

**CODE-SWITCHING AS A COMMUNICATIVE TOOL FOR  
SCIENCE LEARNING IN A CHINESE SECONDARY  
SCHOOL IN MALAYSIA**

**by**

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**PERTUKARAN KOD SEBAGAI ALAT KOMUNIKASI  
UNTUK PEMBELAJARAN SAINS DI SATU SEKOLAH  
MENENGAH JENIS KEBANGSAAN CINA DI  
MALAYSIA**

**oleh**

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**Tesis yang diserahkan untuk  
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# **PERTUKARAN KOD SEBAGAI ALAT KOMUNIKASI UNTUK PEMBELAJARAN SAINS DI SATU SEKOLAH MENENGAH JENIS KEBANGSAAN CINA DI MALAYSIA**

## **ABSTRAK**

Di dalam pelaksanaan dasar pendidikan pengajaran matapelajaran Sains dan Matematiks dalam Bahasa Inggeris, penggubal-penggubal dasar telah mengabaikan masalah komunikasi yang dihadapi oleh guru dan pelajar di dalam bilik darjah. Sebagai salah satu cara untuk mengatasi masalah tersebut, guru dan pelajar melibatkan diri dalam pertukaran kod. Pertukaran kod menjadi masalah kerana ia akan menghalang matlamat untuk memperbaiki penguasaan Bahasa Inggeris dalam penggunaannya sebagai bahasa pengantaraan untuk mengajar dan membelajar Sains.

Tumpuan utama kajian ini ialah untuk mengenalpasti jenis bahasa yang digunakan oleh guru-guru dan pelajar-pelajar untuk berkomunikasi di dalam bilik darjah Sains Tingkatan Dua dan juga untuk menangkap ciri-ciri pertukaran kod di dalam pertuturan kelas Sains mereka. Kajian ini bertujuan untuk mengenalpasti pelbagai jenis, fungsi dan sebab pertukaran kod di dalam kelas Sains Tingkatan Dua. Data yang digunakan dalam kajian ini datangnya daripada dua sumber, iaitu (1) rakaman audio pelajaran Sains dan (2) temuramah-temuramah dengan guru dan pelajar yang berkenaan. Kelas-kelas tiga orang guru dan sekumpulan pelajar telah pun dipilih sebagai informan-informan. Data juga dikategorikan mengikut jenis, fungsi dan sebab pertukaran kod. Guru-guru dan pelajar-pelajar didapati telah menggunakan tiga jenis bahasa, iaitu Bahasa Inggeris, Bahasa Mandarin dan Bahasa Melayu, juga disertai dengan dialek Hokkien ala Pulau Pinang dan Cantonese. Dua

jenis pertukaran kod yang baru, disamping pertukaran kod jenis tag, intra-sentential dan inter-sentential, telah pun muncul. Lima fungsi pertukaran kod yang baru juga dapat dikenalpasti manakala tiada wujudnya sebab yang baru untuk pertukaran kod di dalam kajian ini. Walaubagaimanapun, adalah lebih menarik jika kajian untuk mengkaji corak pertukaran kod ini melibatkan sampel yang lebih besar. Perubahan setting dengan menggunakan pelajar-pelajar Tingkatan Enam sebagai subjek pengkajian adalah di galakkan supaya dapat mengenalpasti kepentingan penggunaan bahasa dalam pertukaran kod sebagai alat komunikasi yang efektif dan pertuturan Sains yang dapat difaham.

# **CODE-SWITCHING AS A COMMUNICATIVE TOOL FOR SCIENCE LEARNING IN A CHINESE SECONDARY SCHOOL IN MALAYSIA**

## **ABSTRACT**

In implementing the educational policy of teaching Science and Mathematics in English, policy makers have overlooked the problem in communication faced by both teachers and students in the classrooms. One of the ways, teachers and students use to deal with the problem is to engage themselves in code-switching. Code-switching becomes a problem as it may interfere with the noble aim of improving the command of English through its use as medium of instruction for teaching and learning Science.

The main purpose of this study is to identify the languages used by teachers and students to communicate in the Form Two Science classrooms and to capture the characteristics of code-switching in their Science discourse. The study intends to identify the types, functions and the reasons of code-switching in the Form Two Science classrooms. The data used in this study comes from two sources: (i) audio recordings of the Science lessons and (ii) interviews conducted with the informants. The classes of three teachers were selected for observation and a group of students were also chosen as subjects. Data was then categorized according to the features of types, functions and the reasons for code-switching. The teachers and students had used three languages, English, Mandarin and Malay, as well as a local dialect, Penang Hokkien in the classrooms. Two new types of switching had emerged along with tag switching, intra-sentential switching and inter-sentential switching. Five new functions of code-switching were discovered, while there were no new reasons for code-switching in this study. However, it would be more interesting if a bigger



sample is used to study the patterns of code-switching. A change of setting with the Form Six students as subjects is also recommended to determine the importance of language use in code-switching for effective communication and comprehensible Science discourse.

## **CHAPTER I**

### **1.0 Introduction**

This chapter introduces the subject of the study, code-switching, in the Form Two Science classrooms of a Chinese National Type Secondary School in Malaysia. First, it provides the background of the study by discussing issues which are related to the bilingual phenomenon in these classrooms. Then it leads to a discussion of the problem of code-switching in these settings. The aim and objectives of the study are later specified. The rationale and significance of this study are also given. The limitations of the study, operational definitions and the conclusion follow after that.

### **1.1 Background of the Study**

The concept of bilingual education began in Post-War Malaya in the Cheeseman Programme (1945-46) during the period of the Malayan Union (Asmah 1979). The plan of the Cheeseman Programme was to have four types of school at the primary level and two types at the secondary level. The primary schools were the English, Malay, Chinese and Tamil schools which were then using their own respective languages in their education systems. In the programme, the vernacular schools would be turned into bilingual schools by introducing English as another medium of instruction in each one of them. At the secondary level, there would be two types: an English-medium school with the teaching of the mother tongue as a subject, and a school with the mother tongue (Malay, Chinese or Tamil) as the main medium but where English would be the second language. However, the programme was never implemented due to instability of the government at that time and the Malayan Union was dissolved with the formation of the Federation of Malaya in 1948.

The concept of bilingual education re-germinated in 1951 in the Report of the Committee On Malay Education, Federation of Malaya chaired by Mr L.J. Barnes, the Director of Social Training, University of Oxford at that time. The main aim of this committee was to inquire into the problem of Malay education and the educational facilities available to them. They had also to examine several issues such as the system of Malay vernacular education, methods required to raise scholastic achievement of Malay pupils in such schools and measures necessary to elevate the education of Malays in English.

The Barnes Committee had envisaged a bilingual National School with a type of curriculum that could help children to achieve the target of effective bilingualism at twelve plus. 'Effective bilingualism' was defined by the Committee as the ability to read, write and converse in both Malay and English with approximately equal freedom (Report of the Committee on Malay Education, Federation of Malaya 1951). However, the Committee did not give a clear guideline as to how the policy would be implemented for instance, it did not say what were the school subjects to be taught in Malay and how the bilingual education policy it proposed should be carried out. It was a hazy concept of the implementation of this policy (Asmah 1979).

Before the recommendations of the Barnes Committee could be carried out, the Chinese community reacted by opposing the implementation. Then a commission for an investigation into Chinese education was set up in 1951 under Dr. William P. Fenn, Associate Executive Secretary of the Board of Trustees of several Chinese institutions of higher learning and Dr. Wu Teh-Yao, an official of the United Nations. Their report containing recommendations on the Chinese system of education was entitled 'Chinese Schools and the Education of Chinese Malaysians: The Report of Mission invited by the

Federation Government to study the problem of the Education of Chinese in Malaya, June 1951'. It was better known as the Fenn-Wu Report 1951.

The Fenn-Wu Committee had a similar recommendation to that of the Barnes Committee in that there was one type of secondary school with English as medium of instruction. For primary education, it recommended teaching three languages, Chinese, English and Malay, but the medium of instruction was Chinese. The transition from primary to secondary education for the Chinese-educated pupils was a 'Special Chinese' class for one year where the pupils were given intensive training in the English language. It was in line with the practice of transferring the pupils from Malay primary schools to English schools by putting them through a one-year Special Malay class with immersion of English.

Subsequently, the Razak Committee came about to reiterate the concept of bilingual education which also advocated the learning of languages for the acquisition of language proficiency and not for media of instruction. There was no suggestion of using two of three languages as media of instruction except in the teaching of the languages and literatures of the communities concerned, For instance, in the English school Malay was not only taught as a subject but also as a medium of instruction in the teaching of literature. The same treatment would still apply to a Chinese if he/she ever entered any single English school.

The Razak Report was heading for a system of one-language as the main medium of instruction: Malay in the Standard Malay School, English in the Standard Type English school, Tamil in the Standard Type Indian school and Chinese in the Standard Type Chinese school. As such under this system, the schools, apart from the main medium of instruction, could offer teaching of the language or languages concerned and their literatures.

The Rahman Talib Report had a similar concept of bilingual education with the Razak Report. The only difference was that the Rahaman Talib Report envisaged a secondary system of education mainly in English or Malay only. The Report of the Education Review Committee (1960) contained such notes, “After passing through the Remove Form, pupils would be taught subjects other than language and literature subjects mainly in the medium of Malay or English. In the circumstances now prevailing in Malaya, however, we see no reason why additional explanations in some subjects should not be given in other languages so as to help both the teacher and the pupils.” Such notes contained encouragement in using other languages during explanation which meant code-switching was allowed in those early days of bilingual education.

In the early years of independence, existing Chinese, Tamil and mission schools accepted government funding and were allowed to retain their medium of instructions on the condition that they adopt the national curriculum. Chinese secondary schools were given the options of accepting government funding and change into English national-type schools, or remain Chinese and private without government funding. Most of the schools accepted the change, although a few rejected the offer and came to be known as Chinese Independent High Schools, which are private high schools until today. They provide secondary education in the Chinese language as the continuation of the primary education in Chinese national-type primary schools. Shortly after the change, some of the national-type schools reestablished their Chinese independent high school branches. This showed the persistent nature of the Chinese in preserving their mother tongue, Mandarin and their views about education.

In the 1970s, in accordance to the national language policy, the government began to change English-medium primary and secondary national-type schools into

Malay-medium national schools. The language change was made gradually starting from the first year in primary school, then the second year in the following year and so on. The change was completed by the end of 1982. Malay became predominant as ‘In a truly bilingual system of education, equality of the languages concerned cannot be attained. One language is certainly going to be more equal than the other (Asmah 1979).’

In 1979, a report from the Special Cabinet Committee chaired by Dr. Mahathir Mohamad (Mahathir’s Report), who was the Minister of Education at that time (later became a Prime Minister since 1981), was finalized after a six-year study. The objectives were to achieve national unity in a multi-ethnic society and increase the sense of patriotism, as well as to produce skilled manpower for national development and to further extend the policy of democratization of education in order to strike a balance in all aspects of education between rural and urban areas. This report has become a guideline for reforming the education system in the recent years. In 1995 and 1996, the Education Act was amended to give sufficient need to meet the challenges in the 21st century besides making Malaysia globally competitive. The national education philosophy indicates that it is essential to develop potential individuals who are responsible and capable of achieving high level of personal well-being as well as being able to contribute to the harmony and betterment of the family, the society and the nation at large.

The explanation of the historical perspective of the implementation of bilingual education since the British colonial days provided an understanding as to why most Malaysians had been so accustomed to bilingual education. The national language policy to strengthen Bahasa Melayu (Malay) and to maintain English as a second language has resulted in tacit acceptance of bilingual education for some quarters of the

population especially those who code-switch to cope with language problems especially in communication. Different ethnic groups in Malaysia react differently to the language changes in the education policy. It is not within the scope of this study to examine how each ethnic group reacts to the language changes especially in the medium of instruction. This study is only concerned about how one particular ethnic group has reacted to overcome communication problems in teaching and learning Science by code-switching. Despite the changed language policies in education throughout the years, most pupils and teachers in one Chinese National-Type Secondary School in Malaysia have resorted to use their mother tongue, L1 (Mandarin) as the matrix language (base language) and English (L2), Malay (national language) and Penang Hokkien (local dialect) as the embedded languages (EL) in teaching and learning Science.

In the learning environment of a Chinese secondary school in Malaysia, most students and teachers communicate in Mandarin, which is acknowledged as the written language of the Chinese people in Malaysia. This is due to the fact that the students come from primary Chinese feeder schools and most of the Chinese teachers are also educated in Mandarin. However, there are some teachers and students who communicate in Penang Hokkien, English or Malay (Bahasa Melayu). These teachers are not educated in Mandarin and they may be Chinese, Malays or Indians.

In the Form Two Science classrooms, it has been observed that teachers and students (being learners of English as second language) code-switch in order to convey meaningful messages to each other. The reasons why they code-switch can be varied, but interesting. Nevertheless, the issue of code-switching could be related to “communicative competence” which is defined by Hymes (1972) as the aspect of a person’s language competence that enables him/her to convey and interpret messages as well as to “negotiate meanings” interpersonally within specific contexts.

Code-switching may be adopted as a communicative strategy in a bid to negotiate for meaning in the context of this study. Possibly, students use code-switching as a tool to negotiate for meaning so as to ensure comprehensibility of input and teachers use it to improve understanding of their teaching and classroom management. However, further research needs to be undertaken to confirm or refute this claim. Consequently, code-switching becomes an intriguing problem to study.

## **1.2 The Problem**

In implementing the educational policy of teaching Science and Mathematics in English, policy makers have overlooked the problem in communication faced by both teachers and students in the classrooms. One of the ways, teachers and students use to deal with the problem is to engage themselves in code-switching. Code-switching becomes a problem as it may interfere with the noble aim of improving the command of English through its use as medium of instruction for teaching and learning Science.

In Malaysia, some research has been done on code-switching. For instance, there was the study on inter-gender discourse at the workplace to investigate power wielding (Jarrah 2003) and the study of language-dialect code-switching in a multilingual context among undergraduates of Kelantanese origin (Zuraidah 2003). Regarding code-switching in teaching Science, Juliana (2005) studied the coping strategies, which include code-switching, of trainee teachers in their teaching practice.

In Jarrah's study on inter-gender discourse at the workplace to investigate power wielding, she examined several extracts from talk exchanges amongst working adults during office meetings. Special attention was paid to linguistic power-wielding among male and female participants and to determine how strategies of domination, negotiations of personal rights and obligations and control in their mutual interaction



can be understood. The study showed how the intricate interplay of language choices and code-switching of male and female speakers are manipulated in order to give power and turn-taking rights in conversations and to influence events according to the speakers' aims. The study suggested that participants developed a strategy of code-switching to exert power in a particular context and to negotiate language choice.

On the other hand, Zuraidah was more interested in an analysis and description of language-dialect code-switching. She studied the language-dialect code-switching (specifically Standard Malay/Kelantanese Malay code-switching) behaviour of Malay students, aged 20-25, who were undergraduates at the University of Malaya at the time of the study. The central concern of her study was to determine the structural and functional constraints of Malay/Kelantanese code-switching in a new ethnolinguistic environment. Data collection comprised of recordings of spontaneous conversations collected over a period of three months and interviews conducted with the informants, with the main purpose of determining their reasons for code-switching.

Concerning Juliana (2005), she explored the challenges that pre-service student teachers faced with the new medium of instruction, English and the strategies they employed to cope with language problems during their teaching practicum. Data was drawn from survey questionnaires and interviews with the student teachers, with the aim of studying their perceptions and strategies used to cope with language-related problems while teaching Science. The findings of the study suggested that pre-service student teachers were handicapped by limited English language proficiency. On the other hand, the learners also faced limited English proficiency. To cope with these challenges, pre-service student teachers had resorted to code-switching by using scripts and speaking slowly during lessons.

For the purpose of this study, code-switching is defined as “the juxtaposition within the same speech exchange of passages of speech belonging to two different grammatical systems or subsystems (Gumperz 1982). These changes can occur at any point in the sentence, and they may occur within the sentence or between sentences. Its occurrence can also be from language to dialect, dialect to dialect, and dialect to language. However, the analysis of code-switching in this study does not intend to go into detail on the analysis of the whole discourse taking place between teachers and students, but merely to study structural units of sentences in their utterances. If viewed strictly from an educational perspective, code-switching can be considered as a refusal to commit oneself to the obligation of using English to teach and learn Science. However, it has to be acknowledged that in the case of teachers and students who are less proficient in English, they have no choice but to code-switch in the classrooms. In this way, code-switching becomes a conversational strategy to mediate the conflicting pressures felt by teachers and students (Heller 1988).

### **1.3 Objectives of the Study**

The main purpose of this study was to identify the languages used by teachers and students to communicate in the Form Two Science classrooms and to capture the characteristics of code-switching in their Science discourse. Specifically, the study intended to:

1. Identify the types of code-switching that occurred among teachers and students.
2. Identify the functions of code-switching in the Science classrooms
3. Identify the reasons for code-switching among the subjects.

### **1.4 Research Questions**

The study intended to answer the following:

1. Where does code-switching occur in the subjects' speeches?
2. When do teachers and students code-switch in their speeches?
3. Why do teachers and students code-switch in the Science classes?

### **1.5 Rationale of the Study**

This study is timely as the Ministry of Education has made changes in the Science and Mathematics curriculum to allow the two subjects to be taught in English. Historically, in 1983, all English-medium schools in Malaysia had been fully converted into national schools using the National Language (Bahasa Malaysia) as the medium of instruction. As a result, English became the second language in Malaysian schools. Since then, the role of Bahasa Malaysia and English has taken the path of “nationalism” and “nationism” in the academic and social context of Malaysia (Asmah 1994).

A recent survey by the Ministry of Education on the academic performance of the pioneer batch of students who had completed two years of studying Science in English also indicated a need for research on languages used in the Science classrooms. The survey was conducted on the country's 20 best and 20 worst performing schools (The Star: 8/3/05). There was a stark difference in the performance of urban and rural secondary schools. All schools that excelled in Science were found to be located in urban areas. The results were based on school tests. The weak performance of students in rural secondary schools was of great concern. Education Director-General Dr Ahamad Sipon at that time said secondary school students needed more time to understand terms, sentences and complex concepts in English.

This study was also important in providing some explanations on the linguistic behaviour of bilinguals in the Science classrooms. The mixed language strategy in the learning and teaching of Science had been investigated in Africa (Rollnick &

Rutherford 1993) and Hong Kong (Marton, Ng & Tsui 2001). Their studies revealed that the home language or first language of the child could help to form the bridge between the 'common life-world meanings' to the formal Science meanings of the 'inventive Science geniuses'. In South Africa, Rollnick & Rutherford (1996) investigated the use of both English and SiSwati (mother tongue) in the learning and expression of science concepts. They found that the home language served several functions in the lessons. It manifested its role as a mediator of thought. In Hong Kong, Marton, Ng & Tsui (2001) explored the effects of a change in the medium of instruction by asking a teacher to code-switch between English and Chinese in the technical description of the Reed relay. The teacher could shift contextually and expand the space of learning for the students when she used Chinese in the lesson.

However, research on code-switching in Science learning in Malaysian schools is little explored or understood. This has provided the impetus for the present study which investigated the occurrence of code-switching in the Science classrooms.

The results of the study may be used as recommendations for the teachers to improve their teaching and the students to be able to understand better and participate effectively in the learning of science.

## **1.6 Significance of the Study**

An attempt to understand code-switching in the science classrooms may provide understanding and recognition of linguistic diversity in the Malaysian academic context. The students in my study had undergone a year's learning of Science in English in Form One and they had been streamed according to their overall performance in the school examinations before being put in their Form 2 classes.

The study identified the second language learner as an important element in gaining literacy skills in Science learning. Having to struggle with the learning of English as a second language and then to acquire scientific knowledge through that language might prevent the learner from effectively participating in Science learning. Understanding why the teacher needed to code-switch in the Science classrooms might provide insights into the problems of teaching Science in English.

### **1.7 Limitations of the Study**

The study had confined itself to only nine Form Two students and three teachers in the Science classes of different academic abilities. The case study analysis was favoured as it could be used to categorize the subjects of three graded academic levels of performance into three groupings and the method may generate important findings for reference or future research.

### **1.8 Operational Definitions**

The following are operational definitions for this study:

#### **1.8.1 Bilingualism**

This refers to simply the alternate use of two or more languages (Mackey 1968).

#### **1.8.2 Bilingual**

The word 'bilingual' primarily describes someone with the possession of two languages. It can, however, also be taken to include the many people in the world who have varying degrees of proficiency in and interchangeably use three, four or even more languages (Li Wei 2000).

#### **1.8.3 Code**

The term refers to not only different languages, but also the varieties of the same language as well as styles within the same language.

#### **1.8.4 Code-Switching**

It refers to “the juxtaposition within the same speech exchange of passages of speech belonging to two different grammatical systems or subsystems (Gumperz, 1982).

Code-switching is not a simple combination of two sets of grammatical rules but grammatical integration of one language in another (Li Wei 2000).

#### **1.8.5 Discourse**

It refers to the teachers’ and students’ naturally occurring language use in classroom settings.

#### **1.8.6 First Language (L1)**

The term refers to the first language learnt and acquired by the students. It could be their home language that they have learnt from their parents or caretakers.

#### **1.8.7 Nationalism**

It refers to the process of transformation from fragmentary and tradition bound ethnicity to unifying and ideologized nationality (a socio-cultural identity that may have no corresponding politico-geographic realization). It is also the first of many transformation of socio-cultural integration (Fishman 1968).

#### **1.8.8 Nationism**

A term used where political boundaries are most salient and most efforts are directed towards maintaining or strengthening them, regardless of the immediate socio-cultural character of the population they embrace (Fishman 1968).

#### **1.8.9 Second Language (L2)**

The term refers specifically to English, which has been used a medium of instruction in the teaching and learning of science.

### **1.9 Conclusion**

Learning or acquisition of knowledge is related to language learning. It is important to realize this because Malaysia is using a second language, English, as the medium of instruction to teach Science. Issues of bilingual education in Malaysia, especially on policies related to language planning and medium of instruction have been mostly controversial. This includes linguistic conflict and ambivalence towards using English as a medium of instruction and the role it plays in nation-building. The conflicts and ambivalence towards learning English in schools have resulted in learning difficulties as a result of language problems. Learning difficulties will affect literacy skills. The issue is whether to allow the teachers and students who do not possess the required proficiency in English needed to code-switch in the Science lessons. This study is significant because the L2 learner is an important element in gaining literacy skills in Science learning. The struggle to learn Science in English is a great challenge to students who have to cope with both language and content. In this struggle, teachers are also involved as they have to teach scientific language and content to the students. As a result, this study is important in explaining why they code-switch in the classrooms in order to understand their linguistic behaviour and problems in teaching and learning Science.

## CHAPTER II

### REVIEW OF LITERATURE

#### 2.0 Introduction

This chapter provides a review of literature on firstly, bilingualism which happens at the societal and individual level. There is a fundamental difference between societal and individual bilingualism. Most of the time the issue of the degree or the extent of bilingualism is not sufficiently dealt with until language planning policies find their way into a nation's education system with the explicit aim of fostering bilingualism to facilitate a nation's goal of achieving success in globalization or for the nation's multi-ethnic harmony and peace. For instance, India, Switzerland and Belgium are multilingual countries, while Canada, Finland, Paraguay and even Malaysia are officially bilingual. Although individual bilingualism may be widespread in Luxembourg and Paraguay, Mackey (1968) points out that the main concern in multilingual nations has often been the guaranteed maintenance and use of two or more languages in the same nation, rather than the promotion of bilingualism among its citizens.

One does not have to move to a different place to come into contact with people speaking a different language. There are plenty of opportunities for language contact in the same country, the same community, the same neighbourhood or even the same family. The usual consequence of language contact is bilingualism, or even multilingualism, which is commonly found in an individual speaker. It is therefore important to consider certain aspects of the context in which the bilingual finds himself or herself as this provides information about the ways in which two or more languages form part of the person's everyday life. There are also other relevant factors such as



psychological, neurological, pathological and general cognitive factors that may influence or affect the linguistic behaviour of the bilingual. However, the lengthy discussion of these factors is beyond the scope of this study.

Under bilingualism, it is pertinent to discuss briefly who a bilingual is and what a language is made of. Bilinguals can also be classified according to individual family circumstances which prevail to decide whether and to what extent a child becomes and stays bilingual, as well as other psychological, social and educational determinants that may come into play.

Next, the features of bilingual speech will be discussed briefly. These will include features such as interference, borrowing, mixing, individual linguistic creations and lastly, the most important feature of all - code-switching which is the focus of this study. Under code-switching, essential issues such as definitions, reasons, its relationship with second language acquisition and functions are highlighted in the discussion. It will then go on to provide glimpses on the various studies done on code-switching in general in formal and informal settings, code-switching in bilingual/multilingual classrooms and those which are related to Chinese students/pupils and the languages that they use.

The chapter ends with a conclusion that code-switching provides an interesting scope for researchers to do further studies on its occurrence in the various fields anytime and anywhere. As far as the researcher is concerned, it is found that code-switching being used as a tool to negotiate for comprehensible input in the Science classroom is rarely explored.

## **2.1 Bilingualism**

The most salient feature of bilingualism is that it is a multi-faceted phenomenon. Whether one is considering it as a societal or an individual level, one has to accept that there can be no clear cut-off points. As bilingualism defies delimitation, it is open to a variety of descriptions, interpretations and definitions. At one end of the spectrum of definitions of bilingualism would be one which, like Bloomfield's (1933:56), would specify 'native-like control of two languages' as the criterion for bilingualism. He had observed that the immigrants in the USA could become so proficient in the new language that they were indistinguishable from the native speakers around them. At the other end, the definition of bilingualism was broadened by Haugen to the ability to produce 'complete meaningful utterances in the other language' (Haugen 1953:7). On the other hand, Diebold (1964) used the term "incipient bilingualism" when he characterized the initial stages of contact between two languages. This definition was rather inadequate as he leaves open the question of the absolute minimal proficiency required in order to be bilingual and allows for the fact that a person may be bilingual to some degree, yet not be able to produce complete meaningful utterances (Romaine 1989). It was also suggested that a person might not have productive control over a language, but was able to understand utterances in it. Some linguists like Hockett (1958:16) used the term 'semibilingualism' when he referred to such situations of 'passive' or 'receptive' bilingualism.

In 1967, Mackey pointed out that the concept of bilingualism had become increasingly broader. Hakuta (1986:4) has noted that Haugen's broad definition incorporates a developmental perspective which brings the entire process of second language acquisition within the scope of the study of bilingualism. Hakuta also believes that the field should deal not only with the bilingual individual, but also the circumstances surrounding the creation of bilingualism and its maintenance and attrition.

Another bilingual researcher, Uriel Weinreich, offers one of the shortest definitions of bilingualism in his book *Languages in Contact*: ‘The practice of alternately using the two languages will be called bilingualism and the person involved, bilingual’ (Weinreich 1968:1). Mackey seems to agree with Weinreich, but the former expanded the concept. Mackey concludes that in order to study bilingualism, one is forced to consider it as something entirely relative because the point at which the speaker of a second language becomes bilingual is either arbitrary or impossible to determine. He therefore considers bilingualism as simply ‘the alternate use of two or more languages by the same individual’ (Mackey 1968:555). Romaine (1989) has used the term ‘bilingualism’ to include multilingualism.

### **2.1.1 Definition of a Bilingual/Multilingual**

The word ‘bilingual’ primarily describes someone with the possession of two languages. It can, however, also be taken to include the people in the world who have varying degrees of proficiency in and interchangeably use three, four or even more languages (Li Wei 2000).

In many countries of Africa and Asia, several languages co-exist and large sections of the population speak three or more languages. Individual multilingualism in these countries is a fact of life. Many people speak one or more local or ethnic languages, as well as another indigenous language which has become the medium of communication between different ethnic groups or speech communities. Such individuals may also speak a foreign language, such as English, French or Spanish – which has been introduced into the community during the process of colonization. This latter language is often the language of education, bureaucracy and privilege.

Multilingualism can also be the possession of individuals who do not live within a multilingual country or speech community. Families can be trilingual when the husband and wife each speak a different language as well as the common language of the place of residence. People with sufficient social and educational advantages can learn a second, third or fourth language at school or university, at work or in leisure time. In Malaysia, students in the national type secondary schools learn at least two languages – English and Malay, while their counterparts in the non-national-type (Chinese) secondary schools take on Chinese as the third language.

It is vital to recognize that a multilingual speaker uses different languages for different purposes and does not typically possess the same level or type of proficiency in each language. In Malaysia, for instance, some children of Chinese origin may be able to speak the Chinese language, but are not able to read or write in that language. In Morocco, a native speaker of Berber may be fluent in colloquial Moroccan Arabic, but is not literate in either of these languages. The Berber speaker is educated in modern standard Arabic and uses that language for writing and formal purposes. Classical Arabic is the language of the mosque, used for prayers and reading the Quran. Many Moroccans also have some knowledge of French which is the former colonial language (Bentahila 1983).

### **2.1.2 Definition of Language**

Language can be thought of as a systematic combination of smaller units into larger units to create meaning. The combination of the sounds in a language (phonemes) will form meaningful words (lexical items) according to the rules of the spoken language. Those lexical items combine to make meaningful structures (sentences) according to the syntactic rules of the language (Li Wei 2000).

According to the description above, language becomes a rule-governed system. However, in reality, when a specific language of a specific speech community is focused on, it is found that many other factors, mostly non-linguistic, have to be considered. For instance, when one wants to work out the rules of the Malay language, there is a need to have some kind of agreement as to what Malay refers to. Is it just confined to the Malay language spoken by the Malay people or the Malay language spoken by non-Malays as well?

The *Concise Oxford Dictionary* defines English as ‘the language of England’. If that is what English means, then what is that type of English spoken by the people in Australia, Canada, South Africa and the USA? Such questions have led some linguists to suggest that the notion of ‘language’ is essentially a social one in the sense that it is defined in terms of the people who speak it and the language they speak vary according to their social characteristics, such as age, gender, place of origin and ethnicity.

In a traditional sense, linguists make a distinction between ‘language’ and ‘dialect’ when they consider the criteria of size and prestige (Hudson 1992). A language is considered to be larger than a dialect. A variety of language would contain more items than a dialect. In this sense, English can be considered a language containing all the sum total of all the terms in all its dialects, such as Texan English and Yorkshire English. Another example can be said of the Chinese language. It contains the sum total of the other dialects such as Cantonese, Hokkien and Hakka. The versatility of the Chinese language is that the Chinese characters can be read in the sound of Cantonese, Hokkien and some other Chinese dialects. According to the Wikipedia Encyclopedia, there are about 1.2 billion speakers of the Chinese language in the world.

A language is also thought to have prestige which a dialect lacks. English as a language, for instance, is supported institutionally through schools and the mass media. The Chinese language has also gained prestige in that it is one of the six official languages of the United Nations.

Language is therefore a social notion; it cannot be defined without reference to its speakers and context of its use. Language boundaries are boundaries between groups of people, as language contacts are contacts between people. Thus, language is not simply a system of sounds, words and sentences. It also has a social function, both as a means of communication and as a way of identifying social groups (Li Wei 2000).

### **2.1.3 Types of Bilinguals**

Skutnabb-Kangas (1984) suggests a classification of the world's bilinguals into four groups. In drawing distinctions between these four categories she takes the following factors into account:

- (a) pressure to become bilingual;
- (b) the prerequisites for bilingualism;
- (c) route by which the individual has become bilingual;
- (d) the consequences entailed in failing to become bilingual.

The following are the four groups:

#### **(1) Elite bilinguals**

They are people who have chosen freely to become so because of a need to work or study abroad. In these cases, the acquisition of both languages proceeds unhindered, with the two languages receiving wide social support and the mother tongue enjoying a firm and stable position.

#### **(2) Children from linguistic majorities**

These children learn another language because it is advantageous to do so. The learning of the second language enhances the prestige of the minority language, for instance, learning French in Canada. English is learnt in the Netherlands because it has wider educational or vocational benefits. Children from this group tend to come from monolingual backgrounds.

(3) Children from bilingual families

These are children whose parents have different mother tongues. There will be societal pressure to become fluent in the official language, but there will be no external compulsion to become bilingual. Bilingualism becomes desirable due to internal family pressures which require the child to communicate in the parents' language.

(4) Children from linguistic minorities

These children have parents who belong to a linguistic minority; they are under intense external pressure to learn the language of the majority. There may be little support offered to them in terms of bilingual education programmes or primary/secondary school teaching. They also find themselves under the influence of strong internal forces that encourage them to learn the language of their parents and to form social relationships with the members of the wider minority group. The lack of success in attaining bilingualism may be catastrophic, ranging from loss of educational and future opportunities to problems of rootlessness and alienation.

#### **2.1.4 Features of Bilingual Speech**

Grosjean (1985) suggests that bilingual competence in an individual will manifest itself in various ways. Phenomena such as interference, mixing and switching will surface in a bilingual's communication with other speakers. A non-native accent and the choice of a wrong word are more likely to be detected in bilinguals when they are fatigued or

excited. Children tend to mix more if they are frequently exposed to mixed speech. In addition, both bilingual children and adults tend to mix and switch more when they are in each other's company than when talking to monolinguals, because they want to maintain group identity to outsiders or solidarity to other group members, or express a shared experience.

#### **2.1.4.1 Interference**

In the older literature, all instances of transfer of elements tended to be subsumed under the heading of 'interference'. In 1953, when he first published his book *Languages in Contact*, Weinreich called interference as 'those instances of deviation from the norms of either language which occur in the speech of bilinguals as a result of their familiarity with more than one language, i.e. as a result of language contact.' Mackey, however, did not mention about 'norm' or 'deviation' in his definition. He defines interference as 'the use of features belonging to one language while speaking or writing another' (Mackey 1970:569).

Mackey emphasizes the distinction between interference and borrowing: the former is an instance of 'parole', while the latter is one of 'langue'. Interference varies according to a number of psychological, situational and discourse factors. There are also various types of interference – phonological, lexical, grammatical and cultural.

Interference at the phonological level is often called 'a foreign accent' which is usually more readily noticed by the layman. Adult bilinguals are more likely than child bilinguals to show features of stress, rhythm, intonation and speech sounds from their first language impinging on their second. Phonological interference can probably occur in given groups of speakers as the transferred elements are likely to be those that are absent in the other language or dissimilar in the two codes (Lado 1957). For example,



speakers of Greek or Italian may tend to use vowel sounds similar to those in their own languages when speaking German or English. Greek and Italian have simple vowel systems, consisting of five and seven phonemes respectively, whereas German and English have complex systems with between sixteen and twenty units, including both pure vowels and diphthongs. Thus, native speakers of Greek and Italian may fail to distinguish between long and short vowels, as in *beat* versus *bit* or *Mus* as distinct from *muß* (Hoffmann 1991).

Interference at the grammatical level involves aspects of syntax such as word order, the use of pronouns and determiners, prepositions, tense and mood. Saunders (1982a) remarks that transference of word-order patterns in his children's speech was predominantly from English into German, although there were some examples of occasional influence in the reverse direction. Interference involving word order noun-adjective are found in Spanish-French bilinguals. They often use the order of noun followed by adjective when speaking non-Romance languages like English or German. Among English-French bilinguals, the reverse has been observed, that is, a preference for using the adjective-noun sequence in French (Hoffmann 1989).

When interference occurs at the lexical level, Hoffmann (1989) has observed that a bilingual may borrow a word from one language when speaking in the other to a monolingual, either on an ad-hoc basis or in a more permanent way and may do the same when addressing another bilingual. The borrowed item may even be 'fitted up' with the appropriate morphology to make the borrowing less obvious. A fairly large amount of ad-hoc formations which clearly showed the influence of the other languages emerged when some children were given vocabulary recall tests in Spanish, German and English. They produced such items as, for instance, German 'die Axe (based on English 'axe') instead of 'die Axt', or 'das Kalf' (based on 'calf', the animal) for the

correct ‘das Kalb’, and Spanish ‘las grapas’ (based on English ‘grapes’) instead of ‘las uvas’, or ‘esos ticos’ (on the basis of ‘those sticks’) for ‘esos palos’.

Interference in spelling is the transfer of writing conventions from one language to the other. The following example from Hoffmann (1991) shows that the bilingual child (aged about 11 years old) who wrote this note to her mother had imperfect knowledge of German orthography. She was following the rules of spelling in English for most of the parts of the note because she knew English better. That note was written this way: ‘Canst du bitte die watte weknehmen? Die Hamster machen viel crach wen sie im rat laufen. Ein hamster ging grade em, aber 2? Ich hoffe daß gehapt hast.’ (The correct spelling should be: ‘Kannst Du bitte die Watte wegnehmen? Die Hamster machen viel Krach wenn sie im Rad laufen. Ein Hamster ging gerade eben, aber 2? Ich hoffe, daß Du viel Spaß gehabt hast.’ Two spelling conventions were therefore ignored: nouns spelt with initial capitals, and in letters the pronoun ‘du’ is usually ‘Du’. The note actually explains to the mother that when she was out, the girl stuffed some cotton wool into her ears and went to bed so as not to hear her hamsters. She was asking her mother to remove it.

#### **2.1.4.2 Borrowing**

Most languages borrow lexical items from other codes, for instance, German, which has over the centuries incorporated large numbers of words from Latin, Italian, French and more recently, English. English has also over the centuries borrowed extensively from other European languages, but today it is the most prolific ‘donor’ to most European languages (Hoffman 1991). The few examples are: ‘der Computer’ in German; ‘le weekend’ in French; ‘un mitin (meeting)’ in Spanish.