

# A Preliminary Study of Teacher Code-switching in Secondary English and Science in Malaysia

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#### **Abstract**

This study examines functions of teacher code-switching in secondary school English and science classrooms in Malaysia, where English has recently been implemented as the language of instruction for science. Classroom interaction data were obtained from two English lessons and a science lesson. Analysis of the teachers' code-switching using Gumperz's (1982) semantic model show that code-switching in the two English lessons were vastly different, with little code-switching in the teacher-facilitated lesson. The other lesson, in which English was taught as a content subject was similar to the science lesson in the frequent use and co-occurrence use of code-switching for reiteration and message qualification. The direction of the language switch from English to Bahasa Malaysia as well as the proportion of teacher talk in English suggests that the base language for teaching is still English, even for the science lesson, and code-switching is a necessary tool for teachers to achieve teaching goals in content-based lessons involving students who lack proficiency in the instructional language.

#### Introduction

In multilingual communities, code-switching is a widespread phenomenon that extends from daily life and workplaces (Ting, 2002; Ting, 2007) to classrooms in which specific languages have been instituted as the official languages of instruction. Teachers code-switch when teaching content subjects such as history (Butzkamm, 1998), linguistics (Zabrodskaja, 2007) and science (Martin, 1999; Mwinsheikhe, 2003; Probyn, 2005). Martin's (1996) earlier study in primary level 4 and 5 classrooms in Brunei, Darussalam revealed that code-switching is the most frequent in history lessons, followed by science and geography, with the least use in mathematics. In language classrooms, code-switching is employed to facilitate student comprehension at various educational levels: kindergarten (Huerta-Macias & Quintero, 1992), secondary (Flyman-Mattsson & Burenhult, 1999; Gabusi, n.d.; Rethinasamy &

Johie, 2008) and university (Greggio & Gil, 2007; Liu, n.d.). Teachers also codeswitch to repair trouble or silence in university classes (Ustunel, 2004). Alternatively, code-switching is a strategy for teachers to adapt to students' English proficiency, teaching goals, and teacher roles in a university setting in China (Yang, 2004). These findings, however, are based on teachers' reports of their reasons for code-switching. Studies offering linguistic evidence based on naturally occurring classroom data provide better insight into the functions and forms of code-switching. For this, Gumperz (1982)'s semantic model of code-switching is a useful approach for the study of social and cultural functions and meanings of language use (see also Nilep, 2006) in learning contexts, such as collaborative problem-solving interactions (Baron, 2003) and schoolchildren's conversations (Reyes, 2004).

Studies using Gumperz's semantic model find the use of code-switching by students and teachers for a variety of conversational functions. Choi and Kuipers (2003) studied the interaction of two bilingual Hispanic students and two monolingual English students in middle school during a unit of hands-on and inquiry-based chemistry lessons. The bilingual Hispanic students frequently co-constructed or re-constructed their knowledge from the curriculum in Spanish, particularly in clarification of procedures rather than concepts. The students were found to code-switch for calling attention (quotation and addressee specification), revoicing, clarification (message qualification), and objectivisation versus personalisation. Choi and Kuipers argue that the students made sense of schooling when interacting with peers, curriculum and the teacher by using two linguistic resources. Zheng (2009) examines the switching between Mandarin Chinese and English of 30 Chinese-Australian bilingual children in Melbourne, aged six to seven, attending school language programmes. The interviewer only spoke Mandarin Chinese while students switched between Chinese and English. It was found situational switching was prompted by changes in the setting and topic presented in the visual stimuli. There was no addressee specification as there was only one interviewer. Zheng found direct quotation drew listener's attention to another speaker's comment, reiteration clarified and emphasised a message, message qualification distinguished topic and comment of a discourse, and personalisation versus objectivisation distinguished between talk and action.

While Choi and Kuipers (2003) and Zheng (2009) focus on student code-switching, other researchers show more interest in the phenomenon of teacher code-switching. By adopting approaches of Choi and Kuipers (2003) and Richards and Rodgers (1986), Mahadhir and Then (2007) analyse the code-switching of nine pre-service English teachers in Malaysia in relation to teacher roles. The teachers switched to other languages for revoicing, calling attention and personalisation, and in the process they acted as resources, needs analysts, and communication facilitators for their students. The primary function of switching to languages familiar to students was to facilitate their understanding and build their vocabulary knowledge. In another study on teachers of second year university German classes, Seidlitz (2003) finds that, on average, the five American teachers of German performed more situational switching than the three German native speakers. As for metaphorical codeswitching functions, Seidlitz finds that the German native speakers' reiteration was

slightly more frequent while the American speakers' reiteration was typically lengthier. The American teachers tended to speak German first, followed by English, while the order of the languages for the Germans was the reverse. Moreover, "the American teachers tended to switch in response to perceived student misunderstandings while the Germans' use of English was typically motivated by student language choice" (Seidlitz, 2003, p. 82). Message qualification was observed infrequently among the teachers studied. There was a difference between the two groups of teachers pertaining to personalisation *versus* objectivisation, with native American teachers using English overall much more often for humour, praise, encouragement, and chastising than German native speakers did. Addressee specification and direct quotations were not found. While these studies affirm that the code-switching functions identified by Gumperz (1982) were used by the students or teachers, there is less understanding of the relationship between code-switching for different discourse functions in good instructional practice.

This preliminary study examines the discourse functions of teacher code-switching in secondary school English and science classrooms in Malaysia where English was recently implemented as the instructional language. Code-switching can be defined as the use of more than one code or language in the course of a single speech event (Gumperz, 1982), taken to refer to teacher utterances in the classroom for this study. The teachers' use of code-switching to convey meanings to students was analysed using Gumperz's (1982) semantic model of conversational code-switching. In this paper, we show that it is the content knowledge or language focus of the lesson that influences the discourse functions of choice of the "official" language of the classroom or other languages. The findings point to selected code-switching functions being useful for teachers to achieve teaching goals in classrooms where lack of proficiency in the instructional language might compromise learning.

#### **Research Site**

The setting for the study is Malaysia, where English was simultaneously implemented as the medium of instruction for science and Mathematics in 2003 at Primary One, Form Four, and Lower Six (Malaysia Ministry of Education, 2002). This move was taken to address the declining standard of English and to ensure Malaysia's future economic competitiveness and its industrial and technical progress. Teachers who had been teaching science and mathematics in Bahasa Malaysia were required to switch to English. Half a decade on, research reports (e.g., Pandian & Ramiah, 2004; Nordin, 2005) and newspapers are still rife with science and mathematics teachers voicing their problems in using English for teaching these subjects (e.g. Rusmin, 2008; "Sabah Ready", 2007; "Teaching of Math and Science," 2008). The problems were considered serious enough to warrant special teacher preparation courses for science and mathematics teachers (Idris, Loh, Nor, Razak & Saad, 2007) and a review of the language policy.

The study was conducted in three government secondary schools in Kuching City, the capital of the Malaysian state of Sarawak. Bahasa Malaysia, the national lan-

guage, is the language of instruction for all subjects, with the exception of science, mathematics, and language subjects. School 1, located in a semi-urban part of Kuching, has a predominant Malay student population with a few Chinese students. The students are from middle class families with their parents typically working as clerks, nurses, and accountants. The students could understand English. When spoken to in English, they attempted to reply in English but more often than not, answered in Bahasa Malaysia. School 2, on the other hand, is rather balanced in the number of Malay and Chinese students. Most of the Chinese students attended Mandarin Chinese national type primary school and are accustomed to speaking Mandarin with their schoolmates. This school is in an urban Chinese residential area. The majority of the students can understand English but only a handful are able to speak English well. School 3 is located in a semi-urban part of Kuching City. There are more Bidayuh (a Sarawak indigenous people group) and Malay students than Chinese students in the school. The students are from middle to lower income families, and their parents are teachers, clerks, nurses, police officers, lorry drivers, and laboratory assistants. Similar to Schools 1 and 2, the students had better listening than speaking skills in English.

# **Participants**

The participants were two English teachers (Schools 1 and 2) and a Science teacher (School 3) from three secondary schools. All three were Chinese and were proficient users of English scoring at least Band 4 out of six in the Malaysian University English Test, making them academic users of the language. All three teachers had a Bachelor's degree in teaching. The Science teacher was trained to teach English but she was teaching both English and Science in her school at the time of the study.

The socio-economic backgrounds of the three teachers are slightly different. English Teacher 1 comes from a middle class family in which his father was a goldsmith and his mother a manager. English Teacher 2 was also from a middle class background. Her father is an engineer and her mother a homemaker. The father of the science teacher, on the other hand, is a farmer. All three teachers could speak Mandarin although English Teacher 1 did not attend Chinese primary school, unlike the other two teachers who also had the ability to read and write in Mandarin Chinese. The medium of education at secondary and university level was Bahasa Malaysia for all three teachers.

#### **Data Collection**

For the purpose of comparing the nature of code-switching in science and English lessons, two lessons were selected from a corpus of English lessons. The first was a lesson with frequent code-switching. For contrast, a second English lesson with few instances of code-switching was selected. The classroom data for the science teacher were collected as part of a larger study.

Prior to the data collection, verbal consent was sought from the teachers and they were requested to audio-record a single 40-minute lesson. Until the recordings were done, they were only told that the study was on classroom interaction. On average, the amount of time allocated for English and science subjects was five lessons per week amounting to about 200 minutes of class instruction time. The classroom interactions were transcribed with pauses indicated by ellipses (...) and use of languages other than English in italics and bold. Additional contextual information was placed in parentheses. The transcripts were analysed for code-switching functions using Gumperz's (1982) semantic model encompassing situational and metaphorical code-switching (see Appendix 1).

#### **Results and Discussion**

This section presents the results on code-switching in the English and science lessons. In the excerpts included in this section, use of languages other than English is indicated in italics and the English translation is given next to it in bold. The function of code-switching is indicated above the utterance in capital letters.

Table 1. Frequency of Teacher Code-switching in the English and Science Lessons

Lesson	Торіс	Code-switching in- stances
Science	Simple machine: Lever	23
English 1	The poem: The Lack of Industry	21
English 2	Reading: School Bullying	4
Total		48

The results show that there were 48 instances of code-switching in the three lessons combined (Table 1), involving mainly English and Bahasa Malaysia. Both the science teacher (n=23) and English Teacher 1 (n=21) code-switched frequently during the lesson but English Teacher 2 code-switched very little when she taught reading skills (n=4). The frequency does not take account of the word "Okay" as an example of code-switching as it may not be considered as an English word any longer. In view of the frequent use of "Okay" by the teachers (28 by the science teacher, 28 by English Teacher 1, 45 by English teacher), including it would over-represent the incidence of code-switching.

Table 2. Frequency of Code-switching Functions in Science and English Lessons

Functions of code- switching	Science	English 1	English 2	Total	%
Reiteration	9	11	0	20	41.67
Message qualification	11	7	0	18	37.50
Interjections	3	1	0	4	8.33
Quotations	0	0	3	3	6.25
Personalisation or objectivisation	0	0	1	1	2.08
Addressee specification	0	1	0	1	2.08
Situational switching	0	1	0	1	2.08
Total	23	21	4	48	99.99*

<sup>\*</sup>The total percentage does not equal 100% due to rounding error.

Table 2 shows that the most common discourse functions of code-switching were reiteration (41.6%) and message qualification (37.5%), and these were used only by the science teacher and English Teacher 1. The use of languages other than English for interjections, quotations, addressee specification, and personalisation *versus* objectivisation was minimal, accounting for less than 21 percent of the total instances of code-switching identified in the data set. The four instances of interjection indicated a signposting function (Table 2). For example, English Teacher 1 said *keseluruhannya* ('as a whole') to sum up his explanation on point of view in a poem. Similarly, the science teacher said *dapat?* ('got it?') in the middle of her explanation to mark the different parts of her explanation rather than to find out whether her students really understood that part of the lesson. The interjections served to focus students' attention and facilitated their comprehension of the lesson, although not directly assisting in the explanation of the referential content.

In the next section, results are presented to show that the content focus of the science lesson and English Lesson 1, which resulted in frequent code-switching.

#### **Teacher-fronted Content Lessons**

In both the science lesson and English Lesson 1, the teacher's main objective was to transmit content knowledge to the students in the form of the working of a lever and the point of view for a poem, respectively. In these teacher-fronted content lessons, most of the time was taken up by the teacher giving explanations and providing input to the students. The analysis showed that the nature of code-switching for reiteration and message qualification in the science and English 1 lessons was similar.

The science lesson was conducted in class with a simple teacher demonstration of the operation of levers. It was not a laboratory session where students had hands-on experience experimenting with the three types of levers. The science teacher began the lesson by explaining the working of a simple lever. She initially explained the essential elements of a lever (load, effort, and fulcrum) in English and reiterated the explanation in Bahasa Malaysia. She also elaborated on her explanation by interspersing the use of English and Bahasa Malaysia. The alternation of reiteration and message qualification is illustrated in Example 1.

# Example 1.

In this example, the science teacher uses using English to explain how effort needs to be exerted for a lever to lift a load while resting on a fulcrum. She reiterated by translating it to Bahasa Malaysia (*Untuk mengangkat sesuatu kamu mesti gunakan tenaga*). She went on to qualify what she meant by making a reference to the students' force and load/object (*Jadi ini tenaga kamu. Dan ini beban kamu, objek kamu*). Following this, the science teacher talked about the three parts of a lever again and immediately reiterated the concepts in Bahasa Malaysia. This pattern of alternation between reiteration and message qualification with the message first given in English and then Bahasa Malaysia seemed to have worked for the science teacher because she used this pattern throughout the lesson.

The use of English seemed to be a launching pad for the explanation in Bahasa Malaysia, considered as the part that students could grasp. This tendency arose from her use of English as the base instructional language for the science lesson, in compliance with government language policy. However, the science teacher had to codeswitch to Bahasa Malaysia during the lesson because her students complained that they could not understand a new topic if she used only English--and this was from a class considered the second best in the school. Technical vocabulary was a problem. To familiarise her students with the key terms for the topic (i.e. fulcrum, effort, and load), she embedded the English lexical items in the Bahasa Malaysia discourse, similar to linguistic strategies used by the Primary Two and Form Two English teachers in Martin's (2005) study in two Malaysian schools. Since her students had studied science in English for only the past two years (Forms 1 and 2) after six years of learning it in Bahasa Malaysia in primary school, the science teacher's use of Bahasa Malaysia facilitated their learning of science. The science teacher also deemed the code-switching to Bahasa Malaysia beneficial to her students because they were allowed to answer examination questions in both English and Bahasa Malaysia, not only in the school examinations but also in the standardised Lower Secondary Examination which was compulsory for all Form Three students in Malaysia.

English Lesson 1 was about a literary element of a poem, the point of view used by the writer of the poem, making it a content-oriented language lesson. English Teacher 1 began the lesson by reviewing what was taught in the previous lesson on the characters in the poem before introducing the notion of "first person" and "third person" point of view, which was reiterated with a translation to Bahasa Malaysia to help students draw upon their background knowledge. English Teacher 1 proceeded to cite evidence from the poem (e.g., the use of "I") to show that it was the poet expressing his feelings using the first person point of view. When asked whether they understood, the students said *no*, after which he made another attempt to re-explain "point of view", and this time beginning with Bahasa Malaysia, as shown in Example 2.

### Example 2.

[ MESSAGE QUALIFICATION ]
Point of view means siapakah yang bercakap di dalam poem ini. (who
[ REITERATION ]
is speaking in the poem). Siapa sebenar bercakap okay? (Who is
[ MESSAGE QUALIFICATION
really speaking okay?) Orang yang bercakap dalam poem ini (the
person who is speaking in this poem), the Lack of Industry ialah (is)
William Butler Yeats okay? Who is the speaker in the poem? William
Butler Yeats. You can see. How do you see this? You can see he uses
the first person of view okay? I, I, I here refers to William Butler Yeats.
He tries to tell you his feeling. He tries to tell you his feeling. Dia cuba REITERATION
menyampaikan perasaannya melalui puisi yang ditulisnya ini okay? (He

# tries to express his feelings through the poem he wrote)

In Example 2, Bahasa Malaysia was used to explain "point of view" first in the form of a message qualification, then reiteration and back to message qualification before continuing in English on the poet's expression of his feelings in the poem. It seemed that Bahasa Malaysia was used to recapitulate the previously explained content to ensure students' comprehension before introducing new information that was subsequently reiterated in Bahasa Malaysia. The order of language from English to Bahasa Malaysia was evident in several shorter explanations later in the lesson and a final lengthy explanation before the teacher was interrupted by students making noise, which prompted situational code-switching. Throughout the lesson, the teacher posed questions to check their comprehension and the students gave short answers such as "yes", "no" and "first person" in English. There were also instances of responses in Bahasa Malaysia (e.g., satu orang saja meaning 'one person only') but this did not influence the teacher's code-switching patterns, and the lesson took place mainly in English except for instances when the teacher switched to Bahasa Malaysia to help his students understand his explanation. Based on the relatively higher frequency of reiteration (n=11) compared to message qualification (n=7, Table 2), English Teacher 1 was only translating at important junctures but still giving most of the explanations in English.

In these two content-based lessons, the science teacher and English Teacher 1 were providing input to their students in the form of extensive explanations of concepts by switching to Bahasa Malaysia for reiteration and message qualification. These two functions of code-switching were found to co-occur. By using both languages, a double layered message was encoded: 1) this is how a lever works/this is what first person point of view means; and 2) this is important and you need to know this. This follows the finding of Zheng (2009), who states that a message is clarified and emphasised when said in both languages (reiteration). Frequent message qualification was also found by Choi and Kuipers (2003) in their study of science students. As the order of the language switch was generally one way from English to Bahasa Malaysia, this suggests that the base language for teaching was English for these two teachers. The transcripts also show that a larger proportion of the teacher talk was in English. In the given circumstances where students' proficiency in English might not be adequate for them to understand the complex subject matter if Bahasa Malaysia were not used, the judicious use of code-switching by the teachers was a good teaching strategy to construct the information in a form that was more comprehensible to the students.

### **Teacher-facilitated English Lesson**

In contrast to the teacher-fronted science lesson and English Lesson 1, English Teacher 2 facilitated a reading lesson by asking students questions and building on their responses. Only four instances of code-switching were identified (Table 2). This section describes the functions of code-switching which could occur despite the teacher's attempt to keep to an English-only lesson. In this lesson on school bullying, English Teacher 2 began by asking students to look at a picture on school bullying and state the gist of the story. After an effortful sixteen-turn attempt, a student finally said, "threatening." The teacher prompted for the meaning but inferring "threatening" from contextual clues proved too difficult for the students. Realising the complexity of the task, she called upon a student to roleplay the scenario in the picture with her to explain its meaning. This time she was successful and students responded with laughter and side remarks. She went on to ask the students about the number of characters in the dialogue, their identity, their relationship with one another, and the real life context of the scenario before getting students to role play two scenes based on the dialogue. Throughout the lesson, English Teacher 2 said only two non-English words, the first was initiated by her and the second by her student.

After giving students some time to read the dialogue, she repeatedly asked the students if they had finished, only to be met with silence and soft replies of "yes". So she said, "Why? Why do you all not want to answer me? You are afraid [if] you answer me I will *kena* you, is it?" The closest translation of "I will *kena* you" in this context is "I will get you" but the Bahasa Malaysia word carries the meaning of trickery and getting the person into trouble. In this context, English Teacher 2 stated her observation of the students' silence in response to her question, and proceeded to make a guess that the students did not want to answer in case she called upon them to answer the questions that follow. We coded this instance of code-switching as personal-

isation, where the personal opinion of English Teacher 2 is indicated and where the teacher closed the distance with the students. The personalisation strategy worked and the students were more responsive after that.

The other incidences of code-switching by English Teacher 2 happened on another occasion when she was illustrating what a conversation was. She gave an example of a conversation starter as "how are you today?" and instructed a student to answer her. A student unexpectedly answered "bei song" ('not feeling good') in Chinese Hokkien instead of "I'm fine, thank you", as shown in Example 3.

# Example 3.

English Do you know what is conversation? Conversation is like how are you

Teacher 2:

today? You answer me okay.

Student: Bei song (Not feeling good).

[QUOTATION] [QUOTATION]

English Ah ah bei song (not feeling good). Ah, he answer me bei song. Then I

Teacher 2: [OUOTATION]

ask him why you bei song? Ah, you have to answer me. This is

conversation. I talk to him and he talk to me. Okay? Ah, so how many

people are involved in the conversation? ...

English Teacher 2 first repeated what the student said (*bei song*) before reporting what he said in "He answer me *bei song*". She went on to narrate how she responded to him in the fictitious conversation, "Then I ask him why you *bei song?*" In total, she said *bei song* three times and we counted this as three instances of quotation. Instead of telling off the student for playing the fool, English Teacher 2 accepted the response in its original language and resourcefully used it to explain what a conversation was. According to Finocchiaro and Brumfit (1983), a communicative lesson may accept judicious use of native language where feasible (as cited in Richards & Rodgers, 1986). By making use of the student's response, the interruption to the lesson was negated and the lesson progressed well.

The minimal teacher code-switching in English Lesson 2 might suggest that the students were better in English. However, based on English Teacher 2's description of her students' proficiency in English, the students in this class were similar to those in the other two classes. The three teachers' English proficiency was also comparable. The low frequency of code-switching was also not due to the lower amount of teacher talk. Contrary to what might have been expected, English Teacher 2 was talking more than the other two teachers; the total word count for the classroom interaction was about 1900 words compared to English Teacher 1 (900 words) and the Science

teacher (1100 words). The students in English Lesson 2 were also more responsive, although their responses were brief, unlike the other two classes where there were longer silences whenever questions were posed. According to English Teacher 2, in other lessons when she had to explain difficult words, she preferred to speak Bahasa Malaysia to save time and it was also her students' preference. For this particular lesson audio-taped for analysis, the subject matter did not involve language content such as explanation of grammar rules and specialised vocabulary for an unfamiliar topic but rather elicitation of key points from the dialogue on school bullying and students' background knowledge related to the topic. Hence, English Teacher 2 could facilitate a language lesson with minimal code-switching.

Putting the results for the two teacher-fronted content lessons and the teacher-facilitated language lesson together, it is apparent that the lesson content had an influence on the nature of teacher code-switching. When the teachers needed to provide a lot of explanation, they could not do without Bahasa Malaysia for reiteration and message qualification. These two types of code-switching usually co-occurred, with reiteration before a lengthier qualification of the message in Bahasa Malaysia. The order of the switch from English to Bahasa Malaysia is interesting as it suggests that English is the base language for teaching in content-based lessons, and therefore the more important language in the classroom. Yet at the same time, it suggests that Bahasa Malaysia is more important because it ensures student comprehension of the teacher input.

#### Conclusion

This study shows that the content knowledge focus of the science and English lessons necessitates use of code-switching to convey the message to students. In teacherfronted content lessons, frequent alternation between reiteration of key points and message qualification from English to Bahasa Malaysia is targeted at ensuring student comprehension. In teacher-facilitated language lessons, code-switching is not used for explanation but for personalization, and may be a quotation of students' use of other languages which is resourcefully incorporated into the lesson. The study has gone beyond affirming the use of code-switching for discourse functions identified by Gumperz (1982) to identifying the co-occurrence of reiteration and message qualification as useful strategies to enhance teacher explanations of referential content for the students' benefit. While some may view code-switching in language lessons to be invalidating the second language of students rather than helping them to learn (e.g., Lin, 1996; Montague & Meza-Zaragosa, 1999), this study suggests that in circumstances where students' proficiency in the instructional language is lacking, codeswitching is a necessary tool for teachers to make their messages more comprehensible to students. Admittedly, this preliminary study of three teachers is limited in scope and the teacher code-switching practices may be idiosyncratic. Hence, the pattern of the teacher code-switching practices which emerged need to be interpreted within the scope of the study, and verified with further research using a larger and varied corpus of teachers and schools.

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#### References

Baron, B. (2003). When smart groups fail. *The Journal of Learning Sciences*, 12(3), 307-359.

Butzkamm, W. (1998). Code-switching in a bilingual history lesson: The mother tongue as a conversational lubricant. *International Journal of Bilingual Education and Bilingualism*, 1(2), 81-99.

Choi, J., & Kuipers, J. (2003). *Bilingual practices in a science classroom: Bilingual Hispanic students' ways of constructing school science*. Retrieved March 28, 2006, from http://www.gwu.edu/~scale-up/EQRE.doc

Flyman-Mattsson, A., & Burenhult, N. (1999). Code-switching in second language teaching of French. *Working Papers* 47, 59-72.

Gabusi, V. (n.d.). *Code-switching uses: The focus on the teacher. Applied analysis in a high school context*. Retrieved August 10, 2008, from http://www.facli.unibo.it/NR/rdonlyres/36CF5E3C-A2FB-4D24-B4D8-BDC2029D 2319/81457/TesinadiValentinaGabusi.pdf

Greggio, S., & Gil, G. (2007). Teacher's and learners' use of code switching in the English as a foreign language classroom: A qualitative study. *Linguagem & Ensino*, 10(2), 371-393.

Gumperz, J. J. (1982). *Discourse strategies*. Cambridge: Cambridge University Press.

Huerta-Macias, A., & Quintero, E. (1992). Code-switching, bilingualism, and biliteracy: A case study. *Bilingual Research Journal*, *16*(3-4), 69-89.

Idris, N., Loh, S. C., Nor, N. M., Razak, A. Z. A., & Saad, R. M. (2007). Professional preparation of Malaysian teachers in the implementation of teaching and learning of Mathematics and Science in English. *Eurasia Journal of Mathematics, Science and Technology Education*, *3*(2), 101-110.

Malaysia Ministry of Education (2002). Surat pekeliling ikhtisas bil. 11/2002: pelaksanaan pengajaran dan pembelajaran Sains dan Matematik dalam Bahasa Inggeris di Sekolah Kebangsaan (SK), Sekolah Jenis Kebangsaan Tamil (SJKT), Sekolah Jenis Kebangsaan Cina (SJKC), Sekolah Menengah (SM) dan Tingkatan Enam mulai tahun 2003 [Circular no. 11/2002: Implementation of teaching and learning of Science and Mathematics in English in national schools, national-type Tamil schools and national-type Chinese schools, secondary schools and Form Six beginning from the year 2003]. Kuala Lumpur: Author.

Lin, A. M. Y. (1990). *Teaching in two tongues: Language alternation in foreign language classrooms*. Research Report No. 3. City Polytechnic of Hong Kong, Department of English.

Liu, A. (n.d.). Teacher codeswitching between English and Chinese in English-asforeign-language classroom. Retrieved August 24, 2008, from http://www.beiwaionline.com/tutor/2003collection/liuaichun.htm

Mahadhir, M., & Then, C. O. (2007). Code-switching in the English language class-rooms in Kuching secondary schools. *Sarawak Museum Journal, Special Issue No. 7* on Social Sciences and Humanities, LXIV(85), 197-219.

Martin, P. W. (1996). Code-Switching in the primary classroom: One response to the planned and the unplanned language environment in Brunei. *Journal of Multilingual and Multicultural Development*, *17*(2-4), 128-144.

Martin, P. W. (1999). encounters of a bilingual kind: Interactional practices in the primary classroom in Brunei. *International Journal of Educational Development*, 19, 127-140.

Martin, P. (2005). "Safe" language practices in two rural schools in Malaysia: Tensions between policy and practice. In M. Y. Lin & P. W. Martin (Eds.), *Decolonisation, globalization: Language-in-education policy and practice. New perspectives on language and education* (pp. 74-97). Cleveland: Multilingual Matters.

Montague, N. S., & Meza-Zaragosa, E. (1999). Elicited response in the pre-kindergarten setting with a dual language program: Good or bad idea? *Bilingual Research Journal*, *23*, 2-3.

Mwinsheikhe, H. M. (2003). Using Kiswahili as a medium of instruction in Tanzania secondary schools as a strategy of improving student participation and performance in science. *Journal of Instruction in Tanzania and South Africa*, 129-148.

Nilep, C. (2006). "Code Switching" in sociocultural linguistics. *Colorado Research in Linguistics*, *19*(1). Retrieved June 19, 2009, from http://www.colorado.edu/ling/CRIL/Volume19\_Issue1/paper\_NILEP.pdf

Nordin, A. (2005). Students' perception on teaching and learning Mathematics in English. *Bulletin Pendidikan Sains dan Matematik Johor* [Johor Science and Mathematics Education Bulletin], *14*(1). Retrieved June 19, 2009, from http://eprints.utm.my/1507/1/KERTASINT.pdf

Pandian, A., & Ramiah, R. (2004). Mathematics and Science in English: Teacher voice. *The English Teacher*, *XXXIII*. Retrieved February 13, 2009, from http://www.melta.org.my/ET/2004/2004-50.pdf

Probyn, M. J. (2005). Learning science through two languages in South Africa. In J. Cohen, K. T. McAlister, K. Rostlad & J. MacSwan (Eds.). *Proceedings of the 4th International Symposium on Bilingualism*. Somerville, MA: Cascadilla Press.

Rethinasamy, S. & Johie, P. (2008, December 13-15). Preparing and delivering Science in English: A case study among primary school teachers. Proceedings of Seminar Kebangsaan Jawatankuasa Penyelarasan Pendidikan Guru [National Seminar on Streamlining Committee on Teacher Education], Bayview Hotel, Langkawi.

Reyes, I. (2004). Functions of code-switching in schoolchildren's conversations. *Bilingual Research Journal*, *28*(1), 77-98.

Richards, J. C., & Rodgers, T. R. (1986). *Approaches and methods in language teaching: a description and analysis*. Cambridge: Cambridge University Press.

Rusmin, R. (2008, June 10). Kenyataan timb. Menteri tanpa kajian [Assistant Minister's statement without research]. *Malaysiakini*. Retrieved December 1, 2008, from http://www.malaysiakini.com/letters/84231

Sabah ready to revert to BM for Science and Maths if directed. (2007, November 19). *Daily Express*. Retrieved December 1, 2008, from http://www.dailyexpress.com.my/news.cfm?NewsID=54071

Seidlitz, L. M. (2003). Functions of codeswitching in classes of German as a foreign language. Unpublished doctoral dissertation, University of Texas, Austin.

Teaching of Maths and Science in English: 'Revert to teaching in our national language'. (2008, September 7). *The Malaysian Bar*. Retrieved December 1, 2008, from http://www.malaysianbar.org.my/news\_features/teaching\_of\_maths\_and\_science in english revert to teaching in our national language .html

Ting, S. H. (2002). Is English needed in a Malay workplace? *RELC Journal*, 33(1), 137-153.

Ting, S. H. (2007). Influence of ethnicity and hierarchical status on language choice in a multilingual organization in Sarawak. *Sarawak Museum Journal, Special issue No. 7, LXIV*(85), 221-250.

Ustunel, E. (2004). Preference organization in learners' language choice following teacher-initiated and teacher-induced code-switching in Turkish EFL classrooms. *ARECLS E-Journal*. Retrieved September 10, 2008, from http://www.ecls.ncl.ac.uk/publish/Volume1/Eda/EdaUstunel.htm

Yang, M. (2004). A study of code-switching in Chinese EFL classrooms: A pragmatic approach. *Sino-US English Teaching*, 1(10), 43-49.

Zabrodskaja, A. (2007). Russian-Estonian code-switching in the university. *Arizona Working papers in SLA & Teaching*, 14, 123-139

Zheng, L. (2009). Living in two worlds code-switching amongst bilingual Chinese-Australian children. *Australian Review of Applied Linguistics*, *32*(1), 5.1-5.18. DOI: 10.2104/aralogo5.

# Appendix 1

Table 3. Code-switching functions as defined by Gumperz (1982, pp. 75-81)

<b>Functions</b>	Description	Example
Quotation	Serves as direct quotations or as reported speech.	She doesn't speak English, so, dice que la reganan: "Si se les va olvidar el idioma a las criatura" (she says that they would scold her: "the chil- dren are surely going to forget their language")
Addressee specifica- tion	Serves to direct the message to one of several addressees.	A: Sometimes you get excited and then you speak in Hindi, then again you go on to English.  B: No nonsense, it depends on your command of English.  A: [shortly after turning to a third participant, who has just returned from answering the doorbell] <i>Kən hai bai</i> (who is it)?
Interjec- tions	Serves to mark an interjection or sentence filler.	A: Well, I'm glad I met you. B: <i>Andale pues</i> (O.K. swell). And do come again. Mm?
Reiteration	Serves to repeat a message from one code to another code either literally or in somewhat modified form.	Keep straight. Sidha jao [louder] (keep straight)

Message qualifica- tion	Serves to qualify constructions such as sentence and verb complements or predicates following a copula.	The oldest one, <i>la grande la de once anos</i> (the big one who is eleven years old).
Personal- isation or objectivisa- tion	Serves to distinguish between talk about action and talk as action, the degree of speaker involvement in, or distance from, a message, whether a statement reflects personal opinion or knowledge, whether it refers to specific instances or has the authority of generally known fact.	A: Vigələ ma yə sa americə (Wigele got them from America) B: Kanada pridə (it comes from Canada). A: kanada mus I səgn nit (I would not say Canada).
Situational code- switching	Code-switching resulting from a change in social setting: topic, setting or participants.	

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