perceptions are important in its implementation. It is recommended that further studies be conducted on the use of MTB-MLE in science classes across the country, and thus, may help policy makers, curriculum developers and stakeholders create a sound curriculum and materials in the context of MTB-MLE science teaching and learning.

Key words: MTB-MLE, mother tongue, Ilocano, Philippines, science class

Ⅰ. Introduction

Science in the Philippines, prior to 2012, was previously taught in English but is now being delivered in Grade 3 using MTB-MLE across the country. This is embedded in the K to 12 Curriculum to ensure that Filipinos are provided with scientific and functional literacy thus function well in the global society (Republic Act No. 10533, 2013). Although it already began in 2009 as an auxiliary to classroom teaching, MTB-MLE became fully implemented in 2013 (Burton, 2013). This shift in the medium of instruction policy was a product of decades of research works in the Philippines (Lartec et al., 2014; Malone & Malone, 2011; Medilo Jr., 2016; Paz, 2018; Perez, 2019; Wong & Benson, 2019; Young, 2002) which have been linked to its effective use to the

* 이 논문은 Delia D. Lumiwes의 석사논문을 재구성하여 작성되었음. 이 논문은 대구대학교 연구 장학기금 지원에 의한 것임.
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http://dx.doi.org/10.15812/ter.60.3.202109.383

academic performance of Filipino students in mathematics and science (Mondez, 2013), its significant effect on children's learning (DepEd, 2009; Dekker & Young, 2005) most specifically among girls and children from rural and indigenous communities (Monje, Orbeta Jr., Francisco-Abrigo, & Capones, 2019).

Most of the Filipino students viewed science as a difficult subject (Padama et al., 2014) and this is reflected in their dismal performance in science, both in national and international assessments (Bernardo, Aggabao & Tarun, 2018). It is probably attributed to the medium of instruction used in science classrooms. According to Kalshian (2018), teaching students not in their mother tongue will put them more in educational disadvantage and further widen marginalization. On the contrary, students learned better in school using mother tongue based on studies conducted by local institutions, UNESCO, and World Bank (Wa-Mbaleka, 2015) and children acquired academic competencies more quickly in science and mathematics based on local and international research (Pamittan, 2019). This is evident in countries like Hongkong, Japan and South Korea which use mother tongue in their basic education and consistently ranked high in science and mathematics in international assessments (Tapang, 2018). However, the implementation of MTB-MLE is more challenging in multilingual setting especially in countries where English was the medium of instruction (Mahboob & Cruz, 2013) like the Philippines.

The MTB-MLE implementation in the Philippines impacts science classroom teaching and learning (Mondez, 2013) where students' listening, speaking, reading, and writing skills are in danger of underdevelopment because the number of instructional materials written in mother tongue is low due to the presence of multiple local languages (Adarlo & Jackson, 2017). On the other hand, South Korea, which has been using mother tongue in teaching science for a long time, is changing its basic education leaning towards multicultural education due to globalization and migration (Lee, 2013) and as such gave birth to English fever phenomenon (Park, 2009). All these factors may affect in either way the Philippines and South Korea's preservation of mother tongue positively and negatively. Thus, without the mainstream support of Korean stakeholders for language heritage, it might disappear in the second and third generations based on the previous studies conducted in East Asia (Kondo-Brown, 2006 as cited by Yang, 2017). This fact denotes the importance of collaborative effort of teachers and parents in educating the children using MTB-MLE in science classrooms. It is because according to Drellishak and Bender (2005), it does not only bridge the gap between the culture at home and the one at school and in the mainstream society, but it also fosters respect for cultural diversity.

Blair (2014) emphasized the significant impact of parental involvement of Filipinos on the academic performance of their children. In addition, Lartec (2016) has shown that the model for the development of instructional materials in multilingual setting was a result of collaborative perspectives of teachers and parents. This implies the necessity of collaboration among teachers and parents in educating students to improve their learning and the quality of science education in the Philippines. However, there are few studies on the field of science teaching which discuss the roles of teachers and parents in science instruction. Thereby, this study purposely analyzes the use of MTB-MLE in science classrooms as perceived by teachers and parents in Baguio City.

The examination of teachers' and parents' perception on the use of MTB-MLE in science classrooms is a timely response to address the gaps on the development of scientific literacy in the country. This study addresses the perception of teachers and parents toward MTB-MLE in terms of language for learning and implementation, the challenges faced by teachers when they teach using mother tongue and the perception of teachers on the use of MTB-MLE in science teaching. Results from this study may help policy makers, curriculum makers and stakeholders create a sound curriculum and materials in the context of MTB-MLE in science teaching and learning. Also, this study may help parents be able to

know how to collaborate effectively with the teachers and guide their children in their journey of science learning using mother tongue. Likewise, it will also enable teachers to identify and prepare appropriate materials for their students using MTB-MLE in science teaching. Lastly, future researchers may use this as a guide for further inquiries related to science teaching and learning.

Ⅱ. Methodology

1. Setting of the study

This study was conducted in the northern part of Luzon specifically in Baguio City. It belongs to Cordillera Administrative Region (CAR) where people speak various dialects. Ilocano is the main dialect commonly spoken and understood in this region (Lartec et al., 2014) and being used in science teaching and learning in Grade 3.

2. Participants

This study draws primarily from the quantitative data collected from 6 public and private schools in Baguio City, Philippines. <Table 1> shows the sex and age of 54 teachers and 96 parents of Grade 3 students. The demographic profile of primary science teachers illustrates that the respondents are mature and rich with experience and are qualified to teach since most of them obtained bachelor's degrees and some of them pursued graduate studies while the parents' educational attainment are above basic education level, wherein having

〈Table 1〉 Breakdown of Participants

Category		Teacher (n=54)	Parent (n=96)	Total
Sex	Male	12	58	70
	Female	42	38	80
Age	21~25	-	12	12
	26~30	4	6	10
	31~35	7	8	15
	46~40	7	20	27
	41~45	16	22	38
	46~50	9	15	24
	51 or above	11	8	19
	Missing	-	5	5
Highest Educational Attainment	Elementary and High School Graduates	-	46	46
	Vocational	-	15	15
	College Undergraduates	-	6	6
	College Graduates	37	29	66
	Master of Arts	7	-	7
	Doctorate	10	-	10

bachelors' degree holder accounts as the highest number.

3. Research Instrument

Survey questionnaires were modified to examine the perception of teachers and parents on the use of MTB-MLE in science classrooms in the Philippines. The instrument uses a 4-point Likert scale on the level of agreement with 1 as strongly disagree, 2 as disagree, 3 as agree and 4 as strongly agree. It consists of 3 parts; Part 1, adapted from Burton (2013), includes the perception of teachers and parents on language for learning and MTB-MLE implementation, part 2, adapted from Filmore (2014) deals with the perception of teachers toward MTB-MLE challenges and part 3, adapted from Lualhati (2018), is about the perception of teachers on the use of MTB-MLE in science teaching. The word mother tongue (Ilocano) was changed from the original items. Cronbach Alpha was used to validate the internal reliability of the research instrument as shown in <Table 2>.

4. Procedure and Data Analysis

This study employed descriptive statistics to identify the perception of teachers and parents on the use of MTB-MLE in science classrooms. It includes non-experimental and non-probability sampling. Non-probability sampling disregards random selection of participants. The participants were chosen based on their availability and purpose of study. Consent was sought from administrators and principals prior to the distribution of the survey questionnaire. Two weeks were allotted for its retrieval after handling it personally to the participants by one of the authors.

The researcher employed the following statistical treatment of data using Statistical Package for the Social Sciences (SPSS): mean, standard deviation, ranking, and t-test. The mean score was used to assess the perception of respondents in Parts 1 to 3 respectively while ranking was applied to arrange the items from highest (strongly agree) to lowest (strongly disagree). For comparison of teachers' and parents' perception, independent samples t-test was used.

Ⅲ. Results and Discussion

1. Comparison of Teachers' and Parents' Perception of MTB-MLE

Teachers' and parents' perception towards MTB-MLE is examined based on language for learning and implementation.

1.1 Language for Learning

Teachers and parents expressed their perceptions towards MTB-MLE in terms of language as to whether they agree or disagree on the use of Ilocano as the language for learning. This can be seen below. As shown

〈Table 2〉 Question distribution in the survey questionnaire

Category	Subject	No of items	Reliability
1. Perception on the use of MTB-MLE[a]	Teacher/Parent	22	-
- Language for Learning		8	.692
- Implementation		14	.790
2. Perception on MTB-MLE Challenges[b]	Teacher	12	.682
3. Perception on Science Teaching Using MTB[c]	Teacher	10	.827

[a]Adapted from Burton (2013); [b]Adapted from Fillmore (2014); [c]Adapted from Lualhati (2018)

〈Table 3〉 Comparison of teachers' and parents' perception of language for learning

Statement	Teacher (n=54)			Parent (n=96)			t	p
	M	SD	Rank	M	SD	Rank		
1. Children who can read and write in Ilocano will be able to learn English easier than children who cannot read and write in Ilocano.	3.31	.61	8	3.64	.62	4	-3.067	.003**
2. Children will do better in school if they learn to read and write in Ilocano first.	3.80	.45	5	3.94	.28	1	-2.083	.041*
3. When children learn to read and write in Ilocano, it is easier to learn to read and write in English later.	3.81	.39	4	3.47	.70	8	3.898	.000**
4. Using Ilocano to teach children has negative effects for when they learn English.	3.57	.57	7	3.61	.69	5	-.368	.713
5. Children will learn English best if English is the only language spoken in their classroom.	3.78	.46	6	3.56	.61	6	2.427	.017*
6. Learning in Ilocano might be confusing for children.	3.87	.44	2	3.76	.50	2	1.408	.162
7. In the early grades, it is better for students to learn in English than Ilocano.	3.94	.23	1	3.53	.70	7	5.324	.000**
8. Learning math and science in Ilocano helps children do better in those subjects	3.83	.47	3	3.71	.61	3	1.402	.163
Overall	3.74	.27	-	3.65	.34	-	1.636	.104

*p<.05, **p<.01

in <Table 3>, it is evident that the perception of teachers that it is best for students to learn English at an early grade rather than Ilocano ranks 1 among other items on language learning (M=3.94) while their perception on Ilocano as a requisite for children to be able to learn English easier is ranked 8 (M=3.31). In contrast with the perception of teachers, parents have strongly agreed that "their children will do better in school if they learn to read and write in Ilocano first rather than English" (M=3.94). This is followed by the statement that "learning in Ilocano might be confusing for children" (M=3.76) while third on the rank is "learning math and science in Ilocano helps children do better in those subjects" (M=3.71). All the 8 items are above the midpoint of the Likert scale (4-point).

There were significant differences between teachers' and parents' perceptions in items 1, 2, 3, 5, 7, however there was no significant difference in the total score. This shows that teachers and parents have different perceptions on majority of the items on the use of language in science teaching. The teachers' perception that it is better to use English rather than Ilocano in science classes is aligned with other studies. The hemogenic position of English language in the Philippine society being a colonized country (Mahboob & Cruz, 2013), its long-held views as the desired language (Cabansag, 2016), the difficulties experienced by teachers in the teaching of science concepts (Mondez, 2013) and students' understanding of science concepts in their mother tongue are maybe the possible reasons why

the teachers prefer English as a medium of instruction in teaching science. Students experienced difficulties in connecting with their teachers when local language is used (Bernardo et al., 2018). Likewise, teachers had difficulty in translating science terms in mother tongue (de Jesus, 2019). Hence, it was pointed out that language is not the sole prime factor that affects student's academic performance (Valerio, 2015).

While teachers prefer English in science teaching, parents supported the use of Ilocano in science teaching. This clearly suggests a misalignment on the appropriate medium of instructions to be used in the classroom. Burton (2013) argued the misalignment of teachers' and parents' perception in terms of knowledge, beliefs, and practices behind the MTB-MLE implementation. However, some parents believed that "mother tongue should not be taught beyond Grade 3, and should remain as a subject, and not as medium of instruction" (Monje et al., 2019). This contradictory finding is in line with the study of Gonzales (2018) which cited the lack of proper coordination among implementers and parents on MTB-MLE. This may be attributed to the unfamiliarity of the teacher themselves in the mother tongue used in science classrooms because they are affiliated with other ethnicities (Valerio, 2015) or the new medium of instruction using Ilocano is not yet widely practiced (Lartec et al., 2014). As a result, there is a need for teachers to learn the new language as some of them do not speak the same mother tongue spoken in the locality of Baguio City. The same thing goes with the parents as some of them are just immigrants in Baguio City. Such scenario is specifically true in the study of Medilo Jr. (2009) wherein teachers' preference for English is evident because not all concepts in science are readily available, some do not have exact equivalent terminology, and some words in mother tongue conveys different meaning used by the different localities in Visayas region.

1.2 Implementation

Teachers and parents expressed their perceptions towards MTB-MLE in terms of its implementation. Fourteen statements were given which discussed how probably MTB-MLE is implemented in schools in Baguio City. They were asked whether they agree or disagree on its implementation.

Using t-test to compare teachers' and parents' perception of implementing MTB-MLE, it is reflected in <Table 4> that there was a significant difference between both groups in the total score (teachers, M=3.63; parents, M=3.45; $p<.01$), with significant differences in items 1, 3, 4, 5, 7, 8, 10, 11. While parents showed more positive perceptions in items 1 and 3 which is about using Ilocano in teaching and learning, teachers showed more positive perceptions in other items (4, 5, 7, 8, 10, 11). The implementation of MTB-MLE is perceived by the teachers according to the availability of materials in Ilocano (item 10), its positive (items 5 and 6) and negative (items 12 and 14) impacts to stakeholders, its positive (items 1, 2, 3, 7 and 11), and negative (item 9) effects in the academic achievement of students, and the use of native languages apart from Ilocano (items 4, 8 and 13). Teachers strongly agreed that although the use of Ilocano develop learners' academic achievement (M=3.93), it also confused some students because Ilocano is not their mother tongue (M=3.81).

The teachers also strongly agreed that the use of Ilocano advances academic performance of students (M=3.91). The advantage of using mother tongue in the academic performance of students in science and mathematics can be supported by the literature (Estremera, 2017). Nonetheless, mother tongue is not the sole factor that contributes to students' academic performance. Other factors include location and population of the school and sectioning of the participants who responded in the study. Likewise, apart from Ilocano, there is still a need to use the native tongue or dialect of students to understand the science lesson well thus made the implementation of MTB-MLE difficult (M=3.69). It is because Ilocano is not spoken by all students and teachers in Baguio City (Valerio, 2015). This finding is consistent with other studies (de Jesus, 2019; Medilo Jr., 2016; Tupas & Martin, 2016;

〈Table 4〉 Comparison of teachers' and parents' perception on MTB-MLE implementation

Statement	Teacher (n=54)			Parent (n=96)			t	p
	M	SD	Rank	M	SD	Rank		
1. Using Ilocano textbooks will help the learners understand the information better.	2.87	.99	14	3.60	.61	5	-4.943	.000**
2. All instruction must be in Ilocano for the learners to comprehend the subjects easily.	3.48	.61	12	3.68	.61	3	-1.895	.060
3. By using Ilocano, learners can communicate faster with their teachers.	3.50	.69	10	3.75	.52	1	-2.305	.024*
4. Learners must be allowed to use any native language for as long as they can understand the topic faster.	3.98	.14	1	3.50	.62	9	7.351	.000**
5. Schools in Baguio are ready for the implementation of the MTB-MLE.	3.50	.75	10	2.79	1.03	14	4.859	.000**
6. Teachers in my school are ready for the implementation of the MTB-MLE.	3.41	.69	13	3.22	.82	12	1.427	.156
7. I can see improvement of my students in their ability to understand information after the implementation of MTB-MLE.	3.91	.35	3	3.52	.6	7	4.987	.000**
8. My students ask me a lot about translating the words learned in mother tongue class to other language they can understand.	3.74	.52	6	3.14	.87	13	5.344	.000**
9. Mother tongue class make some of my students confusing since their mother tongue is not Ilocano.	3.81	.44	5	3.69	.53	2	1.583	.116
10. Books and materials in Ilocano are available for the learners and parents.	3.85	.36	4	3.59	.57	6	3.390	.001**
11. Using mother tongue in class will develop learners' academic achievements.	3.93	.26	2	3.25	.68	11	8.641	.000**
12. It is difficult to implement MTB-MLE in class due to learners' different native languages.	3.69	.58	7	3.44	.81	10	2.179	.031*
13. The implementation of bilingual education (Filipino and English) as medium of instruction in class is better.	3.65	.62	8	3.61	.64	4	.312	.755
14. Implementation of MTB-MLE might not be applicable in Baguio.	3.54	.64	9	3.51	.68	8	.235	.814
Overall	3.63	.31	-	3.45	.36	-	3.103	.002**

*p<.05, **p<.01

Wa-Mbaleka, 2014). In addition, though the perception of teachers toward the implementation of MTB-MLE in Baguio City is favorable in the sense that teachers in Baguio City are ready for its implementation (M=3.41), they strongly agreed that MTB-MLE is not applicable in Baguio City.

This finding reveals the misalignments in the implementation of MTB-MLE in Baguio City. This result conforms with other research papers (Bernardo et al., 2018; Cabansag, 2016) which emphasize that misalignments of stakeholders rooted from lack of instructional materials, difficulty of defining concepts using mother-tongue, multilingual environment, and the adherence to the mandates of the DepEd. Furthermore, this misalignment is maybe due to the fact that the persons involved in decision-making are not aware of how implementers practice it (Fullan, 2003).

Parents perceived the implementation of MTB-MLE as a means of fostering academic achievement of their children as they strongly agreed that using Ilocano in science teaching made their children understand information better and comprehend the subjects easily. It also enables their children to communicate faster with their teachers. This statement ranked 1 among the given items (M=3.75). Notwithstanding the fact that the use of Ilocano as ranked 2 (M=3.69) make their children confused since Ilocano is not their children's mother tongue.

2. Perception of Teachers on MTB-MLE Challenges

Teachers in Baguio City were asked about their perception on MTB-MLE in terms of its challenges. Twelve challenges are listed on the item column. These challenges are related to instructional materials, teacher training, teacher competencies, and policy.

The findings indicated in <Table 5> suggests that teachers modestly agree on the items listed as challenges towards MTB-MLE. It is noted that the lack of learning materials ranked number 1 (M=3.93) among the given challenges. The lack of learning materials in mathematics and science in mother tongue added to the many problems encountered by teachers in the teaching and

〈Table 5〉 Summary table for the teachers' perception on MTB-MLE challenges

Item Statement	Mean	SD	Rank
Lack of learning materials	3.93	1.07	1
Resistance to change teaching habits	3.91	.25	2
Frequent changes in administration	3.85	.36	3
Teachers assigned from outside community with different mother-tongue	3.81	.44	4
Lack of consultation/training for teachers and parents	3.74	.52	5
Transfer of learning materials is impossible to/from another region	3.59	1.04	6
Lack of teacher knowledge about MTB-MLE	3.50	.69	7
Lack of public (e.g., parents) knowledge about MTB-MLE	3.50	.14	7
Lack of DepEd staff's knowledge about MTB-MLE	3.50	.75	7
Parents' perception on the superiority of English	3.41	.69	10
Lack of financial resources	3.26	1.07	11
Production of learning materials for a lot of different mother-tongues	2.69	.62	12

learning process of science using MTB-MLE (Estremera, 2017). The foregoing result shows that "resistance to change teaching habits" (M=3.91), "frequent changes in administration" (M=3.85), "teachers assigned from outside community with different mother-tongue" (M=3.81), and "lack of consultation/training for teacher and parents" (M=3.74) are the challenges that were ranked second to fifth, respectively.

It can be inferred that although "lack of financial resources" (M=3.26) is one of the challenges listed, it is not the primary challenge perceived by the teachers in Baguio City. Rather, it is ranked number 11 among the 12 challenges shown on <Table 5>. It implies that there might be budgets allotted by the DepEd in the implementation of MTB-MLE. However, this dilemma exists maybe due to the unpreparedness and attitudes of the teachers towards the use of vernacular language (Dekker & Young, 2005) and unclear guidelines prior to its implementation. The result of this survey is parallel with some studies about implementing MTB-MLE (Malone & Malone, 2011; Medilo Jr., 2016; Perez, 2019; Williams, Metila, Pradilla, & Digo, 2014; Wong & Benson, 2019). Hence, as suggested by these authors, these challenges could be means as bridge to link the gap of the missing appropriate teaching strategies and pedagogies to the needs of the learners and teachers by empowering language policy through MTB-MLE specifically in science lessons (Dekker & Young, 2005; Wong & Benson, 2019).

3. Perception of Teachers on Science Teaching Using MTB-MLE

Teachers were asked about their perception towards science teaching using Ilocano as the mother tongue. There are 10 statements listed for them to agree or disagree on the advantages or benefits of using Ilocano in science teaching. The collected data shown in <Table 6> represents a positive recognition of teachers in Baguio City on the use of Ilocano in science classes. It also shows that overall, they modestly agreed (M=3.36) that the use of Ilocano as a mother tongue enhances science teaching and learning process, thus, benefits students. The benefits of MTB-MLE in classrooms are discussed in previous works that resulted in the policy mandate of the DepEd to be used from Kindergarten to Grade 3 (Nolasco, 2009; Walter & Dekker, 2011; Williams et al., 2014; Young, 2002, 2003). The evidence of MTB-MLE benefits on children's cognitive and affective improvement are further emphasized in other works (Asia Multilingual Education Working Group, 2014; Uayan, 2020).

On the contrary, other localities in the Philippines that used different mother tongue in science opposed this idea and as such recommended that not all places should be mandated with the use of MTB-MLE especially in urban areas where English is most preferred than any other mother tongue in science teaching (Gonzales, 2018; Mondez, 2013). Though the use of MTB-MLE has a good impact on students' learning, it did not have a good implication on English Language Teaching (ELT), thus, require intensive studies on its impact on actual learning (Wa-Mbaleka, 2014). Furthermore, we cannot overlook the previous work reporting that the academic performance of students in the classroom has a very weak correlation on the use of MTB-MLE in the classrooms specifically in teaching mathematics (Uayan, 2020).

The perception of teachers and parents on the use of MTB-MLE in science classrooms conveys positive and negative aspects in the field of science teaching and learning in the Philippines specifically in Baguio City. The finding that the preference for the English language as a medium of instruction is still apparent, which is consistent with the findings of other studies (Lartec et al., 2014; Medilo Jr., 2009; Valerio, 2015), implies the need to allocate resources and trainings for teachers to be competent in the use of MTB-MLE in science classrooms and suggests the need for proper alignment of teaching assignments relative to geographic area and native mother tongue of the teachers per locality so as to lessen their burden in lesson and teaching preparations. The teachers' trainings and proper alignment of teaching assignments

〈Table 6〉 Summary table for the perception of teachers on science teaching using MTB-MLE

Item Statement	Mean	SD	Rank
1. Teaching science in Ilocano leads to better understanding of scientific concepts that make the lesson meaningful for the students.	3.67	.67	1
2. Teaching science in Ilocano allows the use of a variety of instructional strategies that may enhance student cognitive development and reasoning skills.	3.02	.90	10
3. Teaching science in Ilocano fosters collaboration and supportive interaction inside the classroom through the use of native language.	3.33	.73	6
4. Teaching science in Ilocano enables the students to freely and spontaneously ask or answer questions or discuss observation with the teachers and with the peers.	3.30	.79	7
5. Teaching science in Ilocano encourages maximum participation for both high and low performing students to be actively involved in the learning process.	3.15	.81	9
6. Teaching science in Ilocano promotes self-motivation, positive social interaction and active engagement among the learners.	3.30	.82	7
7. Teaching science in Ilocano establishes good relationships among students, teachers, and parents.	3.43	.77	4
8. Teaching science in Ilocano enables the teacher to easily assess students of what has been learned and identify areas where students need further assistance as they express themselves.	3.43	.77	4
9. Teaching science in Ilocano provides opportunities for formulating effective and challenging questions that develop higher order thinking skills of the learners.	3.48	.77	3
10. Teaching science in Ilocano is applicable to different styles of learning that allow constructing, exploring, and learners' own knowledge.	3.57	.57	ㄲ2
Overall Mean	3.42	.50	-

could also be used as a means of supporting the students' academic background especially for those who are also not affiliated with any ethnicities of a certain locality considering the multiplicities of languages in the country, thus may enhance competencies in science. Furthermore, as Valerio (2015) stated in her article that since there is no evidence yet that exists on the benefits of MTB-MLE in pedagogical aspects in classroom instructions in the Philippines, knowing the perception of teachers and parents on its use in science classroom would enable educational authorities and stakeholders to identify the appropriate means of collaboration salient in the creation of appropriate pedagogy vital for the improvement of science learning in the country.

Ⅳ. Conclusion

This study confirms previous research works

(Gacheche, 2010; Ghimire, 2012 as cited by Wa-Mbaleka, 2015) that countries like the Philippines, where Baguio City is located, encountered more challenges implementing MTB-MLE in science classes due to the multilingual settings of its locality.

Although there is a significant difference in the perception of teachers and parents regarding availability of books and materials in Ilocano, there is still a need for materials because teachers think that the lack of learning materials is the biggest challenge in MTB-MLE. Books and materials are important in improving science teaching and learning. It has shown that teachers perceived the lack of learning materials in Ilocano which makes it harder to implement in science classes. This is despite the positive impacts of MTB-MLE on the cognitive and affective domain to students cited in literatures (Perez, 2019; Walter & Dekker, 2011; Wong & Benson, 2019) which is also evident in science teaching (Mondez, 2013). Thus, having known the teachers' and parents' perception on the use of MTB-MLE in science classes, it sheds light that there is a misalignment in its policy and implementation. Likewise, it implies that parents are important partners of teachers and other stakeholders in the success of MTB-MLE implementation.

UNESCO (2005) reported that South Korea is the leading country successful in implementing mother tongue-based education (MTBE) with higher literacy rate. This is contrary to those countries with linguistic diversities such as Indonesia and the Philippines which are least successful. This implies the need to enhance the implementation of MTB-MLE in science classrooms across the country. While the Philippines is struggling to overcome the many facets of MTB-MLE in science classes due to its plurality of languages based on this study, South Korea, being successful having one mother tongue should maintain its stand on preserving it even if the country is continuously acquiring foreign languages that may endanger its language heritage in the future because as reported by UNESCO (2003 as cited by Wa-Mbaleka, 2015), there is an increasing number of endangered indigenous languages due to the heavy influence of western languages. The shift to MTB-MLE is a means of preserving the various indigenous languages in the Philippines.

In the future, there should be a collaboration between the prime agency, which is the DepEd, and the schools, teachers, and parents to come-up with the appropriate pedagogies and instructional materials since not everyone in Baguio City use Ilocano as a mother tongue. Based on this findings and other cited literatures, there are teachers and parents who still prefer English as a medium of instruction. Hence, continuous orientation, monitoring, and evaluation of MTB-MLE implementation must be conducted to ensure that students in science classrooms are supported academically to enhance their competencies in science. In addition, teacher training and professional development on the use of MTB-MLE in science classes must be planned and organized to overcome the present and future challenges. It is further recommended to conduct studies regarding the use of MTB-MLE in science classes not only in Baguio City but also in other parts of the country to see a clear picture of the advantages and disadvantages, as well as the positive and negative impacts of MTB-MLE in science teaching and learning in the Philippines.

References

Adarlo, G., & Jackson, L. (2017). For whom is K-12 education: A critical look into twenty-first century educational policy and curriculum in the Philippines. In Educating for the 21st Century (pp. 207-223). Springer, Singapore.

Asia Multilingual Education Working Group (2014). *MTB-MLE: Mother tongue-based multilingual education; lessons learned from a decade of research and practice*. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000231865 on Jan 1, 2021.

Bernardo, E., Aggabao, I., & Tarun, J. (2018). *The implementation of the mother tongue-based*

multilingual education (MTB-MLE) program in Northern Isabela, Philippines: Reactions, attitudes and perceptions of teachers. Paper presented at the Asian Conference on Education & International Development 2018, Kobe, Japan. Retrieved from https://papers.iafor.org/submission39734/ on January 1, 2021.

Blair, S. (2014). Parental involvement and children's educational performance: A comparison of Filipino and U.S. parents. *Journal of Comparative Family Studies, 45*(3), 351-366.

Burton, L. A. (2013). *Mother tongue-based multilingual education in the Philippines: Studying a top-down policy from the bottom up.* Doctoral Dissertation, University of Minnesota.

Cabansag, J. N. (2016). The implementation of mother tongue-based multilingual education: Seeing it from the stakeholders' perspective. *International Journal of English Linguistics, 6*(5), 43-53

de Jesus, L. (2019). *Difficulties and challenges in teaching science: The aftermath of MTB-MLE.* Available at SSRN 3412898. http://dx.doi.org/10.2139/ssrn.3412898

Dekker, D., & Young, C. (2005). Bridging the gap: The development of appropriate educational strategies for minority language communities in the Philippines. *Current Issues in Language Planning, 6*(2), 182-199.

Department of Education [DepEd] (2009). DepEd Order No. 74 s. 2009: Institutionalizing Mother Tongue-Based Multilingual Education: Philippines.

Drellishak, S., & Bender, E. M. (2005, August 24, 2005). Coordination modules for a crosslinguistic grammar resource. Paper presented at the HPSG05 Conference, Lisbon, Portugal.

Estremera, M.L. (2017). The implementation of mother tongue-based multilingual education: Viewing it from the grade III teachers' perspective. *Journal of Literature, Languages and Linguistics, 40.*

Fillmore, N. (2014). Mother tongue-based multilingual education policy and implementation in Mindanao, Philippines (No. M. International and Community Development). Deakin University.

Fullan, M. (2003). *The new meaning of educational change.* New York: Teachers College Press.

Gonzales, J. B. (2018). Mother tongue-based multilingual education implementation in Cebu Philippines, in the eyes of the stakeholders. *International Journal of Research Science & Management, 5*(2), 165-172. DOI: 10.5281/zenodo.1185615

Kalshian, R. (2018). Is it realistic to teach science in vernacular languages? *DownToEarth.* Retrieved from https://www.downtoearth.org.in/news/governance/is-it-realistic-to-teach-science-in-vernacular-languages--60775 on May 10, 2021.

Lartec, J. K. (2016). Parents' and teachers' collaborative perspective: An input for a model on materials development in a multilingual setting. *Journal of Research Initiatives, 2*(2), Article 1.

Lartec, J. K., Belisario, A. M., Bendanillo, J. P., Binas-o, H. K., Bucang, N. O., & Cammagay, J. L. W. (2014). Strategies and problems encountered by teachers in implementing mother tongue-based instruction in a multilingual classroom. *IAFOR Journal of Language Learning, 1*(1), n1.

Lee, J. Y. (2013). Multicultural education in the Republic of Korea: How elementary school teachers interpret multicultural education and its practical use in classrooms (Doctoral dissertation, UCLA).

Lualhati, G. P. (2018). The Bridging Process: Filipino Teachers' View on Mother Tongue. *International Journal of Research and Innovation in Social Science, 2*(4), 1-5.

Mahboob, A., & Cruz, P. (2013). English and mother-tongue-based multilingual education: Language attitudes in the Philippines. *Asian Journal of English Language Studies, 1,* 2-19.

Malone, D., & Malone, S. (2011). Teacher education for mother tongue-based education programmes. SIL International, 1-15.

Medilo Jr., C. G. (2016). The experience of mother

tongue-based multilingual education teachers in Southern Leyte, Philippines. *In International Forum, 19*(2), 64-79.

Mondez, R. G. (2013). Appropriateness of mother-tongue based multilingual education (MTB-MLE) in urban areas: A synthesis study. *International Journal of Science and Research, 2*(1), 611-620.

Monje, J. D., Orbeta, A. C., Francisco-Abrigo, K. A., & Capones, E. M. (2019). *Starting where the children are: A process evaluation of the mother tongue-based multilingual education implementation* (No. 2019-06). PIDS Discussion Paper Series.

Nolasco, R. M. D. (2009). 21 reasons why Filipino children learn better while using their mother tongue: A primer on mother tongue-based multilingual education (MLE) and other issues on language and learning in the Philippines. Quezon City: Guro Formation Forum, University of the Philippines.

Padama, E. L., Gallardo, A. C., Lacuata, F. C., Lamorena, M. B., Navaza, D. C., Espana, R. C., Panganiban, M. S., Pili, A. S., & Prudente, M. S. (2014). Practices of teacher education institutions in science education. *International Journal of Education and Research, 2*(11). 345-356.

Pamittan, F. A. (2019). The Impact of mother tongue on the performance of ESL students' in listening and speaking skills embracing mother tongue based-multilingual education (MTB-MLE) curriculum. *The Asian ESP Journal, 15*(1.2), 320-343.

Park, J. (2009). 'English fever' in South Korea: Its history and symptoms. *English Today, 25*(1), 50-57. doi:10.1017/S026607840900008X

Paz, R. M. O. (2018). Elementary education programs teachers and MTB MLE implementation in the Philippines. *International Journal of Social Sciences, 4*(2), 1642-1663.

Perez, N. B. (2019). A comparative study of the MTB-MLE programs in Southeast Asian countries. *Journal of Humanities and Social Sciences Research, 3*(6), 47-55.

Republic Act No. 10533, Implementing Rules and Regulations; Philippines, 2013.

Tapang, G. (2018). Don't teach maths and science in English. SciDevNet. Published on January 12, 2020. Retrieved from https://www.scidev.net/global/opinions/don-t-teach-maths-and-science-in-english/ on May 10, 2021.

Tupas, R., & Martin, I. P. (2016). Bilingual and mother tongue-based multilingual education in the Philippines. In O. García et al. (Eds.), *Bilingual and multilingual education* (pp. 247-258). DOI:10.1007/978-3-319-02324-3_18-1.

Uayan, M. D. (2020). The extent of the use of the MTB-MLE in teaching grade 3 mathematics and its effect on the performance of the pupils. *Journal of Educational Research, 5*(8), 1-18.

UNESCO (2005). *First language first: Community-based literacy programmes for minority language contexts in Asia.* Bangkok, Thailand: UNESCO.

Valerio, M. T. B. (2015). Current perspectives on mother tongue-based instruction in the newly implemented K to 12 curriculum of the Philippines. *British Journal of Education, 3*(9), 51-66.

Walter, S. L., & Dekker, D. E. (2011). Mother tongue instruction in Lubuagan: A case study from the Philippines. *International Review of Education, 57*(5-6), 667-683. DOI: 10.1007/s11159-011-9246-4

Wa-Mbaleka, S. (2014). English teachers' perceptions of the mother tongue-based education policy in the Philippines. *European Journal of Research and Reflection in Educational Sciences, 2*(4), 17-32.

Wa-Mbaleka, S. (2015). Switching to mother tongue-based education: The new trend and its challenges. *US-China Foreign Language, 13*(4), 257-264.

Williams, A. B, Metila, R. A, Pradilla, L. A. S & Digo,

M. M. B. (2014). Strategies and challenges in MTB-MLE implementation in the early years (Phase 1 Progress Report). Quezon City: University of the Philippines and University of Melbourne.

Wong, K. M., & Benson, C. (2019). Policy and practice in L1-based multilingual education: Challenges and steps forward. *In FIRE: Forum for International Research in Education, 5*(3), 1-11.

Yang, J. (2017). Korean ESL parents' perspectives and maintenance of mother tongue: A case study of two Korean mothers. *English Language Teaching, 10*(11), 183-190.

Young, C. (2002). First language first: Literacy education for the future in a multilingual Philippine society. *International Journal of Bilingual Education and Bilingualism, 5*(4), 221-232.

Young, C. (2003). First language: A foundation for effective basic education. *Philippine Journal of Linguistics, 34*(1), 123-131.

논문접수: 2021.05.11. / 수정본접수: 2021.09.27. / 게재승인: 2021.09.29.