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Evaluating the Effectiveness of Sugboanong Bisaya Instruction on Pupils' Mathematics Achievement and Behavior Among Blaan Learner: Basis for Proposed Intervention Program

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Abstract

This study investigated the impact of Sugboanong Binisaya (SB)-based instruction on mathematics achievement and classroom behaviors among Grade 3 Blaan pupils in two Indigenous Peoples (IP) schools in Glan District, Sarangani Province. Guided by Mother Tongue-Based Multilingual Education (MTB-MLE) principles, it employed a quasi-experimental design involving two heterogeneous groups—one taught using SB and another using English. Pre-tests and post-tests measured mathematics achievement, while teacher observations and learner self-assessments evaluated cognitive, affective, and psychomotor behaviors. Regression analysis indicated that mother's educational attainment significantly influenced learners' academic performance. Results showed that SB instruction enhanced both mathematics achievement and classroom engagement. The study recommends developing localized instructional materials, strengthening MTB-MLE teacher training, and increasing parental involvement, leading to the proposed intervention program to better support IP learners.

Keywords: Sugboanong Binisaya instruction, mathematics achievement, Indigenous learners, MTB-MLE, classroom behavior

Introduction

Education in a child's native language is fundamental for fostering comprehension, confidence, and engagement, especially among Indigenous learners. Research (Bhatt, 2022; Tamang, 2018) shows that mother tongue instruction improves learning outcomes and preserves cultural identity. In the Philippines,

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Republic Act 10533 mandates the use of local languages in early education under the MTB-MLE framework.

However, challenges persist. In regions like Glan District, where Blaan learners' first language differs from the regional lingua franca (Sugboanong Binisaya), teachers often rely on regional dialects due to a lack of native language materials (Cansino et al., 2022). While MTB-MLE's benefits in literacy are well-documented, its effect on numeracy remains underexplored, especially when the language used is not the learner's true mother tongue (Tenorio, 2024; Loquias, 2023).

This study bridges that gap by examining how SB-based instruction influences mathematics achievement and learner behaviors (cognitive, affective, psychomotor) among Blaan learners. It is anchored in Sociocultural Theory (Vygotsky, 1978), Ecological Systems Theory (Bronfenbrenner, 1979), Behaviorist Learning Theory (Skinner, 1953), and Constructivist Theory (Piaget, 1970), among others. It also considers contrasting views such as Cognitive Load Theory (Sweller, 1988) and Second Language Acquisition Theory (Krashen, 1981).

The study provides critical insights for educational policy and classroom practices in Indigenous contexts.

Methodology

Research Design

The study employed a quasi-experimental design complemented by a descriptive research approach. Two naturally formed groups were compared: the experimental group, taught using Sugboanong Binisaya, and the control group, taught using English. Pre-tests and post-tests measured mathematics achievement, while teacher observations and learner self-assessments gauged behavioral responses.

Locale of the Study

The study was conducted in two remote public schools: Edsa Integrated School and Banlas Integrated School, both located in Glan III District, Sarangani Province.

Respondents and Sampling Technique

All Grade 3 pupils (n=60) and their respective mathematics teachers were included using complete enumeration for pupils and purposive sampling for teachers.

Research Instruments

Three instruments were used:

Three instruments were utilized to collect the data for this study. First, a Demographic Profile Survey was administered to gather information on the learners' age, gender, ethnic origin, family income, and parents' educational attainment. Second, a Mathematics Pre-Test and Post-Test, consisting of 40 items aligned with the Department of Education's (DepEd) Grade 3 Mathematics curriculum, was employed to assess learners' academic performance. Third, a Behavioral Observation Checklist based on a 5-point Likert scale was used to measure learners' behaviors across cognitive, affective, and psychomotor domains, providing a comprehensive view of classroom engagement and participation during the intervention.

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Data Gathering Procedure

Following necessary approvals, pre-tests were administered. The experimental group received mathematics instruction in SB, while the control group used English. Post-tests and behavioral assessments were conducted after eight weeks.

Statistical Treatment

For data analysis, several statistical treatments were employed. Frequency and percentage were used to describe the demographic profiles of the learners. To evaluate academic performance and behavioral outcomes, mean and standard deviation were calculated for test scores and behavioral ratings. Paired t-tests were utilized to compare pre-test and post-test results within each group, while independent t-tests were conducted to assess differences between the experimental and control groups. To determine variations across behavioral domains, a one-way ANOVA was performed. Additionally, Pearson's correlation coefficient was applied to examine the relationship between learners' behaviors and their mathematics achievement. Finally, multiple regression analysis was used to identify the influence of demographic factors on post-test performance. All statistical tests were conducted at a significance level of $\alpha = 0.05$.

Results

Learner Profile

Table 1. Learners Demographic Profile

Category	Details
Gender	63% Female
Age	7–8 years old
Family Income	₱0–₱999 monthly (Low-income families)
Father's Education	52.2% had no formal schooling or only elementary
Mother's Education	41.3% had no formal schooling or only elementary

Table 1 displays most pupils (63%) were female, aged 7–8 years, and belonged to low-income families (monthly income ₱0–₱999). Educational attainment among parents was low, with 52.2% of fathers and 41.3% of mothers having no formal schooling or only elementary education.

Mathematics Achievement

Table 2. Extent of Learners Achievement in the Pre-Test and Post-Test Taught Using Sugbuanong Binisaya and English

Medium of Instruction		Pretest	Verbal Description	Posttest	Verbal Description
English	Mean	64.67	Average	76.76	Average
	SD	2.08		5.53	
Sugbuanong Binisaya	Mean	64.36	Average	76.40	Average
	SD	2.38		6.57	

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Table 2 showed the extent of learners' achievement in the pre-test and post-test in mathematics, comparing pupils taught through English and Sugboanong Binisaya. For the English group, the pre-test mean score was 64.67 (SD = 2.08), classified as "Average," and the post-test mean score improved to 76.76 (SD = 5.53), also interpreted as "Average." Similarly, for the Sugboanong Binisaya group, the pre-test mean score was 64.36 (SD = 2.38), and the post-test mean score increased to 76.40 (SD = 6.57), both falling under the "Average" category.

Behavioral Observations

Table 3. Levels of Pupils Cognitive Behaviors when Taught of Mathematics Through English and Suboanong Binisaya as Perceived by the Teachers

Indicators	English			Sugbuanong Binisaya		
	Mean Ratings	SD	Verbal Description	Mean Ratings	SD	Verbal Description
1. Learner can easily recall and remember the lesson.	2.86	1.20	Moderate	3.64	1.19	Moderate
2. Learner can make a rule on how to solve the problems.	2.71	1.31	Moderate	3.48	1.08	Moderate
3. Learner can solve word problems independently.	2.62	1.24	Moderate	3.60	1.04	High
4. Learner can solve the problems using mathematical operations with less supervision from the teacher.	3.14	1.06	Moderate	3.44	0.96	High
5. The teacher has to repeat the lesson for the Learner to understand.	3.05	1.12	Moderate	2.76	1.01	Moderate
6. When asked about past lessons the majority of the Learner can answer by a simple recall.	2.86	1.24	Moderate	3.28	1.10	Moderate
7. Learners asked a question to translate the worded figures.	2.71	1.06	Moderate	3.04	0.84	Moderate
8. Learner asked the teacher to further explain the meanings of words in Sinugbuanon in either English or Filipino.	2.81	1.12	Moderate	2.92	0.64	Moderate
Mean	2.85	1.17	Moderate	3.27	0.98	Moderate

Table 3 presented the levels of pupils' cognitive behaviors in mathematics as perceived by teachers. Overall, pupils taught in Sugboanong Binisaya demonstrated higher mean ratings (M = 3.27, SD = 0.98) compared to those taught in English (M = 2.85, SD = 1.17), although both groups were interpreted within the "Moderate" verbal description range.

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Specifically, pupils taught through Sugboanong Binisaya achieved higher cognitive engagement in solving word problems independently (M = 3.60, SD = 1.04) and in solving problems using mathematical operations with less supervision (M = 3.44, SD = 0.96), both rated as "High." In contrast, their English-instructed counterparts remained within the "Moderate" range across all indicators. Additionally, pupils taught through Sugboanong Binisaya had a higher recall of lessons (M = 3.64, SD = 1.19) compared to those taught in English (M = 2.86, SD = 1.20).

It is also notable that the English group required more teacher repetition for understanding (M = 3.05, SD = 1.12) compared to the Sugboanong Binisaya group (M = 2.76, SD = 1.01).

Table 4. Levels of Pupils Cognitive Behaviors when Taught of Mathematics Through English and Suboanong Binisaya as Perceived by themselves

Indicators	English			Sugbuanong Binisaya		
	Mean Ratings	SD	Verbal Description	Mean Ratings	SD	Verbal Description
1. I can hardly recall the lesson	3.00	1.05	Moderate	2.56	0.92	Moderate
2. I cannot answer the teacher when I am called.	2.71	1.01	Moderate	2.36	1.19	Moderate
3. I easily forgot the rules of problem-solving.	3.00	1.38	Moderate	2.32	1.03	Moderate
4. I cannot understand some of the terms in Sugbuanong .	2.95	1.12	Moderate	2.04	1.10	Low
5. I have to ask the teacher to translate the words of Sugbuanong mathematics.	2.86	1.28	Moderate	2.36	0.99	Low
6. I have difficulty in reading the words and sentences.	2.86	1.20	Moderate	2.48	0.77	Moderate
7. Words in Sugbuanong are unfamiliar to me.	2.67	1.11	Moderate	2.64	0.95	Moderate
8. I could hardly read the sentences in Sugbuanong .	3.00	1.45	Moderate	2.32	1.11	Low
Mean	**2.88**	**1.20**	**Moderate**	**2.39**	**1.01**	**Low**

Table 4 displays the levels of cognitive behaviors in mathematics as perceived by the pupils themselves. In particular, pupils taught in Sugboanong Binisaya reported fewer difficulties in understanding mathematical terms (M = 2.04, SD = 1.10) and less need for translation assistance (M = 2.36, SD = 0.99).

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Table 5. Levels of Pupils Cognitive Behaviors when Taught of Mathematics Through English and Suboanong Binisaya as Perceived by the Teachers

Indicators	English			Sugbuanong Binisaya		
	Mean Ratings	SD	Verbal Description	Mean Ratings	SD	Verbal Description
1. Learner are interested in the subject matter.	2.81	1.08	Moderate	3.72	1.17	High
2. Learner uses the lesson in their actual life experiences in counting numbers, coins, and paper bills.	2.81	1.12	Moderate	3.52	0.96	High
3. Learner is always attentive listening to the teacher.	2.67	1.06	Moderate	3.80	0.96	High
4. Learner is always awake and participative.	2.67	1.35	Moderate	3.72	1.14	High
5. Learner appreciate their lesson every after the class and share their experiences during the class about the lessons.	2.67	1.15	Moderate	3.48	1.00	High
6. Help others who are having difficulty understanding the lesson	2.90	1.48	Moderate	3.28	1.06	High
Mean	2.75	1.21	Moderate	3.59	1.05	High

Table 5 presents the levels of pupils' affective taught using Sugboanong Binisaya attained a higher overall mean rating (M = 3.59, SD = 1.05), categorized as "High," compared to those taught using English (M = 2.75, SD = 1.21), which remained within the "Moderate" range.

Specifically, teachers observed greater interest in the subject matter (M = 3.72, SD = 1.17), consistent attentiveness (M = 3.80, SD = 0.96), and higher participation (M = 3.72, SD = 1.14) among pupils taught in Sugboanong Binisaya.

Table 6. Level of Pupils' Affective Behaviors when taught of Mathematics through English and Sugboanong Binisaya as perceived by Themselves

Indicators	English			Sugbuanong Binisaya		
	Mean Ratings	SD	Verbal Description	Mean Ratings	SD	Verbal Description
1. I am not interested in listening.	2.90	1.48	Moderate	2.28	1.31	Low
2. I do not appreciate the lesson.	2.76	1.26	Moderate	2.12	1.39	Low

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3. I cannot apply the lesson in actual life experience.	2.71	1.49	Moderate	2.04	1.14	Low
4. I find it more easy to say the numbers and figures in English	3.10	1.30	Moderate	3.04	1.34	Moderate
5. I am not interested in coming to class for my math subject.	2.71	1.23	Moderate	2.28	1.10	Low
6. I do not study math subject.	3.00	1.22	Moderate	2.36	0.86	Low
7. I am forced to copy the answers of my classmates.	3.00	1.22	Moderate	2.08	1.15	Low
8. I felt sad about my grades in math	2.86	1.28	Moderate	2.04	1.17	Low
Mean	2.88	1.31	Moderate	2.28	1.18	Low

Teachers observed higher cognitive and affective behaviors among pupils instructed in SB, with affective behaviors scoring the highest (Mean = 3.59). One-way ANOVA revealed significant differences among behavioral domains ($F = 9.98$, $p = 0.0001$).

Levels of Pupils' Psychomotor Behaviors Based on Teachers' Perception

Table 7. Level of Pupils' Psychomotor Behaviors when taught of Mathematics through English and Sugboanong Binisaya as perceived by Teachers

Indicators	English			Sugbuanong Binisaya		
	Mean Ratings	SD	Verbal Description	Mean Ratings	SD	Verbal Description
1. Learner is excited to raise their hands to go to the board to answer problems.	2.95	1.36	Moderate	3.40	1.38	Moderate
2. Learner is participative in terms of moving around sharing their answers and discussing during group discussions	3.00	1.38	Moderate	3.32	1.07	Moderate
3. Learner is not interested that is why they go out of the classroom to loiter.	2.71	1.27	Moderate	1.96	0.79	Low
4. Learner is sleeping or manifest being sleepy in class during discussions.	2.52	1.08	Low	1.52	0.65	Very Low

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5. Learner is excited that they are noisy inside the classroom.	2.81	1.40	Moderate	2.68	0.75	Moderate
6. Learner can perform the worded problems with agility when called.	3.24	1.04	Moderate	3.00	0.87	Moderate
Mean	2.87	1.26	Moderate	2.65	0.92	Moderate

Table 7 presents the levels of pupils' psychomotor behaviors when taught mathematics through English and Sugboanong Binisaya, as perceived by their teachers. The English group obtained an overall mean rating of 2.87 (SD = 1.26), interpreted as "Moderate," while the Sugboanong Binisaya group recorded a slightly lower mean of 2.65 (SD = 0.92), also interpreted as "Moderate."

However, differences were noted in negative behaviors: pupils taught through Sugboanong Binisaya were perceived to manifest fewer instances of loitering (M = 1.96, SD = 0.79, "Low") and sleeping during class (M = 1.52, SD = 0.65.

Results: Levels of Pupils' Psychomotor Behaviors Based on Self-Perception

Table 8. Level of Pupils' Psychomotor Behaviors when taught of Mathematics through English and Sugboanong Binisaya as perceived by Themselves

Indicators	English			Sugbuanong Binisaya		
	Mean Ratings	SD	Verbal Description	Mean Ratings	SD	Verbal Description
1. I sleep during the class.	2.62	1.28	Moderate	1.96	1.17	Low
2. I am active and interested in listening and I am raising my hands to volunteer.	2.86	1.35	Moderate	3.24	1.27	Moderate
3. I am awake always during class.	3.14	1.35	Moderate	3.12	1.48	Moderate
4. I do not go out and just stay in my seat during the class.	3.29	1.10	Moderate	2.64	1.22	Moderate
5. I talked with my seatmate during the class.	3.10	0.94	Moderate	2.56	1.04	Low
6. I always yawn during the class in math.	2.81	0.93	Moderate	2.48	1.00	Low
7. I am noisy always so I cannot sleep in class.	2.57	1.08	Low	2.48	1.19	Low
Mean	2.91	1.15	Moderate	2.64	1.20	Moderate

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Table 8 shows the levels of pupils' psychomotor behaviors during mathematics classes, Pupils taught using English reported a higher overall mean (M = 2.91, SD = 1.15), interpreted as "Moderate," compared to those taught using Sugboanong Binisaya (M = 2.64, SD = 1.20.

However, pupils in the Sugboanong Binisaya group reported lower incidences of negative behaviors such as sleeping during class (M = 1.96, SD = 1.17, "Low") and talking with seatmates (M = 2.56, SD = 1.04, "Low") compared to those in the English group.

These results suggest that using a more familiar language in instruction may reduce off-task behaviors and enhance classroom focus among Indigenous learners.

T-test Analysis between Pre-Test and Post-Test Scores of Learners Taught through Sugboanong Binisaya

Table 9. Results of the t-test Analysis between Pretest and Posttest Scores of Learners Taught through Sinogbuanong Binisaya

Scores	Mean	SD	df	t-stat	p-value
Posttest	76.40	6.57	48	8.62	0.0000
Pretest	64.36	2.38			

p<.05, significant

Table 9 Results revealed that the mean post-test score (M = 76.40, SD = 6.57) was significantly higher than the mean pre-test score (M = 64.36, SD = 2.38). The paired t-test yielded a t-statistic of 8.62 with 48 degrees of freedom and a p-value of 0.0000, indicating a statistically significant difference ($p < .05$).

T-test Analysis between Pre-Test and Post-Test Scores of Learners Taught through English

Table 10. Results of the t-test Analysis between Pretest and Posttest Scores of Learners Taught through English

Scores	Mean	SD	df	t-stat	p-value
Posttest	76.76	5.53	40	9.38	0.0000
Pretest	64.67	2.08			

p<.05, significant

Table 10 presents the mean post-test score (M = 76.76, SD = 5.53) was significantly higher than the mean pre-test score (M = 64.67, SD = 2.08). The paired t-test produced a t-statistic of 9.38 with 40 degrees of freedom and a p-value of 0.0000, indicating a statistically significant difference ($p < .05$).

One-Way ANOVA of Pupils' Behaviors Based on Self-Perception (Sugboanong Binisaya Instruction)

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Table 11. Results of the one-way ANOVA of the Pupils' Behaviours when taught in Sinogbuanong B as Perceived by themselves

Behaviours	*Count*	*Sum*	*Average*	*Variance*
Cognitive	25	59.63	2.39	0.59
Affective	25	57.00	2.28	0.67
Psychomotor	25	66.00	2.64	0.52

Table 11 presents the results of the one-way ANOVA analysis. The cognitive behaviors recorded an average score of 2.39 with a variance of 0.59, affective behaviors had an average of 2.28 with a variance of 0.67, and psychomotor behaviors showed a slightly higher average of 2.64 with a variance of 0.52.

One-Way ANOVA of Pupils' Behaviors Based on Teachers' Perception (Sugboanong Binisaya Instruction)

Table 12. Results of the one-way Analysis of Variance of the Pupils' Behaviours when taught in SB as Perceived by Teachers

SUMMARY

Behaviours	*Count*	*Sum*	*Average*	*Variance*
Cognitive	25	81.75	3.27	0.50
Affective	25	89.67	3.59	0.89
Psychomotor	25	66.17	2.65	0.33

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*
Between Groups	11.44	2	5.72	9.98	0.0001
Within Groups	41.26	72	0.57		
Total	52.70	74			

p<.05, significant

Table 12 presents the results of the one-way ANOVA among the three domains, affective behaviors obtained the highest mean rating (M = 3.59, Variance = 0.89), followed by cognitive behaviors (M = 3.27, Variance = 0.50), and psychomotor behaviors (M = 2.65, Variance = 0.33).

The ANOVA test revealed a statistically significant difference among the behavior domains, $F(2, 72) = 9.98$, $p = 0.0001$ ($p < .05$).

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One-Way ANOVA of Pupils' Behaviors Based on Self-Perception (English Instruction)

Table 13. Results of the one-way ANOVA on Pupils' Behaviours when taught in English as Perceived by themselves

Behaviours	*Count*	*Sum*	*Average*	*Variance*
Cognitive	25	59.63	2.39	0.59
Affective	25	57.00	2.28	0.67
Psychomotor	25	66.00	2.64	0.52

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*
Between Groups	1.71	2	0.86	1.45	0.2410
Within Groups	42.50	72	0.59		
Total	44.22	74			

p<.05, significant

Table 13 presents the results of the one-way ANOVA analysis comparing the levels of pupils' cognitive, affective, and psychomotor behaviors when taught mathematics. Among the three domains, affective behaviors obtained the highest mean rating (M = 3.59, Variance = 0.89), followed by cognitive behaviors (M = 3.27, Variance = 0.50), and psychomotor behaviors (M = 2.65, Variance = 0.33).

The ANOVA test revealed a statistically significant difference among the behavior domains, $F(2, 72) = 9.98$, $p = 0.0001$ ($p < .05$).

One-Way ANOVA of Pupils' Behaviors Based on Teachers' Perception (English Instruction)

Table 14. Results of the one-way Analysis of Variance of the Pupils' Behaviours when taught in English as Perceived by Teachers

SUMMARY

Behaviours	*Count*	*Sum*	*Average*	*Variance*
Cognitive	25	81.75	3.27	0.50
Affective	25	89.67	3.59	0.89
Psychomotor	25	66.17	2.65	0.33

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*
Between Groups	11.44	2	5.72	9.98	0.0001

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Within Groups	41.26	72	0.57
Total	52.70	74	

p<.05, significant

Table 14 presents the one-way ANOVA results comparing the levels of pupils' cognitive, affective, based on teachers' observations. Among the three domains, affective behaviors obtained the highest mean rating (M = 3.59, Variance = 0.89), followed by cognitive behaviors (M = 3.27, Variance = 0.50), and psychomotor behaviors (M = 2.65, Variance = 0.33).

The ANOVA analysis yielded a statistically significant result, $F(2, 72) = 9.98$, $p = 0.0001$ ($p < .05$), indicating significant differences in behavior ratings across the three domains.

Table 15. Regression Anlysis between the Pupils' Demographic Factors and Posttest Scores using Sugboanong Binisaya Instruction.

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	69.26	3.98	17.42	0.0000
Age	0.96	1.16	0.84	0.4140
Gender	-4.24	2.14	-1.98	0.0626
Family Income	1.77	1.03	1.73	0.1001
Education (father)	2.07	1.78	1.16	0.2595
Education (mother)	2.54	1.12	2.28	0.0345

Regression Analysis Between Pupils' Demographic Factors and Post-Test Scores (Sugboanong Binisaya Instruction)

Table 16. Regression Anlysis between the Pupils' Demographic Factors and Posttest Scores using Sugboanong Binisaya Instruction.

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	69.26	3.98	17.42	0.0000
Age	0.96	1.16	0.84	0.4140
Gender	-4.24	2.14	-1.98	0.0626

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Family Income	1.77	1.03	1.73	0.1001
Education (father)	2.07	1.78	1.16	0.2595
Education (mother)	2.54	1.12	2.28	0.0345

Notes: R^2=.7065, F(5,19)=9.15, p=.0002

Table 16 presents the results of the multiple regression analysis the overall model was statistically significant, F(5,19) = 9.15, p = 0.0002, with an R^2 value of 0.7065, indicating that approximately 70.65% of the variance in post-test scores could be explained by the combined demographic variables.

Among the predictors, only the mother's educational attainment was found to have a statistically significant effect on post-test scores (B = 2.54, SE = 1.12, t = 2.28, p = 0.0345). Other demographic factors—including age (p = 0.4140), gender (p = 0.0626), family income (p = 0.1001), and father's education (p = 0.2595)—were not found to be statistically significant predictors individually.

Relationship Between Behaviors and Achievement

Positive correlations were found between mathematics achievement and behavioral domains, with affective behaviors (teacher perceptions) exhibiting the strongest relationship.

Influence of Demographic Factors

Regression analysis indicated that demographic variables collectively accounted for 70.65% of the variance in post-test scores (R^2 = 0.7065). Mother's educational attainment emerged as the only significant individual predictor (p = 0.0345).

Discussion

Mother Tongue Instruction and Academic Achievement

This study's findings provide clear evidence that using the mother tongue as the medium of instruction can significantly enhance academic performance among Indigenous learners. Teaching mathematics in Sugboanong Binisaya led to notable improvements in Blaan pupils' math achievement, supporting the effectiveness of Mother Tongue-Based Multilingual Education (MTB-MLE). This is consistent with UNESCO (2022). Similarly, the United Nations (n.d.) reported that a mismatch between the home and school language creates learning inequalities and marginalization.

Empirical evidence from the Philippines and abroad supports this conclusion. The historic Iloilo Experiment (Aguilar, 1961) demonstrated that students taught in Hiligaynon performed better and transitioned to English more effectively. These findings affirm that instruction in a familiar language promotes cognitive growth, especially in abstract subjects like mathematics.

Learner Engagement and Affective Outcomes

Beyond academic scores, the study observed increased classroom engagement, particularly in the cognitive and affective domains. Learners taught in Sugboanong Binisaya showed more enthusiasm, participation, and confidence in math lessons. UNESCO (2025) also found that using familiar languages reduces anxiety and increases classroom participation.

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The use of Sugboanong Binisaya likely reduced the cognitive load on Blaan learners, allowing them to focus more on mathematical concepts rather than language decoding. In this study, instruction in a familiar language likely lowered this affective filter, encouraging greater learner interaction and attentiveness.

Influence of Mothers' Educational Attainment

A significant finding was the strong influence of mothers' educational attainment on learners' academic performance. This aligns with Jackson et al. (2017), who found that maternal education is one of the strongest predictors of children's academic success. Tang et al. (2014) similarly reported that children of more educated mothers perform better in early literacy and math, with effects that persist throughout elementary school.

In the Blaan context, even with the benefits of mother tongue instruction, maternal education remained a key determinant of performance. This suggests that MTB-MLE interventions should be paired with community-based strategies that involve and support parents, especially mothers, to reinforce learning at home.

Summary

Overall, this study reinforces the value of MTB-MLE in improving both academic and behavioral outcomes among Indigenous learners. The enhanced mathematics achievement and learner engagement observed when using Sugboanong Binisaya align with both national (Aguilar, 1961; Walter & Dekker, 2011) and international findings (UNESCO, 2022; Walter & Trammell, 2010). At the same time, the significant impact of mothers' education underscores the need to address socio-cultural factors in Indigenous education. These findings highlight that effective instruction must not only be linguistically accessible but also supported by engaged and educated families to achieve lasting impact.

Conclusion

This study demonstrated that utilizing Sugboanong Binisaya as the medium of instruction significantly improved the mathematics achievement and classroom engagement of Grade 3 Blaan learners in Indigenous Peoples schools in Glan III District, Sarangani Province. The experimental group taught through Sugboanong Binisaya exhibited greater gains in post-test scores and demonstrated higher levels of cognitive and affective behaviors compared to the control group taught in English.

Behavioral engagement, particularly in the affective domain, strongly correlated with academic performance, highlighting the crucial role of emotional connection and motivation in learning. Moreover, the study revealed that among demographic factors, mother's educational attainment significantly influenced pupils' academic outcomes, suggesting the importance of home learning environments in supporting formal education.

These findings affirm the value of culturally and linguistically responsive teaching practices, even when the regional language differs slightly from the students' true mother tongue. The results reinforce the theoretical foundations of Sociocultural Theory, Constructivism, and Ecological Systems Theory, emphasizing that language, culture, and social context must be central considerations in education, especially in Indigenous settings.

Thus, localized, culturally aligned instruction can bridge learning gaps, promote stronger learner engagement, and contribute to more equitable and effective educational outcomes for Indigenous learners.

Recommendations

Based on the findings, several practical recommendations are proposed to improve the learning experience of Indigenous Blaan pupils. First, schools should create and adapt math materials in Sugboanong Binisaya, ensuring that lessons reflect the learners' language and culture, while still keeping technical terms accurate. Second, teachers need targeted training on how to use MTB-MLE effectively, including workshops on culturally sensitive teaching and managing diverse classrooms. Third, it's important to involve parents—especially mothers—more actively through community programs and orientation sessions, helping them support learning at home. Fourth, the Department of Education is encouraged to review MTB-MLE policies, allowing the use of regional languages like Sugboanong Binisaya when native language materials are not yet available, and to allocate more resources to support Indigenous education. Lastly, future studies should explore how mother tongue instruction affects learning over time and examine ways to help students smoothly transition between languages as they advance in school.

References

Aguilar, M. A. (1961). The Iloilo experiment in education through the vernacular. *Philippine Journal of Education*, 40(2), 1–15.

Benson, C. (2005). Girls, educational equity and mother tongue-based teaching. *UNESCO Bangkok*.

Jackson, M., Kiernan, K., & McLanahan, S. (2017). Maternal education, parenting practices, and children's academic outcomes. *Annual Review of Sociology*, 43(1), 45–70. https://doi.org/10.1146/annurev-soc-060116-053424

Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon Press.

Tang, S., Dearing, E., & Weiss, H. B. (2014). Mother's education and early academic achievement: Variation by children's age and family structure. *Child Development*, 85(2), 747–763. https://doi.org/10.1111/cdev.12146

UNESCO. (2022). *Using multilingual education to improve learning outcomes*. https://unesdoc.unesco.org

UNESCO. (2025). *Inclusive education for displaced and migrant children: Evidence from multilingual classrooms*. UNESCO Publishing.

United Nations. (n.d.). *Education and language barriers: Global learning crisis*. https://www.un.org

Walter, S., & Dekker, D. (2011). Mother tongue instruction in Lubuagan: A case study from the Philippines. *International Review of Education*, 57(5), 667–683. https://doi.org/10.1007/s11159-011-9255-3

Walter, S., & Trammell, B. (2010). The Kom experiment: Testing the efficacy of mother tongue instruction in Cameroon. *SIL International*.