



LANGUAGE USE IN A BILINGUAL TERTIARY SCIENCE CLASSROOM

Leonard Tello Apilis, Associate Professor, College of Arts and Sciences , Graduate School and Associate Director Open University, Benguet State University, La Trinidad, Benguet

Abstract: *This research project investigates linguistic conventions of oral interaction in Science courses, the second semester of the school year 2016-2017, at the Department of Biology and Chemistry, College of Arts and Sciences. In particular, the project seeks to study the practice of language switching among Filipino tertiary-level teachers and students. Courses in Science are expected to be delivered in English. However, there is widespread perception that Filipino teachers and students freely language switch. This analysis of language-switching in Science courses at Benguet State University Department of Biology and Chemistry hopes to determine if the practice is beneficial or detrimental to Science education. In conclusion, the science teachers are employing language switching in promoting shared meaning, checking student understanding, maintaining the teaching narrative and fostering unity and solidarity during the classroom exchanges. Furthermore, teachers teaching science courses should be allowed to language switch for effective communication. This can be a springboard for the innovations to be done in their teaching techniques in imparting knowledge, setting up good teaching-learning atmosphere and stirring noble teacher-learner relationship. School administrators should give attention to the communicative language teaching methodology and strategies as important elements in teaching.*

Keywords: *Bilingualism, Classroom utterances, Communication, Language switching, Pedagogy*

INTRODUCTION

BACKGROUND OF THE STUDY

In the Philippines, the practice of language switching is popularly perceived as a violation of the Bilingual Education Policy (a.k.a. BEP) which explicitly identifies two languages as Media of Instruction (MOI) for two different set of courses (excluding the language courses): English for Science, Math and technology subjects; Filipino for Social Studies, Music, Arts, and the like (Espiritu,2012). It may be inferred from the spirit of the policy that the two languages are not to be mixed when the courses are taught. The underlying goal is that one



language is not corrupted by the other. And so by having solely English in Math and Science, it is expected that content knowledge would be better grasped by the students. Philippine educator Allan Bernardo notes that the BEP is really symptomatic of the prevalence of the “monolingual assumption which presumes the need to preserve language purity and to avoid language mixing, most especially in the formal education context” (Bernardo, 2015).

As the BEP is intended as a policy for language inside the classrooms, school administrators have begun to think of more creative ways of arresting the perceived deterioration of English language proficiency in the Philippines. This widespread perception of English language deterioration, when combined with a rapidly growing demand for Filipino contact center agents, pushes school administrators to become more inventive and resourceful. Thus, the English-only policy was revived by some schools. This policy effectively extends the BEP’s reach to personal spaces – the lounge, the lobby, the corridors.

Understandably, language switching, especially language switching inside the classroom, is anathema to implementers of both the BEP and the English-only policies throughout the country. But is the practice of language switching truly detrimental to education? Bernardo asked, “Can language switching be appropriated for educational purposes?” (Bernardo, 2015)

Still, that language switching is natural, inevitable, and perhaps necessary in Philippines education is a touchy issue, especially where content-area learning is concerned.

In 1987, soon after the People Power Revolution, at the Solidarity Seminar on Language and Development, leading linguists, educators, government officials, and media personalities met to set future directions for English in the Philippines. It was the consensus that “English language in the Philippines shall be maintained for utilitarian reasons, specifically, for access to the world’s knowledge especially in science and technology” (Gonzales, 2008).

In that same seminar, science educators Manuel Eugenio and Ester Ogena note the peculiarity of science education in the Philippines in that “it utilizes a medium of instruction definitely alien to the population ---- English” (Gonzales, 2008). they write:

While we boast of Filipino academicians doing well in select institutions of higher learning or of a Filipino engineer who designed the Moon Buggy of the Apollo II Luna Module that brought the first man on the moon, the status of science in the country has remained low-level if not stagnant, and Filipino technology was virtually relegated to the assembly-line



type over the past years. Could it be that our graduates are tailors for 'English' technologies? (Gonzales, 2008).

Almost 10 years after Eugenio and Ogena made that statement above, Filipino school children continue to perform poorly in international measures of science and math proficiency. The 2008 Trends in International Mathematics and Science Study (more popularly known as TIMSS) reports that, out of 46 participating countries, Filipino fourth graders placed 19th, while eight graders placed 33rd, in Math and Science scores ranking.

The concern about language in science education in the Philippines remains unaddressed to this day. It is hoped that this study of language switching in Science courses would contribute to better teacher and student performance in a science classroom.

STATEMENT OF THE PROBLEMS

This research project sought to determine answers to the following questions:

1. Is the practice of language switching in the classroom beneficial or detrimental to Science education? and
2. What are the pedagogical functions of language switching?

METHODOLOGY AND PROCEDURE

RESEARCH DESIGN

This is a descriptive research aimed at describing and analysing classroom interaction along the practice of language switching in classroom exchanges. This study made use of the Johnson (2005) interactive mode for the analysis of teacher utterances. Johnson's model describes the teaching functions in the interactive mode that is divided into three phases. The framing phase includes marking boundaries, focusing, structuring and nominating. The mediating phase consist of checking, prompting, clueing, repeating and nominating while the evaluation phase deals with checking, repeating, assessing, commenting and establishing continuity. The three phases are marked by elicitation by the teacher and the response by the learners.

In addition, this study was conducted at Benguet State University, Department of Biology and Department of Chemistry during the second semester of the school year 2016-2017. There were four teachers who were asked to participate, two teachers teaching biology and the other two teaching chemistry. The student respondents were enrolled in the General Curriculum courses such as General and Inorganic Chemistry, Biological Science, Anatomy



and Physiology. The teacher participants were aware that the English language is the medium of instruction in teaching science.

DATA COLLECTION INSTRUMENT

In both case studies that teachers teaching Biology courses and the other teachers teaching Chemistry subjects, the teachers had been informed in advance that audio-video recordings, as well as informal post-observation interviews, would take place during classroom observations in both cases, the teachers introduced the researcher to the students as an observer who is conducting research. Before the lesson formally began, the video camera was positioned. The teachers had been notified by the department head regarding the visit. At the same time, the students, being city dwellers, were also used to being videotaped for various purposes.

The main source of the corpus is the video tape transcriptions. The videotape recordings were used mostly to identify those utterances that could not be clearly identified. In addition, the videotape recordings helped the researcher to confirm the researcher's interpretation of emotions displayed by the informants in the verbal exchange.

In analysing the corpus, the study made use of a working definition of *utterance* what would correspond to a sentence with full stops in written texts. In spontaneous oral discourse, this is determined by locating long pauses, final falling intonation in statements, and rising or falling intonation in questions. This study is that it does not intend to provide a comparative analysis of utterances of Biology teachers and that of Chemistry teachers. Instead, the study hopes to generate information and insight about code-switching practices among students and teachers in the Science courses.

A review of language switching studies that had already been conducted reveals that language switching is a term referred by Erman Boztepe as "terminological confusion" (2008). To avoid such confusion in this study, Shana Poplack's definition of language switching is adopted which is "the alternation of two languages within a single discourse, sentence or constituent" (Poplack, 2012). This study used as one tool for linguistic analysis the syntactic structure of Poplack which identifies three language switching types, namely, tag-switching, intersentential, and intrasentential (cited in Hamers and Blanc, 2008).

However, the study also contextualizes the language switching phenomenon within the framework of sociolinguistic behaviour. Thus, another perspective in defining language



switching is to position the practice as not solely structural, but also cultural. It is vital in analysing language switching in classroom discourse to account for not just the linguistic aspects, but more so, the functional terrain. J.C Peter Auer notes:

Grammatical restrictions on language switching are but necessary conditions; they are not sufficient to describe the reason for or effect of a particular switch. If linguists regard code-switching simply as a product of a grammatical system, and not as a practice of individual speakers, they may produce esoteric analyses that have little importance outside the study of linguistics per se... (Nilep, 2010, p. 2)

This study is concerned with classroom discourse. As classroom discourse, by its nature, aims to achieve understanding between teacher and students, it is imperative for communication to be successful. It is hypothesized then that code-switching is a strategy deliberately used by teachers to ensure communication success. Such assumption is consistent with the observations of Ralph Adendorff (2008) in his study of language switching among high school teachers and students in South Africa, Adendorff writes:

..language switching is in fact highly functional, though mostly subconscious. It is a communicative resource which enables teachers and students to accomplish a considerable number of range of social and educational objectives. (Adendorff, 2008)

RESULTS AND DISCUSSION

The corpus of this study consists of exchanges between teacher and students, which in both cases, are predominantly carried out in English. That English as the base language is expected. The 1987 Bilingual Education Policy explicitly identifies English as the MOI for Science courses.

While the utterances were grammatical, they were also highly functional. Consider the following exchange between teacher and his students:

T: What's the main purpose of a valve? What? *Dali!* + *Para hindi ano ++* (Hurry! + So as not to ++)

Ss: *Para hindi bumalik yung ++* (So that Will not go back ++)

T: *Para hindi bumalik yung ano?* (So that what will not go back?) So as to prevent what?

Ss: X<<in Tagalog>>



The exchange above follows the I-R-F flow of classroom discourse: Initiation-Response-Feedback, which is believed to be the most common pattern of verbal exchange in the classroom (Mortimer & Scott, 2011). In Extract 1 above, the teacher begins with a question in English and then continues with Tagalog as a strategy for encouraging a quick response. This practice of using Tagalog to push students to respond or act is also found in extract 2, where the teacher triggers a competition between two students who are writing a chemical structure on the blackboard.

T: *Ha?O sige + Su2*. Try it there <<Pointing to the blackboard where another student is already working on the reconstructing of a chemical structure>> *Unahan kayo*. Do it there. (What? Go ahead Su2. Try it there. See who will finish first. See who will finish first.)

It is also noted that the teachers in both utterances have a tendency to reply in Tagalog to student utterances in Tagalog, despite the teacher's awareness that only English is to be used in Sciences classes. This is evident in Extract 1 above, as well as in the following extracts:

T: Identify first which are the ventricles + which is the left + which is the right. Identify first. Which is the left? Which is the left?

S: *Yung may dalawang ano?* (That which has two what?)

T: *Yung may dalwang ano? May dalawang?* (That which has two? Has two?)

S: *Yung may dalawang hiwalay na++*(That which has two separate++)

T: *May dalawang hiwalay na?* (Has two separate?)

S: *Sanga*(Branches)

T: We go to the next topic. Look at your outline. *Ah + hindi + babalik tayo sa page 1*. (Ah + no + we will go back to page 1.) Page 1! Go back to page 1+ OK? Fats and oils can be seen in general kinds of formula like this one. When will you consider a triglyceride fat and when will it be oil?

S: *Pano nga ba?*(How can one tell the difference?)

T: *Pano nga ba? Hindi ba binasa nyo yung hand-out?* (How can one tell the difference? Did you not read the handout?) OK. What is no. 1 difference?

S: Source

T: Source! Where do you get fats?



S: Animals

T: *Tapos?* (Then?)

S: Plants.

That the replies in Tagalog to the students' Tagalog utterances, despite the teachers' awareness of the language policy for Science classes, may be an indication of the teachers' desire to make themselves more accessible to their students. In, by addressing their students in Tagalog, the teachers may be exercising what Anne Pakir, in her study of English in Singapore, describes as the "rapport and solidarity factor" which unifies, but also separates groups (Pakir, 2012).

This desire for rapport and solidarity is also evident in the students' code-switches. In the following extract, it is observed that one student speaks Tagalog when he tries to connect his experience to the subject matter, which in this case is the flow of blood through the human body.

T: That is why there is what you call the blue baby ++ What happens? <<S raises his hand. >>
Yes.

S: Sir, *yun ba yung sinasabi nila na, ano ++ Nagkakaroon po ng ++* (Sir, is that what they say that ++ Something is formed ++)

T: Yes. *Nagkakaroon ng ano?* (Yes. What is formed?)

S: *Nagkakaroon po ng butas?* (A hole is formed.)

T: *Bakit nagkakaroon?* (Why does that happen?)

S: *Hindi kopo alam ++ Kasi po yung kapatid ng tatay ko + ano po siya + blue baby + tapos ano + di po siya naoperahan tapos + kaya after 18 years + namatay po siya.* (Because the sibling of my father + he is + blue baby + then he wasn't operated on so + so that after 18 years + he died.)

In Mortimer and Scott's analysis of discourse in the Science classroom, five forms of pedagogical intervention were identified and described as follows (Mortimer & Scott, 2011):

1. DEVELOPING THE CONCEPTUAL LINE: The teacher makes scientific ideas available to the students.
2. DEVELOPING THE EPISTEMOLOGICAL LINE: The teacher introduces some aspects of the nature of scientific knowledge.



3. PROMOTING SHARED MEANING: The teacher presents individual or group ideas to the class.
4. CHECKING STUDENT UNDERSTANDING: The teacher asks for clarification of student ideas, as well as manages the forming of consensus about certain ideas.
5. MAINTAINING THE TEACHING NARRATIVE: The teacher introduces or presents a preview of the next lesson, as well as reviews progress or refocuses discussion.

It is observed from the corpus of this study that language switching is utilized by the teachers for pedagogical interventions described above. The use of tag switches, for example, in the succeeding extract indicates the teacher's attempt to check student understanding.

Language switching in the form of tags are also utilized by the teacher to check student understanding, as revealed in the following extracts:

T: What is ventricular septal defect? Yes? This is a congenital disease. *Ano?* (right?)

T: Other cooking oils come from? Pork. Soya bean. Soya bean oil. Sesame oil. Corn oil. Olive oil. All right, they are all plants. But they are labelled as vegetable oil+ *no?* (right?). Vegetable or plant or whatever!

Tags, by their nature, aim to confirm or disconfirm a listener's understanding of a message. Thus, it is only expected that the language switched tags uttered by the teacher are attempts to check student understanding. However, this form of pedagogical intervention occurs even at the level of intersentential switching, as observed in the following extracts:

T: Now + how many esther groups?

Ss: Three.

T: *Kaya Ngayon* (So now) + that's the original name that you have there + Triglycerin. *Tama?* (Correct?), However+ all right + fats and oils are mainly X tri-esters since this is almost always true + you can drop this off. *Tama?* (Correct?)

Ss: *Tama po* (Correct)

T: Yes.

T: Then + if you drop these two then you change the ending of the parent. *Ano na ang gagamitin nyo?* (What will you use?)

Ss: I.N.

T: OK + I.N. Therefore what's the shortcut name?



Ss: XX

T: *Bakit natin pinaigsi? Hindi bay an ang hilig nyo? Puro shortcut? (Why did we shorten it? Isn't that what you prefer? Always shortcut?)*

In addition to checking student understanding, the teacher also utilizes code-switching to promote shared meaning in the Science classroom. The transcription below is an illustration of this form of pedagogical intervention.

T: OK So X of predicting the products. Now class take note. There are many ways of writing the formula of the triglyceride. You can write it also this way <<T2 writes on the board>> In this structure + we indicated the glycerol first. But you can + write that + oo (yes) + the other way around. OK. I don't know if X prepare. *O ayan. Di ba?* (There. Is that right?) This is also triglyceride. *Ito rin yon + binaligtad lang natin. O kayo naman! O ayan.* (This is the same + we just reversed it. O it's your turn! There.) It's easier that way. You don't have a break + *Di ba?* (right?) H-H-O-H. *Dito papasok yung H.* (That is where H comes in. *Doon papasok yung O-H.* (That is where O-H goes.) Ahhh. OK *na?* (Is that OK?) OK *na?* (Is that OK?) Get *na?* (Did you get it?)

The succeeding extract is an illustration that language switching is also utilized by the teacher to maintain the teaching narrative. Here the teacher refocuses the class discussion by indicating a preview of next topic:

T: What about this fat? *Hah?* X from pork from beef from the + *di ba* (Doesn't) chicken *may* (have) fat *din*(also)?

Ss: Yes!

T: All right, what else? Oils are? Liquids. *Ayon!* << Bell rings>> *Mamaya na natin pag-usapan iyon.* (There! We will talk about that later.)

It is interesting to note that in this study, the teachers were found to have utilized language switching in promoting shared meaning, checking student understanding, and maintaining the teaching narrative. As regards developing the conceptual and epistemological lines, the two other forms of pedagogical intervention which are concerned with providing input about science, the teachers have a tendency to use English. The Extract above is an illustration of this practice of providing input in English (ways of writing a chemical formula) and then promoting shared meaning in Tagalog.



That teacher input about science is presented in English is expected in a context where English is the required medium of instruction for Science courses. In addition to this requirement, instructional materials in tertiary level science courses are predominantly in English. Still, it might be useful, for the purpose of evaluating language in Philippines classrooms, that this teaching practice of presenting input (or developing the conceptual and epistemological lines) in English be assessed in the light of the Filipinos' poor performance in international measures of science and math proficiency.

CONCLUSION

Based on the findings, the following conclusion are derived:

First, this study about language switching among teachers and students in Science classes reveals that the practice does in fact support the educational goals of delivering content knowledge.

Secondly, language switching is a pedagogical tool for motivating student response and action, ensuring rapport and solidarity, promoting shared meaning, checking student understanding, and maintaining the teaching narrative.

Thirdly, at this point, Philippine educator Allan Bernardo's proposal for Philippine language planners must be given importance when he mentioned:

...consider language switching not as a compromise or fall back option, but as a positive option for language in education. Filipinos are most certainly bilingual persons. We need to understand this bilingual status not in fractional terms (e.g. two halves of two monolinguals, etc.), but as whole persons with complete language competencies that draw from two distinct language systems that share a common conceptual representation system (Bernardo, 2015).

Finally, where science education is concerned, educators and policy makers have to make up their minds: Is the primary concern acquiring content knowledge or English language proficiency? By prohibiting language switching in the Science classroom, neither Science education nor English competency will be fully achieved.

RECOMMENDATIONS

The following recommendations are suggested based on the conclusion of this study:



Teachers teaching science courses should be allowed to code-switch for effective communication. This can be a springboard for the innovations to be done in their teaching techniques in imparting knowledge, setting up good teaching-learning atmosphere and stirring noble teacher-learner relationship.

Curriculum planners should initiate a program in enhancing curriculum and language instruction in the classroom to better assist the students.

School administrators should give attention to the communicative language teaching methodology and strategies as important elements in teaching so, they should plan varied ways to enhance communicative teaching through conducting relevant trainings and workshops designed specifically to produce a better quality of classroom instruction.

Future researchers should have more in-depth study on the pedagogical functions of code switching that would improve classroom instruction.

A study on the level of effectiveness of code switching as a science teacher's communication strategy is being recommended to determine the impact of code switch in making students yield better classroom performance.

REFERENCES

- [1] Adendorff, Ralph D. 2008. "The functions of code switching among high school teachers and students in Kwazulu and implications for teacher education." In Kathleen M. Bailey and David Nunan (eds.), *Voices from the Language Classroom*. UK: Cambridge University Press. 388-406.
- [2] Auer, J.C. Peter. 2010. "Conversational Analysis, Code-switching and Transfer." In Li Wei (ed.), *The Bilingualism Reader*. UK: Routledge. 66-187.
- [3] Bautista, Ma. Lourdes S. 2012. "Another Look at Tagalog-English Code-Switching." In Ma. Lourdes S. Bautista (ed.), *Pagtanaw: Essays on Language in honor of Teodoro A. Llamzon*. Manila: Linguistic Society of the Philippines. 128-146.
- [4] Bernardo, Allan B.I. 2015. "Bilingual Code-Switching as a Resource for Learning and teaching: Alternative Reflections on the Language and Education Issue in the Philippines." In Danilo T. Dayag and J. Stephen Quakenbush (eds.), *Linguistics and Language Education in the Philippines and Beyond: A Festschrift in Honor of Ma. Lourdes S. Baustista*. Manila: Linguistic Society of the Philippines. 151-163.



- [5] Blom, Jan-Petter and John J. Gumperz. 2015. "Social meaning in Linguistic Structure: Code-switching in Norway." In Li Wei (ed.), *The Bilingualism Reader*. UK: Routledge. 111- 136.
- [6] Boztepe, Erman. 2013. "Issues in Code-Switching: Competing Theories and Models." In Han, ZhaoHong, et al. (eds.), *Working Papers in TESOL and Applied Linguistics*. NY:Columbia University Teacher's College (<http://www.tc.columbia.edu/academic/tesol/Webjournal>). Retrieved 23 September 2016.
- [7] Chanco, Amaury, Esperanza Francisco and Teresita Talamisan. 2012. "Code Switching: A look into the language patterns of some television hosts in Metro Manila." In Ma. Lourdes Bautista and Grace O. Tan (eds.), *The Filipino bilingual: a multidisciplinary perspective*. Festschrift in honor of Emy M. Pascasio. Manila: Linguistic Society of the Philippines. 32-35.
- [8] Espiritu, Clemencia. 2015. "Language Policies in the Philippines. National Commission on Culture and the Arts." *Articles on Culture and Arts* (http://www.ncca.gov.ph/about_cultarts/comarticles.php?artcl_Id=217). Retrieved 20 September 2016.
- [9] Gonzales, Andrew (ed.), 2011. *The Role of English and its Maintenance in the Philippines: The Transcripts consensus and papers of the Solidarity Seminar on Language and Development*. Manila: Solidaridad Publishing House.
- [10] Gonzales, Patrick, et al. 2014. *Highlights From the Trends in International Mathematics and Science Study (TIMSS) 2003*. National Center for Education Statistics. US Department of Education.
- [11] Hamers, Josiance F. and Micheal H.A.Blanc. 2000. *Bilinguality and Bilingualism*. 2nd edition. UK: Cambridge University Press. 259-260.
- [12] Johnson, Rk. Teacher Education and Teacher Talk. *Philippine Journal for Language Teaching*. Vol 14, 69-81.
- [13] Limoso, Roca Jane. 2015. *Code Switching Among Literature Teachers of Miriam College: Patterns, Functions, and Implications*. MA thesis, Ateneo de Manila University Mortimer, Eduardo and Phil Scott. 2011. "Analysing discourse in the science classroom." In Robin Millar et al. (eds.), *Improving Science Education: The Contribution of Research*. Buckingham: Open University Pres. 126-142.



- [14] Nilep, Chad. 2010. "Code Switching" in Sociocultural Linguistics. *Colorado Research in Linguistics*. Volume 19. Boulder: University of Colorado (http://ucsu.colorado.edu/~nilep/NILEP2005_Code_Switching.pdf) Retrieved 23 September 2006.
- [15] Nivera, Gladys C. 2013 (December 2003 and June 2004). "Spoken Discourse in the Tertiary Mathematics Classroom." *Philippine Journal of Linguistics* 34:2 and 35:1. 7-13.
- [16] Pakir, Anne. 2012. "The Status of English and the Question of 'Standard' in Singapore: A Sociolinguistic Perspective." In Makhan L. Tickoo (ed.), *Languages and Standards: Issues, Attitudes, Case Studies*. Singapore: SEAMEO Regional Language Centre. 109-130.
- [17] Poplack, Shana. 2012. "Sometimes I'll start a sentence in Spanish y termino en espanol: Toward a typology of code-switching." In Li Wed (ed.), *The Bilingualism Reader*. UK: Routledge. 221-256.
- [18] Thompson, Roger M. 2013. *Filipino English and Taglish: Language switching from multiple perspectives*. Amsterdam: John Benjamin Publishing Company.