

A Look into the Discursive Practice of Translanguaging of Multilingual Learners in Mathematics: A Parallel Convergent Approach

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ABSTRACT

Translanguaging is an ability to use language fluidly to make meaning beyond one or two languages. This parallel convergent mixed methods aimed to address the discursive practice on translanguaging of multilingual learners in a Mathematics. By descriptive correlational design, the quantitative phase used standardized survey instrument in determining the status the translanguaging tendencies and grades in identifying the performance in Mathematics of 300 randomly selected Mathematics learners. On the other hand, a triangulation of classroom observations and in-depth interviews with ten purposefully sampled learners were utilized in the qualitative phase, which explored their discourses during translanguaging and how do these discourses help in their learning process. Statistical analysis revealed moderate translanguaging tendencies and good level of performance. Correlation revealed that translanguaging tendencies have no significant relationship with Mathematics performance. Findings also revealed that learners discourse used during translanguaging includes exposition and argumentation. Thematic analysis emerged four themes on the participant's uses of translanguaging in the learning process which include elucidating concepts, facilitating understanding, considering the present scenarios of communication, and overcoming challenges. Remarkably, the mixing of the salient qualitative and quantitative findings revealed merging-converging, diverging, and associating types of nature of integration.

Keywords: Education, applied linguistics, translanguaging, mathematics, parallel convergent, Philippines

INTRODUCTION

The identities of individual languages in structural and/or socio-political terms become relevant most often than not in a teaching-learning environment. In an environment of Mathematics learning, there has been an identified gap in achievement among monolingual and multilingual learners as evidenced by researches in some countries dating more than 30 years ago. For other countries, this gap has been acknowledged more recently and traced back to a limited language proficiency in the official language of instruction (Haag et al., 2013).

The underachievement of students in Mathematics has been purported to the unfamiliarity of language used in the classroom (Nath et al., 2009; Ongstad, 2006). It cannot be denied that most of the prospective college students are unprepared for learning Mathematics. The low understanding level accompanied by discouraging achievements of the students in Mathematics has become a cause of great concern of our country and has bothered badly the educationists (Patena & Dinglasan, 2013). Scholars concerned with academic underachievement among bilingual students began to address important questions about the language these students bring to school and how language may relate to the understanding of school failure (MacSwan, 2017).

In many European countries, bilingual teaching programs are discussed controversially. Although the Council of Europe pleads for including students' home languages in subject-matter courses, most European school systems are still reluctant to open their monolingual classrooms to home languages as the state of research on the benefits of including home languages is not yet consistent (Meyer et al., 2016).

The United States, on the other hand, does not have an official national language policy describing specific language policies and practices for schools. However, many states have passed language policy legislation that ensures the status of English-Only policy over other languages (Shafie et al., 2010; Kaptan et al., 2012). This is in spite of the several research studies over the last 17 years and over a range of contexts provide evidence that enabling students to draw on all of their languaging resources for learning supports that learning (Moll, et al., 2013; Paris, 2012).

One of these studies was of He, Lai & Lin who deeply explored a Math education professor's translanguaging (between Chinese and English) and trans-semiotizing (between verbal explanations and visual displays, Mathematics symbols, images, and graphic organizers, etc.) practices during a tertiary Mathematics education seminar in Hong Kong. The analysis shows that translanguaging and trans-semiotizing strategies interplay to facilitate intercultural communication in the intellectual inquiry of multimodal Mathematics discourse at the tertiary level (He et al., 2016).

Meanwhile in the Philippines, the Commission on Higher Education (CHED) mandated the use of the English language as the primary medium of instruction in the tertiary or higher education level (CHED, 2003). English is also introduced as the "global" language, as well as the language of Math, science and technology (Villanueva et al., 2009). Nevertheless, a study revealed that the use of Filipino language as a medium in teaching Mathematics has significantly improved students' performance. Further, the study investigated the benefits of introducing such intervention to students in a broader perspective. Thus, the adoption of multilingual instruction in Mathematics is then believed to be essential in alleviating students' performance.

Mathematics is a pillar of almost all the streams in academic sectors (Tsanwani, 2009). Given the important role Mathematics plays in tertiary education and most careers, it becomes necessary to consider ESL students' home-language as part of content-learning in order to improve their comprehension skills and appreciate their L1.

In multilingual setting such as that of Philippines where learners come from diverse cultural and linguistic backgrounds, teachers need to synchronize their pedagogies to multilingual principles and translanguaging so as to ease the transfer of knowledge, and to establish their linguistic repertoire (Canagarajah, 2013; García et al., 2014). Moreover, higher education is increasingly characterized by the global movement of people and ideas. For this reason, it is a particularly ripe context for translanguaging.

Nonetheless, even with the groundbreaking researches described above, much remains in question about translanguaging. Almost no literature exists on translanguaging in higher education, since most (though not all) of the existing literature explores translanguaging in primary and occasionally secondary classrooms. Furthermore, studies of spontaneous translanguaging have mainly

focused on cases of bilingual speakers who speak an additional language in English-speaking countries (Martin-Beltrán, 2014; Martínez-Roldán, 2015; Gort and Sembiente, 2015) and not on the regional and local minority languages with a minority status in the country. Thus, there is also a lack of research on translanguaging in global bi- and multilingual contexts.

Worldview and Theoretical Lens

Positivism and Interpretivism are the two basic approaches to research methods in Sociology. Positivists prefer quantitative methods, while Interpretivists prefer qualitative methods (Nguyen et al., 2015). Positivist approach is employed in the study during the use of researcher-made surveys questionnaires and statistics tools as methods. On the other hand, interpretivist approach is utilized through conducting classroom observation and unstructured interviews.

The study also employed the Translanguaging theory (Otheguy, García, & Reid, 2015; Garcia & Li, 2014; Canagarajah, 2012; Baker, 2011; Garcia, 2009). Translanguaging is a theoretical lens that offers a different view of bilingualism and multilingualism. The theory posits that bilinguals, multilinguals, and indeed, all users of language select and deploy particular features from a unitary linguistic repertoire to make meaning and to negotiate particular communicative contexts. It counters the traditional thought of language users possessing two or more autonomous language systems. Translanguaging also represents an approach to language pedagogy that affirms and leverages students' diverse and dynamic language practices in teaching and learning.

The study is also anchored on the Social Learning Theory of Vygotsky (1978). Social Learning Theory by Vygotsky (1978) explained how people learn in social contexts (learn from each other) and informs how teachers construct active learning communities. According to this theory, social interaction is the source of learning and development which is not found solely in the mind of an individual. Thus, students learn through interactions and communication with others. Further, Vygotsky examined how social environments influence the learning process. He suggested that learning takes place through the interactions students have with their peers, teachers and experts. Therefore, there is a need for students to

participate actively in classroom interactions and speaking activities because these may lead them to achieve good academic performance.

METHODOLOGY

Research Design

This study employed a mixed methods design particularly convergent parallel mixed method approach. Mixed methods research draw liberally from both quantitative and qualitative assumptions when they engage in their research (Cherryholmes, 1992; Morgan, 2007; Creswell, 2008). Creswell and Clark (2007) justify the use of mixed methods as a second method is needed to enhance a primary method.

In the design, the quantitative phase employed descriptive statistics to get the results on the status of translanguaging tendencies, and level of the multilingual learner's performance in mathematics. Descriptive study is a type of research in which information is collected without changing or manipulating the environment. The qualitative phase of this study is phenomenological. The purpose of this is to 'describe' events, people or subjects as they exist. quantitative data through a survey questionnaire and Mathematics grade and qualitative data through classroom observation, interview, audio and video recording and transcription were collected and analyzed simultaneously.

Place of the Study

The study was conducted at University A at Lianga, Surigao del Sur. The University Campus is one of the satellite Campuses of the SDSSU System. It is the only State University located in the Municipality of Lianga which comprises of 13 Barangays and the only Fisheries school in the Province of Surigao del Sur. The Institution was established on the year 1948 as a national high school but now, it achieved its status as a university through Republic Act 9998 signed on February 22, 2010. Furthermore, the institution offered eight (8) programs which are all CHED-recognized and AACCUP accredited. Currently, it has 1,343 enrollees, 694 of which are freshmen students who are enrolled in the subjects under the Revised General Education Curriculum (RGECE). Moreover, the University Campus is one of the State Universities and Colleges (SUCs) in the Caraga Region that offers tuition-free higher education. As State Universities

and Colleges (SUC's) offer tuition-free higher education, University A has attracted linguistically diverse students from all over the CARAGA region which made the locale a prospect for multilingual translanguaging in higher education.

Participants

In quantitative phase of this study, random sampling was applied in the selection of the survey participants. A total of 300 survey participants or 50% of the freshmen population who are enrolled in the Mathematics in the Modern World subject on the first and second semesters of the Academic Year 2018-2019 were chosen.

In this phase, non-probability sampling specifically purposive sampling techniques was employed. In this study, the participants were the tertiary multilingual learners who were officially enrolled in Mathematics in the Modern World subject at University A on the first and second semesters of the academic year 2018-2019. Furthermore, the participant's age ranged from 18-30. These participants speak languages other than English and Tagalog. Moreover, to protect the identity of the participants, coding was used. 001 to 300 was used as codes for this study. In the selection of interview participants, Onwuegbuzie et al., (2007) recommended ten participants for phenomenological studies. Same number of participants was employed in this study that was selected through random sampling.

Data Analysis

Frequency Count, Percentage Rank, Weighted Mean and Correlation Analysis. Data from the survey questionnaire was subjected for analysis in the quantitative phase of this MMR study. After the retrieval of the questionnaire, the data were tallied and treated. Survey data were analyzed using SPSS version 22 for descriptive and inferential statistics. These statistical treatments used to identify the status of translanguaging tendencies and the level of the multilingual learner's Mathematics performance, and significant relationship between the translanguaging tendencies and Mathematics performance.

Discourse Analysis. In this MMR study, data were collected from the multilingual learners through recorded classroom observation. In analyzing the recorded classroom observation, the detailed transcripts were explored as to modes of discourse employed

by the participants during the classroom interaction. The aforementioned form of analyzing the data aims to examine the discursive practice on translanguaging of multilingual learners during classroom interaction.

Thematic Analysis. In this study, the researcher probed for patterns and themes that were generated from the utterances or statements of the participants during the one-on-one interview. The themes were framed on purpose of translanguaging on the learning of the participants

Trustworthiness of the Study

To establish the trustworthiness of the study, the researcher followed the four proposed criteria in evaluating interpretive research work by Lincoln and Guba (1985), which are as follows: credibility, transferability, dependability, and confirmability. Trustworthiness of this study was addressed through a thorough collection of data by survey and in-depth interview and was supported by FGD for triangulation.

RESULTS

**Status of the Multilingual Learners in Translanguaging
Tendencies and Performance in Mathematics**

**Status of the Multilingual Learners in Translanguaging
Tendencies.** Revealed in Table 1.1 is the status of translanguaging tendencies of the multilinguals learners. The table displays the statements classified into four categories, namely: Framework Task and Using L1 as a Scaffolding Resource obtained the descriptive rating of high, Crosslinguaging got moderate and Meshing got low. Next to it is the mean, standard deviation and the descriptive rating.

Table 1.1
**Status of the Multilingual Learners in Translanguaging
Tendencies**

Category	Mean	SD	Descriptive Level
Framework tasks	3.67	0.71	High

Using L1 as scaffolding resource	3.66	0.63	High
Crosslinguaging	2.84	0.79	Moderate
Meshing	2.52	0.78	Low
OVERALL MEAN	3.17	0.46	Moderate

The overall mean on the status of multilingual learners in translanguaging tendencies is 3.17 described as high with a standard deviation of 0.46. The category on framework task got the highest mean of 3.67 with a descriptive rating of high. Meanwhile the category meshing got the lowest mean of 2.52 with a descriptive rating of very low.

Performance in Mathematics. Shown in Table 1.2 is the level of the multilingual learner's performance in Mathematics. For the purpose of easy correlation with the status of multilingual learners translanguaging tendencies, grade is divided into five levels. Starting from grade 70 to 74 is grade level 1 described as failed, dropped or withdrawn. Next, grade 75 to 79 is grade level 2 described as fair. Grade 80 to 84 is grade level 3 with descriptive rating of good. Then grade 85 to 89 is grade level 4 with the descriptive rating of satisfactory. Lastly, grade 90 to 95 is grade level 5 described as very satisfactory. The descriptive rating assigned to each grade level was based from the University A's description of grades as reflected in the student's handbook. The table also displays the frequency count and percentage of the multilingual learner's performance per level.

Table 1.2.
Performance in Mathematics

Grade	Level	Descriptive Rating	Frequency (<i>f</i>)	Percentage (%)
90-95	5	Very Satisfactory	13	4.33
85-89	4	Satisfactory	79	26.33
80-84	3	Good	170	56.67
75-79	2	Fair	25	8.33
74-70	1	Failed, Dropped, Withdrawn	13	4.33

The result shows that the highest percentage of 56.67% or 170 of the respondents got a descriptive rating of good or level 3 of 5 under grade bracket of 80-84. This denotes that more than half of the learners has good performance in Mathematics. In contrast, the lowest percentage 4.33% or 13 of the respondents got a descriptive rating of very satisfactory or level 5 of 5 and failed, dropped, withdrawn or 1 of 5 under grade brackets of 90-95 and 74-70 respectively. This represent an evenly distributed number of extreme performers. In general, 92 or 30.67% belong to above good performers and 38 students or 12.67% of the learners belong to below good performers. This indicates that good performers constitute the largest number of respondents, followed by below good performers and lastly, the above good performers. This denotes that majority of the students have acquired good performance in Mathematics.

Relationship between the Multilingual Learners in Translanguaging Tendencies and the Performance in Mathematics

Showcased in Table 2 is the significant relationship of the identified translanguaging domains to the level of performance in Mathematics of the multilingual learners. Displayed in the correlation are the r-value and p-value of Framework Task, Using L1 as Scaffolding Resource, Crosslanguaging and Meshing paired with Performance. R-value of -.01 to .08 and p-value of .92 to .17 of the variables are all interpreted as not significant.

Table 2
**Correlation between Translanguaging Tendencies and
Performance**

<i>Variables Paired</i>	<i>r-value</i>	<i>p-value</i>	<i>Interpretation</i>
Framework Task and Performance	.06	.23	Not significant
Scaffolding Resource and Performance	.08	.17	Not significant
Crosslanguaging and	-.01	.92	Not

Performance			significant
Meshing and			Not
Performance	.03	.27	significant
Overall	.06	.27	Not
			significant
$r^2 = .009$	$f = .668$	$p\text{-value} = .614$	

Overall, Translanguaging got the *R-value* of .06 and *p-value* of .27 interpreted as not significant. It further denotes that translanguaging as a whole does not significantly predict the performance of the multilingual students in Math. The R-squared of the correlation is .009. This value explains the degree of relationship between two variables, the translanguaging tendencies and Mathematics performance.

Discourses used during Translanguaging

Shown in Table 3.1 is the profile of the participants who were the source of data of this study. Codes are used in the presentation of the participants to keep the confidentiality of the study. IDI is used for in-depth interview participant. The number next to the code signifies the number of the participant in this category. In the in-depth interview, two out of ten participants speak Kinamayuyu as their mother tongue. Eight of the informants can either speak or understand Kinamayuyu but they have Bisaya as their mother tongue. Meanwhile, CO is the code used for classroom observation. In the classroom observation, there was a minimum of 20 students and a maximum of 50 students in each class. For every participation taken by the students, codes are assigned to them. SX-f is assigned for an unknown student identified only as female while SX-m is for unknown student identified only as male. S is for a known student and Ss is for students or group of students. There were a total of eight classroom observations conducted. The number next to CO in the reference identifies sequence of the classroom observation. Lastly, the classes observed from CO1 to CO 8 are multilinguals as they either use or understand English, Tagalog, Bisaya and Kinamayuyu languages in their Math class.

Table 3.1
Profile of the Participants

Code	Sex	Languages	Study Group
IDI 1	M	English, Tagalog, Bisaya	In-depth interview
IDI 2	M	English, Tagalog, Bisaya	In-depth interview
IDI 3	F	English, Tagalog, Bisaya	In-depth interview
IDI 4	F	English, Tagalog, Bisaya	In-depth interview
IDI 5	F	English, Tagalog, Bisaya	In-depth interview
IDI 6	F	English, Tagalog, Bisaya	In-depth interview
IDI 7	F	English, Tagalog, Bisaya	In-depth interview
IDI 8	F	English, Tagalog, Bisaya, Kinamayu	In-depth interview
IDI 9	M	English, Tagalog, Bisaya, Kinamayu	In-depth interview
IDI 10	M	English, Tagalog, Bisaya	In-depth interview
Ss1-Ss17	CO 1	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
S1-S22	CO 1	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-m1-SX-m11	CO 1	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-f1-17	CO 1	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
Ss1-Ss17	CO 2	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
S1-S17	CO 2	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-m1-SX-m38	CO 2	English, Tagalog, Bisaya, Kinamayu	Classroom Observation

SX-f1-14	CO 2	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
Ss1-Ss12	CO 3	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
S1-S18	CO 3	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-m1- SX-m29	CO 3	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-f1-12	CO 3	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
Ss1-Ss19	CO 4	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
S1-S13	CO 4	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-m1- SX-m15	CO 4	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-f1- SX-f16	CO 4	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
Ss1-Ss20	CO 5	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
S1-S11	CO 5	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-m1- SX-m7	CO 5	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-f1-11	CO 5	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
Ss1-Ss16	CO 6	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
S1-S8	CO 6	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-m1- SX-m13	CO 6	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-f1-13	CO 6	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
Ss1-Ss38	CO 7	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
S1-S12	CO 7	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-m1- SX-m21	CO 7	English, Tagalog, Bisaya, Kinamayu	Classroom Observation

SX-f1-33	CO 7	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
Ss1-Ss47	CO 8	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
S1-S11	CO 8	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-m1- SX-m27	CO 8	English, Tagalog, Bisaya, Kinamayu	Classroom Observation
SX-f1-31	CO 8	English, Tagalog, Bisaya, Kinamayu	Classroom Observation

Shown in Table 3 are the modes of discourses used during translanguaging. In this study, it was found out that exposition and argumentation were the modes of discourses used during translanguaging in Mathematics class. The table also includes sample utterances per discourse used by the students from the eight classroom observations conducted by the researcher.

Table 3.2
Discourses used during Translanguaging

Mode of Discourse	Sample Utterances
Exposition definition	T: oh what is Cartesian product. {calls random students} <i>walay na</i> research <i>sa</i> definition?
	...
	– SX-m6: X and Y <i>ra</i> . T: X and Y. yes mister [S4/last]. S4: uhm from the word itself Cartesian product is Cartesian plane you see the X and Y where is the X, is the positive and negative, <i>aw</i> <mumbles>. yeah a b <i>basta</i> there are four. {students laugh}. yeah <i>basta</i> X and Y considered <i>da</i> Cartesian plane. (CO 4)

Exposition – classification	<p>T: what is natural number? starts with 0? Ss2: <i>sa</i> 1 ma'am. T: yes. starts with 1. so <i>kung ... mag-start ta sa</i> 1, natural number between 1 and 2, SX-m2: <i>dili na s'ya</i> natural ma'am. ... T: 1.1, 1.2 to 1.9 is not a natural number. SX-m4: <i>dili na</i> natural <i>kay naa na nay</i> point. (CO 1)</p>
Exposition – comparison and contrast	<p>: and then? what's the difference <i>lagi</i> between <i>sa</i> CxD and Dx C? <i>ingon ka parehas ra</i>. S5: <i>bali ra sila</i> ma'am. SX-m7: reverse. SX-m8: swapping. <laughs> (CO 4)</p>
Exposition – process analysis	<p>T: okay who will explain? miss, [S22/last] explain. <i>kay kaw man nag-answer</i>. S20: so, B intersection C. so <i>ang</i> intersection <i>sa</i> B <i>ug</i> C is, 4, 8, 9. then, difference <i>kung</i> A, is union to C is 0, 1, 3, 4, 5, 6, 7, 8, 9. then, <i>ato i-cancel out ang</i> common elements <i>para makuha nato ang</i> difference. so, <i>ang</i> common elements is, <i>aw</i> are, 4, 8 and 9. so, <i>diba galaong si</i> ma'am <i>na haw</i> difference is, <i>mas i-priority ang pinaka-una</i>. so, <i>mawara da ini</i>. so <i>ang bilin</i>, null set. (CO 1)</p>

Argumentation

Teacher: so as business people in the near future, ...why is it important to study or to have a problem solving skill? ...

...

S3: for me ma'am, it is very important especially in business because (2.0) like ah (.) accounting, part *g'yud na sa magkuan* because accounting is art of recording, specifying, summarizing, interpreting the business transaction in terms of <un>xxxxx. </un>

(CO 6)

Exposition Definition. Learners are using exposition definition as a discursive practice in the Math class. This discourse is evident when multilingual students are asked to explain the term “infinite set”. By defining, students translanguaged by translating or mixing languages in an utterance. The excerpts below are the direct utterances of the students which prove that this discourse is employed in the class.

T: infinite set. oh what is infinite set?

SX-f4: unending.

SX-f5: cannot be measured.

T: cannot be measured?

SX-f6: cannot be listed.

Exposition Classification. Another type of exposition used as a discourse in the class is classification. This discourse is utilized when multilingual students are to identify which items qualify the categories “natural numbers between 1 and 2” and “positive integers less than 15” being presented. The excerpt below is an example of such discourse.

T: what is natural number? starts with 0?

Ss2: with 1 ma'am.

T: yes. starts with 1. so if we will start on 1, natural number between 1 and 2,

SX-m2: it's no longer natural ma'am.

Exposition Comparison and Contrast. Aside from the two aforementioned types of exposition, comparison and contrast is another type of exposition discourse employed in the Math class. This type is usually used by multilingual students when looking at similarities and differences of set concept in Math. The excerpts below illustrate this discourse.

T: ... how will you differentiate the two groups? ...

S1: in the (.) inside ma'am we can only see few but in the outside we can see a lot more. <3>based on my experience.</3>

Exposition Process Analysis. The last type of exposition discourse used is process analysis. This discourse is noted when multilingual students explain the pattern of a deductive reasoning activity performed in class. On some level, process analysis has something in common with narrative. The excerpts below affirm this finding.

T: what is the pattern? what pattern can you see in this? based on the example? ... my question is, what is the pattern? why is it 16? yes miss [S9]? ...

SX-m24: <13>ma'am add. add.</13>

T: add what?

SX-m24: 1+1, 2. 2+2, 4. 4+4, 8. 8+8, 16

Argumentation. The second mode of discourse used by students during translanguaging is argumentation. This discourse is often used when multilingual students articulate opinion or reason on the importance of having problem solving skills and on which method between inductive and deductive reasoning is best. The direct utterances between teacher and students are presented below.

T: huh? no question? okay my question is, what is the best method? is it inductive reasoning or deductive reasoning?... oh I heard someone saying inductive here. why is it inductive?

SX-f33: deductive for me because when, when you analyze the situation, uhm you can (.) prove that your answer is correct because through your solution.

Uses of Translanguaging Discourses in the Learning Process of Students

Shown in Table 4 are the uses of translanguaging discourses in the learning process of students. The thematic analysis below shows how the thematic statements were derived from issues probed, core ideas, and codes or categories. The supporting theoretical lens for each of the formulated theme was also indicated.

The results reveal four emerging themes presented in a thematic statement form, namely: 1) elucidating concepts, 2) facilitating understanding, 3) considering present scenarios of communication than on future prospects; and 4) overcoming challenges. These themes were generated from the ten in-depth interviews conducted with the selected participants. These uses of translanguaging are illustrated below.

Table 4
Uses of Translanguaging Discourses in the Learning Process of Students

Essential Themes	Core Ideas
Elucidating concepts	Students do not understand easily when English is used in explaining
	Students prefer to mix languages when explaining answers during oral recitation
	Students are allowed to ask questions or clarifications in vernacular or mixed with English
	Students prefer teacher to ask questions and clarifications in vernacular or mixed with English
	Students understand each other when

Facilitating understanding	<p>vernacular and English are simultaneously used compared to using English only</p> <p>Students easily use vernacular in sharing thoughts and ideas to others</p> <p>Students believe that ideas are best expressed when using the most comfortable language</p> <p>Students simultaneously use different languages for easier expression of ideas</p>
Considering present scenarios of communication than on prospects	<p>Students will not be encouraged to practice speaking in English</p> <p>Students' English-speaking skills will not be harnessed</p> <p>Students are aware that they should not be dependent in being allowed to mixed languages</p> <p>When students encounter persons fluent in English whom they need to speak to, they may not be as confident</p>
Overcoming challenges	<p>students prefer the mixing of languages</p> <p>students observe using English in Math class more loose compared to English class</p> <p>students have poor English vocabulary</p> <p>Students' ideas can be vague when translated since many terms in Math do not have vernacular equivalent</p>

Elucidating Concepts. It was noted during class observation that students indeed use translanguageing in their Math class. During the in-depth-interview, it was verified that learners would use other languages (Kinamayo, Bisaya and Tagalog) in explaining, asking and clarifying Math concepts and ideas. They have affirmed this use of translanguageing as follows:

When explaining because if there, if there is a question it can be uttered in English(.) just gradually. (IDI 8)

Facilitating Understanding. This study found out the translanguageing is employed by multilingual learners to facilitate understanding. The result provides emphasis on the relevance of

translanguaging its role in facilitating academic learning. When a student is comfortable in expressing their ideas in class, they become actively involve which lead them to acquire better understanding of the concepts taught. These views are presented by the quotes from the participants as discussed below:

So that, it can be explained easily
Ma'am and(.) our classmates will
understand. (IDI 1)

As what I have observed Ma'am is,
like, (it) becomes easy to catch up
Ma'am and like easy to understand
already ...so they can easily
understand the topic if, there is
Bisaya(.) and not all in English. (IDI
10)

Considering Present Scenarios of Communication than on Future Prospects. Another use that TL serves is that it gives more consideration on the present scenarios of communication than on future prospects. The results indicate that student's use of translanguaging afforded them comfort and power in the preference and use of their language repertoires. This purpose of TL most likely occur as multilingual students feel the need to accomplish the day's task (activities or assessment) than to gradually improve their English skills for the future use. The student explains this idea as follows:

Maybe it will help better if, you will
simultaneously (use) English and
(vernacular) in understanding
Mathematics, specially in the
discussion Ma'am because, if, the two
are simultaneously used(.) the(.)
students are like "haay" (however) (.)
if you will always use vernacular(.) the
standards are like ... For the students,
they can't compete with other
countries Ma'am. (IDI 5)

Data Integration of Salient Qualitative and Quantitative Findings

Divulged in Table 5 is the data integration of salient qualitative and quantitative findings. It shows the different columns to interpret how the data in the study are integrated. The present study on the discursive practice on translanguaging of multilingual learners in Mathematics carries out a mixed method approach employing convergent parallel approach. The first column presents the aspects or focal points of the study; followed by the second and third columns where the quantitative and qualitative findings are revealed. The fourth column is the nature of data integration which justify the idea of integration.

Table 5
Data Integration of Salient Quantitative and Qualitative Findings

Aspect of focal points	Quantitative Findings	Qualitative Findings	Nature of Integration
Mathematics Achievement	Table 1.2 on performance level 3 (Grade 80-84 with $f=170$, $\%=56.67$) and level 5 (Grade 90-95 with $f=13$, $\%=4.33$)	Code on Ease in expressing self from Table 4	Merging-Association
Non-Significance of Translanguaging Domains on the Performance in Mathematics	Table 2 on correlation between translanguaging domains and level of performance with overall $r=.06$ and $p\text{-value}=.12$	Essential theme on facilitating understanding from Table 4	Merging-Diverging

Framework Task	Table 1.1 on item no. 1 on managing the class with mean 3.42 and SD 0.93	Core Idea on Assisting others to or in participating in class using vernacular or mixed languages from Active Participation Code, Table 4	Merging-Associating
Using L1 as Scaffolding Resource	Table 1.1 on item no. 1 on explaining Math concepts with mean 3.47 and SD 0.99	Code on Explaining from Table 4	Merging-Converging
Crosslinguaging	Table 1.1 on item no. 2 on being allowed to speak other languages with mean 3.93 and SD 1.08	Core idea being allowed to use vernacular or mixed languages when asking question or clarification from Table 4	Merging-Associating
Meshing	Table 1.1 on item no. 1 on being allowed to mix languages for speaking activities with mean 4.13 and SD 1.08	Discourses used during translanguaging from Table 3	Merging-Converging

DISCUSSION

Status of the Multilingual Learner in Translanguaging Tendencies and Performance in Mathematics

The result reveals that out from the four categories of translanguaging tendencies, Framework Task and Using L1 as a Scaffolding Resource obtained the descriptive rating of high, while Meshing got low status. This result supports the findings that translanguaging is evident in multilingual classroom employed either by students or teachers for classroom management (Anderson, 2017; Licona, 2015; Nambisan, 2014; Stavrou, 2015; Bezzina, 2016; McMillan et al., 201). Another notable finding of this study is the high status of translanguaging in using L1 as scaffolding resource. Garcia (2016) noted that in order for a technique to be scaffolding, it needs to provide supporting structures that enable students with the possibility of achieving the target or focus. This study verifies the findings that translanguaging is indeed used by and for the multilingual students as a scaffolding resource (Dahlberg, 2017; Anderson, 2017). Therefore, the data of the study substantiate Licona (2015) statement which says that many emergent bilinguals flow in and out of English and other languages as they move throughout their daily activities. Translanguaging is a resource for bilinguals to draw upon as they carry out their everyday lives, make sense of their worlds, and engage in communicative acts (Licona, 2015).

Significant Relationship between the Multilingual Learners in Translanguaging Tendencies and the Performance in Mathematics

As revealed in the result, there was no significant relationship between the status of translanguaging tendencies and the level of the multilingual learner's Mathematics performance. This means that the Framework task, Using L1 as a Scaffolding Resource, Crosslinguaging and Meshing categories of translanguaging do not have significant relationship to the performance in Mathematics of the multilingual learners. This result does not support the study of Paz (2017) who found that the use of multilingual instruction in Mathematics significantly contributed to the performance of the students.

The findings show that translanguaging and the use of literacy practices enhance thinking within the academic context. Findings also show that translanguaging and the use of literacy practices enabled students to relate the curriculum content to their personal experiences and use them as a resource for negotiating the meanings of the text, to provide constructive and critical opinions in the discussions in the classroom and thus enable the students to control their own learning which became pupil- directed. Finally, the paper examined the way the teacher uses translanguaging to support academic learning. In a different study, Coyoca et al., (2009) case studies of students who participated in unidirectional brokering, in reciprocal brokering where the broker assists the brokee in exchange for help with other academic tasks, and in distributed brokering, where the direction of assistance is directed from one student to many students or from many students to one student. Brokering is considered as crosslinguaging, as the process involves one student asking another directly for a translation or meaning of a word

Discourses used during Translanguaging

The triangulated data from classroom observation, and in-depth interview, confirms two modes of discourses used during translanguaging namely, exposition and argumentation. The study also revealed that multilingual learners shift and mix English, Filipino, Bisaya and Kinamay languages. In some of the discourse, it was revealed that during translanguaging, language input is done in a different language while language output is done in another language. This finding confirms what Garcia (2006) suggests that translanguaging could probably be used in a such a way that the language inputs (reading and listening) will be done in one language and the language outputs (writing and speaking) may be done in another language. She believes that it is one way in which bilingual learners get engaged in the classroom.

This study backs up the study of He et al., (2016) which employed oral presentation strategies such as classification, exemplification, and contrast facilitate understanding of the complex mathematic discourse. This study noted a student translanguaging between English and Bisaya and trans-semiotizing the Bisaya explanation “bali” with the Mathematics symbol “CXD and DXC”. This further supports the claim of He, Lai, & Lin on focusing on the

translanguaging (between Chinese and English) and trans-semiotizing (between verbal explanations and visual displays, Mathematics symbols, images, and graphic organizers, etc.) strategies might have been carried on mathematical meaning-making more smoothly.

Uses of Translanguaging Discourses in the Learning Process of Students

The results reveal four uses of translanguaging discourses of multilingual learners namely: 1) translanguaging is purposively used to explain, ask, and clarify concepts and ideas, 2) translanguaging facilitates better understanding, active participation and ease in expressing ideas among students; 3) translanguaging gives more consideration on the present scenarios of communication than on future prospects; and 4) translanguaging overcomes challenges caused by differences in students' circumstances, level of English proficiency and Math skills.

Many students believe that being able to elucidate concepts serves a vital function in the student's academic life. The result revealed that translanguaging has a role within the classroom discourse. The shifting or mixing of languages supports different purposes which include the practice of explaining and asking Math concepts. This result gives weight to the statement of Hornberber (2012) who says that in classroom interaction, students and teachers not only draw on more than one language, but also use multiple and dynamic varieties of these different languages for varying purpose in different context

This study found out the translanguaging is employed by multilingual learners to facilitate understanding. The result provides emphasis on the relevance of translanguaging in establishing academic learning by facilitating better understanding, active participation and ease in expressing ideas among students. This finding supports Li et al., (2013) who states that translanguaging is holistic process during which people use language to express their thoughts, obtain knowledge and experience, make sense, and communicate with each other.

Another use that TL serve is that it gives more consideration on the present scenarios of communication than on future prospects. The results indicate that multilingual students' use of translanguaging afforded them comfort and power in the preference and use of their

language repertoires while learning Mathematics concepts. This study supports Wahba (2012), Swanwick (2016) and (Dahlberg, 2017) on the findings that translanguaging supports communication.

This study revealed that that students used translanguaging to overcome challenges caused by differences in students' circumstances, level of English proficiency and Math skills. In fact, many concurs to acknowledge translanguaging presentation of ideas so that they can expound and comprehend Mathematical concepts in the languages they can better do so. The result that multilingual learners are positive towards translanguaging corroborates with the findings of Paxton (2009), Shifidi (2014) Caruso (2018), and Bartlett (2018).

Data Integration of the Salient Qualitative and Quantitative Findings

In the corroborated data, average and high levels of performance are associated to the learner's ease in expressing self. According to Joseph (2015), the challenge bilingual student's face is more complicated when the subject involves calculations, computations and the use of scientific jargons during practical sessions. Subjects like Mathematics, Physics or Geography has proved more difficult to learn in a second language (Joseph, 2015). The result of this study validates what psycholinguistic studies suggest that "classroom instruction should allow bilingual students to choose the language they prefer for carrying out arithmetic computation, either orally or in writing" (Moschkovich, 2007).

Implication for Educational Practices

The results of the study provide understanding that learners have varied discursive practices on translanguaging. As mentioned in the introduction to this dissertation, a major goal of this dissertation was to address the discursive practice on translanguaging of multilingual learners in a tertiary institution. An important step in meeting this goal was to describe how these practices are used by the learners and determine how it could predict performance in the classroom. This study directly contributes to a growing body of literature that suggests the power of leveraging heritage languages in the classroom. Whereas prior studies have centered largely around interactions between bilingual individuals, this study suggests that

students that do not share heritage languages can participate in translanguaging practices to summarize texts, clarify procedural information, demonstrate expertise, deepen understandings of vocabulary, and promote students' metalinguistic awareness. Sharing these findings and different activities with teachers that are learning to support emerging bilingual students in their classrooms is one first step towards implementing translanguaging pedagogies.

CONCLUSION

From the results and analysis, the researcher may conclude that the participants' translanguaging is highly evident in framework task and using L1 as a scaffolding resource and their performance in Mathematics is largely good. This means that the multilingual learners most likely mix, or shift English, Filipino, Bisaya and Kinamayu languages when managing the classroom and supporting their own learning. Moreover, from the result of the significant relationship, it may be concluded that translanguaging domains do not affect the Mathematics performance of the multilingual learners. In addition, the multilingual learners employ varied discourses during translanguaging in Mathematics like exposition and argumentation. This could be due to the nature of Mathematics teaching and learning which require comprehensive explanation and systematic reasoning than using descriptive examples to convey an image and telling a story. As to the uses of translanguaging in the learning process, it may be concluded that the multilingual learners finds the practice of translanguaging in class useful particularly in elucidating concepts, facilitating understanding, considering present scenarios of communication and overcoming challenges. It can be further concluded that the participants generally express positive attitudes towards the use of translanguaging.

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