Changing the language of instruction for Mathematics and Science in Malaysia:
The PPSMI policy and the washback effect of bilingual high-stakes secondary school exit exams.

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Abstract

This longitudinal study examines a change in the language of instruction for Mathematics and Science (M & S) subjects from Bahasa Malaysia (BM) to English in Malaysia. This policy, known by the acronym of PPSMI, has two objectives: to promote student learning of M & S, and also to increase students’ proficiency in English. The Education Ministry also chose to create a washback effect by introducing a bilingual high-stakes secondary exit exam.

The study uses a framework which combines the perspectives offered by literature on educational change, content-based instruction (CBI) and washback in language testing to examine PPSMI. The research questions are interested in exploring upper secondary Math and Science teachers (MST) perceptions of the policy and the bilingual exams; in finding out what changes in MST classroom practices, how the changes occur and why; and also in determining what the washback effects of the bilingual exit exam are. It also looks at whether there are significant differences between urban and out-of-town MST in relation to all these aspects. A mixed methods approach is used for data collection and data analysis.

The results point to the complexity of educational change processes. They indicate that classroom implementation of this policy is affected by multiple factors such as MST’s English proficiency, the language proficiency and academic ability of their students, MST beliefs about language in teaching content, MST perception of themselves as subject teachers and the school’s linguistic environment. The study found that while the English SPM exams exerted a strong washback effect throughout the two-year cycle, the BM version created a washback effect specifically among out-of-town MST at the approach of the secondary exit exam. It also found that although PPSMI places the emphasis on both content and language, MST tended to focus on teaching content. The findings contribute to the literature on educational change, washback in language testing, and CBI and bilingual education.
Résumé


L’étude utilise un cadre de travail qui combine les perspectives offertes par la littérature sur le changement éducationnel, enseignement de langue basé sur le contenu (CBI) et washback en test de langage pour examiner le PPSMI. Les questions de la recherche visent à explorer les perceptions des enseignants de Mathématique et de Science (EMS) du haut secondaire quant à ladite politique et aux examens bilingues; pour trouver ce qui change dans les pratiques des (EMS), comment les changements surviennent et pourquoi; et aussi déterminer quels sont les effets washback de l’examen de sortie bilingue. L’étude regarde aussi s’il existe des différences significatives en relations avec tous ces aspects entre EMS urbains et en régions. Une approche de méthodes mixtes est utilisée pour la collecte et l’analyse de données.

Les résultats mettent en relief la complexité du processus de changement éducationnel. Ils indiquent que la mise en œuvre en classe de la politique est affectée par de multiples facteurs tels que la compétence des EMS; la capacité langagièr et l’habilité académique de leurs étudiants; les croyances des EMS regardant la langue dans l’enseignement du contenu; la perception d’eux-mêmes des EMS comme enseignants de sujets et l’environnement linguistique de l’école. L’étude démontre qu’alors que la version anglais du SPM faisaient usage d’un fort effet washback tout au long du cycle de deux ans, la version BM créa un effet washback spécifiquement parmi les EMS en régions à l’approche du examen de sortie. Elle fait aussi valoir que tandis que le PPSMI mettait l’emphase sur les deux : contenu et langue, des EMS tendaient à se concentrer sur l’enseignement du contenu. Ces trouvailles contribuent à la littérature sur le changement éducationnel, sur le washback dans les tests de langues, CBI et l’éducation bilingue.
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Glossary of acronyms and frequently used terms in text

The acronyms are followed by a brief explanation/definition if necessary. Terms specifically used in the quantitative analysis are listed in the second part of the glossary.

**BI – Bahasa Inggeris (English language)**
- English is taught as a second language in all Malaysian primary and secondary schools.

**BM – Bahasa Malaysia/Bahasa Melayu (Malay language)**
- Bahasa Malaysia is the official language of Malaysia. Until 2003, it was the sole language of instruction for all subjects in Malaysian schools and tertiary institutions.

**CBI – Content Based Instruction**
- The teaching of a second or foreign language through a subject or content area

**EAP – English for Academic Purposes**

**EFA – Exploratory Factor Analysis**

**ELL – English Language Learners**
- A term used to refer to non-native speakers of English in content area classrooms where English is the language of instruction

**EPU – Economic Planning Unit**
- This unit, in the Prime Minister’s Department, has the task of approving all research conducted by foreign researchers and issuing an official Research Pass.

**ESL – English as a Second Language**

**JPN – Jabatan Pendidikan Negeri (State Education Department)**
- This department oversees schools and educational programmes within each state.

**MMOE – Malaysian Ministry of Education**

**M & S – Mathematics and Science**

**MST – Mathematics and Science Teacher(s)**

**OOT schools – Out Of Town schools**
- These are schools designated by the JPN (State Education Department) as being located in non-urban areas
PMR – Penilaian Menengah Rendah (Lower Secondary Assessment)
- The PMR is a national, standardised exam taken by all Form Three (Secondary Three) students in Malaysia at the end of three years of secondary schooling. Students normally sit for eight subjects. Although passing the PMR is not compulsory for continuing on to upper secondary education, it can act as a selection mechanism for entry into elite day schools or boarding schools.

PPD – Pejabat Pendidikan Daerah (District Education Office)
- There are several of these offices in every state, depending on the number of districts. The PPD works closely with schools and teachers in the implementation of educational policies.

PPSMI – Pengajaran dan Pembelajaran Sains dan Matematik dalam Bahasa Inggeris (Teaching and Learning of Science and Mathematics in English)
- This policy, implemented by the Malaysian Ministry of Education in 2003, mandates a change in language of instruction, from Bahasa Malaysia to English, for all Mathematics and Science subjects taught in Malaysian primary and secondary schools.

SMK – Sekolah Menengah Kebangsaan (National Secondary School)
- The names of regular, fully government-funded secondary schools in Malaysia are preceded by SMK.

SPM – Sijil Pelajaran Malaysia (Malaysian Education Certificate)
- All Form Five (Secondary Five) students must take this exam at the end of five years of secondary schooling. Students must pass this exam to continue on to pre-university education.

UPSR – Ujian Penilaian Sekolah Rendah (Elementary School Assessment Exam)
- All Standard Six (Elementary Six) students must take the UPSR at the end of six years of elementary schooling. Students sit for five to seven subjects. Passing the exam is not compulsory for continuing on to secondary education. However, those who do well are selected to enter prestigious day schools or boarding schools.

Terms used in statistical analyses

LER – Linguistic environment of school as perceived by teachers

TER – Teacher’s number of years of teaching experience
PolicyP – refers to composite score for MST perception of the PPSMI policy

SupportP – refers to composite score for MST perception of support measures introduced by MMOE

TLComp – refers to composite score for MST perception of their own linguistic competency

SLComp – refers to composite score for MST perception of their students’ linguistic competency

TestQ – refers to composite score for MST perception of the bilingual format of SPM exam

ExPrep – refers to composite score for MST perception of how ready their students are for the SPM examinations
CHAPTER 1
Introduction to the research

1.1 Introduction

This study examines a policy that changed the language of instruction for Mathematics and Science subjects to English in Malaysian schools in 2003. The policy is popularly known by its Malay acronym, PPSMI (Pengajaran dan Pembelajaran Sains dan Matematik dalam Bahasa Inggeris [English as the language of instruction for Mathematics and Science]). With the implementation of this new policy, Mathematics and Science subjects, which had formerly been taught in Bahasa Malaysia (BM), Malaysia’s national language, started being taught in English at the primary and secondary school levels.

1.2 The rationale behind PPSMI

This new policy is part of a deliberate effort by the central government to shift the pattern of Malaysia’s economy. Traditionally, Malaysia has been a nation that counts upon its natural resources to sustain its economy. It is a producer of raw materials such as palm oil, rubber, tin and petroleum for export. Part of the economy is also dependent on the manufacturing of goods from these raw materials. However, the government’s central planners envision the economy moving away from these aspects to one that is based on skills and knowledge, a K-economy, by the year 2020 (Yeoh, 2002). As such, due to the role of English as the language through which research and the latest developments are disseminated in scientific, technological, economic and cultural domains in the K-economy, mastery of this language by the upcoming generation of youths is seen as vital if the move to develop a knowledge-based economy is to succeed (Azman & Abdul Razak, 2007). The entire educational system, therefore, has been mobilised towards achieving this end. For example, the National Science Education Philosophy states:

In consonance with the National Education Philosophy, science education in Malaysia nurtures a science and technology culture by focusing on the development of individuals who are competitive, dynamic, robust and resilient and able to master scientific knowledge and technological competency.
In the Preface to all syllabi and curriculum specifications for Form Four and Five (Secondary Four and Secondary Five) Mathematics and Science (M & S) subjects, the Director of the Curriculum Development Centre, Dr. Sharifah Maimunah Syed Zin specifically writes that the Malaysian education system is giving greater emphasis to Mathematics and Science (M & S) education because the hopes of the nation to become an industrialised nation depends on its ability to provide quality M & S instruction to its youth.

The PPSMI policy was also formulated to address the decreasing levels of English proficiency among its students. Although Malaysia had been a British colony which had used English as a medium of instruction, Bahasa Malaysia was imposed as the medium of instruction, at all levels of schooling, for all subjects, for more than four decades after Malaysia’s independence in 1957. English became a compulsory subject of study within the curriculum. However, it was not a subject which students were required to pass in order to receive certification. Students naturally focused their energies on the subjects which they were required to pass. Consequently, levels of proficiency in English fell considerably (Vatikiotis, 1993; Gill, 2004).

The imposition of Bahasa Malaysia as the only language of instruction posed other problems as well, especially at the secondary or tertiary level. On the one hand, it is proof that this can be done successfully: Bahasa Malaysia has been the sole language of instruction in Malaysian universities for almost 15 years now. On the other hand, the use of only Bahasa Malaysia seriously limits or retards the transfer of knowledge; in some rapidly moving fields, by the time some books or articles are translated and published in Bahasa Malaysia, they are already outdated by five or ten years. With the advent of the worldwide web and the ever increasing use of the internet in all fields of knowledge, the situation has been exacerbated. This “information lag” is problematic because, as mentioned above, Malaysia is a newly industrialising country actively seeking to expand the secondary and tertiary sectors of its economy. Malaysia is also looking to become a regional hub in the knowledge and information technology domain.

The Bahasa Malaysia only policy also means Malaysian students experience more difficulties due to their lack of language skills should they enroll in twinning programs offered by western universities or decide to study abroad, since the language of instruction and lingua franca is primarily English. So, although these students may have the necessary conceptual or theoretical knowledge in the content area, they may be handicapped by their incapacity to properly express
their thoughts and ideas, verbally and in written form, in English. Being educated mainly in Bahasa Malaysia also limits the scope of job opportunities open to graduates of local universities. Many international companies prefer to hire graduates who are fluent in English because English is the global language of trade and commerce.

1.3 New Policy on language of instruction: PPSMI

PPSMI is an attempt to address these issues. In the same Preface mentioned above, the objective for its implementation is given as follows:

This measure will enable students to keep abreast of developments in science and technology in contemporary society by enhancing their capability and know-how to tap the diverse sources of information on science written in the English language. At the same time, this move would also provide opportunities for students to use the English language and hence, increase their proficiency in the language. Thus, in implementing the science curriculum, attention is given to developing students’ ability to use English for study and communication, especially in the early years of learning.

This policy therefore has the dual purpose of allowing students to access mathematics and science content, and also to improve their English language proficiency. Through the implementation of this policy, Mathematics and Science teachers (hereafter referred to as MST), therefore, became the change agents responsible for ensuring that their students would be competent enough to function in these subject domains in English.

1.4 Implementation of PPSMI policy

Official implementation of PPSMI began in Standard One (Grade One), Form One (Grade Seven) and Lower Form Six (Grade Twelve) in 2003. This policy is in line with research in second or foreign language development that points to the effectiveness of language learning when conducted in content classrooms (Genesee, 1987; Swain & Lapkin, 1982; Lazaruk, 2007).
In the Malaysian system, Form Five is one of the exit points from the educational system. High-stakes exams at this level determine whether students qualify for high school or pre-university education or whether they will leave the educational system altogether. As part of this policy, the Form Five (Grade Eleven) high-stakes exit exams, called the SPM exams, for all Mathematics (Mathematics and Additional Mathematics) and Science subjects (Biology, Chemistry, Physics, Science) have been in bilingual format since 2003, even though the Form Five students sitting for these exams from 2003 to 2006 were still being taught in BM. By adopting such an approach, the Malaysian Ministry of Education (MMOE) wished to harness the intense pressure that major public exams can exert to promote change in teaching practices in the classroom. It expected a gradual shift in the language of instruction in Mathematics and Science (M & S) classrooms from BM to English to occur so that by 2007 teachers and students at all levels of elementary and secondary schools would be learning these subjects in English. The MMOE also assumed that students would be ready to be evaluated entirely in English.

1.5 The study

This study examines the PPSMI policy, focusing primarily on the changes occurring at the upper secondary level (Form Four and Form Five). Examining the changes happening at this particular level of schooling is important because, at the end of this two-year cycle, the Form Five students sit for high-stakes, school-leaving examinations administered by the MMOE called the SPM. Within this system, the possibility of continuing on to higher levels of education depends on the student’s performance on these high-stakes, public exams. The reputation of a school and its teachers is also judged by how well their students rank overall when the results of these examinations are announced. It is not surprising then, that teachers will often focus their teaching around the content and format of what will appear on these exams.

The Form Four and Five students participating in the research are, respectively, the first and second cohort of students to have undergone the learning of Mathematics and Science subjects in English throughout the entire secondary cycle. The Mathematics and Science teachers (MST) taking part in this study are also teaching Mathematics and Science at the Form Five level for the first time.
This study explores the implications of policy implementation and preparation for the bilingual SPM M&S exams for teachers and students in the highly exam-oriented Malaysian education system via the lens of educational change and washback from the language testing domain (Washback is defined as the effect that high-stakes tests have on the teaching and learning process. A detailed discussion of washback is provided in Chapter Two). It also examines the impact of this policy from the perspective of content-based instruction (CBI) for English Language Learners (ELL).

1.6 Research Objectives

My study attempts to answer the broad questions, “How are MST coping with the linguistic requirements of the PPSMI policy five years after initial implementation? How are their teaching practices being modified as a result of trying to prepare students for the bilingual SPM exam? What factors play a role in influencing classroom practices during this process?” I am interested primarily in exploring teacher perceptions of the PPSMI policy and the impact of measures put in place to ease the transition process. The study examines how different factors affect the teachers’ classroom practices as they make the switch from teaching in BM to teaching in English. I am especially interested in seeing what kind of influence the transitional bilingual format of the SPM exam exerts on what teachers do in the classroom, and whether there are patterns of response specific to urban or out-of-town schools.

1.7 Organisation of the study

The study is organised into eight chapters. The present chapter presents the objectives and outline of the study. Chapter 2 consists of a review of the literature. Three different bodies of literature, all connected to issues that are of interest to the study, are discussed. The first briefly looks at what has been written concerning change processes in organisations and educational systems. The second examines how exams have been used to promote change in teaching and learning, especially in the area of language testing, that is, washback literature. Finally, literature in the area of learning and teaching languages through content is presented, with a particular
emphasis on English for Academic Purposes (EAP) for English Language Learners (ELLs) in Mathematics and Science classrooms. Chapter 3 presents a historical overview of the education system in Malaysia under British colonial rule, the educational system in Malaysia as it is at present and the measures that have been taken to support the implementation of the PPSMI policy. The embedding of this policy within its socio-educational context is particularly important because it allows a clearer, more grounded understanding of the results and discussion that follow in Chapters 5, 6 and 7. Chapter 4 elaborates on the methodology used in this study. It briefly explains the rationale for using a mixed methods approach and describes the instruments that were used to collect data. This chapter lists the research questions for the study and goes on to provide details of the data collection process as well as particulars of the data analysis. Chapter 5 presents the quantitative results of the study. This is followed by Chapter 6, which presents the qualitative findings. In Chapter 7, the results from both qualitative and quantitative strands are interpreted and discussed with regard to the specific research questions that were posed. Chapter 8 concludes this thesis by presenting the implications of the findings with regard to the literature touched upon in Chapter 2. It discusses the study’s strengths and limitations along with recommendations for improving the implementation of PPSMI. This final chapter also looks ahead to future research directions.

1.8 The study’s original contribution

The results of this study contribute mainly to three areas of knowledge. The first of these is the area of educational change, especially as it concerns the area of language policy. Since teachers are usually the main change agents in these contexts, understanding the factors that influence their pedagogical choices is crucial in the endeavour to explain and to positively influence change processes in educational systems. This study contributes to more effective ways of bringing about such change in teaching and learning.

The second area is in knowledge related to high-stakes assessment and washback in language testing. High-stakes assessments have a strong, and often lasting, impact on the lives of many students. It is, therefore, important to align the teaching, learning and assessment processes within an educational system in order to promote optimum learning for all students. In this sense,
understanding the washback phenomenon allows educators to harness the powerful effects of high-stakes exams to produce better learning and teaching in classrooms. The results of this study contribute to this domain.

Another area in which the results contribute is in the use of content instruction for language learning. The policy of using English to teach Mathematics and Science in Malaysia can be considered a variant of this approach. Studying the implementation of this policy adds to a better understanding of contextual factors and teaching methods that are conducive for language learning with this approach. This is especially pertinent to linguistic environments where both teachers and students are learners of English.
CHAPTER 2

Review of the literature

2.1 Introduction

This chapter presents a review of three different bodies of literature relevant to the study. Since the PPSMI policy is an effort at creating educational change, the first section of this chapter will begin by looking at the literature on educational change and various theories on how it can most effectively be implemented. As stated in Chapter 1, the MMOE has favoured the use of a specific format, the bilingual format, for its national standardised exams at primary and secondary levels in the hopes of changing MST’s linguistic practices when teaching in class. It is therefore pertinent to examine the literature on the use of exams to effect change in classroom teaching, especially with regard to language teaching and language testing. And finally, due to the linguistic context of Malaysia, where both students and teachers are English as a Second Language (ESL) learners, and the fact that this linguistic policy is implemented not in language classes, but in Mathematics and Science subject classrooms, the third section will focus on literature that deals with teaching languages through content and the use of English for Academic Purposes (EAP) in English Language Learner classrooms.

2.2 Section I: Examining literature on educational change in general

In the twenty-first century, many countries are increasingly confronted with rapid social, economic and political changes that take place in their societies as a result of technological innovations and the process of globalisation. These nations often turn to their educational system to help prepare their youth and citizens for the challenges that they must face. As a result, ministries and local school boards are becoming increasingly aware of the need to reform educational practices to bring them in line with the realities and demands of a new age.

In Malaysia, education is regarded as a vital tool in the task of social advancement, preparation of human resources and social engineering. In a report on the development of education in Malaysia, the Malaysian Ministry of Education (MMOE) specifically states that
“the national five-year development plans from the mid-1960s have always identified the education sector as one of the main mechanisms in moving the nation ahead.” (MMOE 2004, p. 20).

Attempts to systematically change and improve the educational enterprise are not new, or limited to only developing or developed countries. Hargreaves (1994) points out that educational change is a global phenomenon. The principal goal, in most attempts to bring about changes in education, is better student learning (Fullan, 1982, 1991). However, these efforts, more often than not, have not resulted in widespread success in terms of changing the way teaching and learning were happening in schools. Fullan(1993) notes of previous efforts that, “successes were isolated – the exception rather than the rule. And they were not convincingly related to greater student learning.”(p.2)

The theories and models for explaining change in teaching are closely related to how the educational system and schools themselves are conceptualized as social entities. The actions taken to implement change initiatives are predicated on how those who promote the reforms view and understand the educational system and schools as organisations (Dalton, 1988). Wenger’s (1998) example of the importance of the conceptual framework or fundamental assumptions in relation to specific actions within organisations is instructive. He points out that for those who believe that the key to organisational performance is diligent implementation of organisational processes, it is logical to define increasingly more efficient and detailed processes to prescribe actions within the organisation. Therefore, “it makes sense to engineer and re-engineer these processes in abstract ways and roll them out for implementation” (p.10). In contrast, if the prevalent belief is that people contribute to organisational goals by being active and creative participants in practices that can never be fully captured by institutionalised processes, then prescription would be minimised, since too much of it could discourage the inventiveness that makes practices effective. The specific culture of the system or institution itself, therefore, influences the type and extent of change that can be implemented (Huse, 1975; Mayhew, 1982; Hargreaves, Lieberman, Fullan & Hopkins, 1998; Senge et al., 2000).

In order to understand how change unfolds, a review of change efforts in the field of education in general, but more specifically, in the field of ESL, over the last three decades will be presented, and the underlying theories and assumptions examined. As mentioned above, these underlying assumptions concerning organisations and how change or learning is supposed to
happen are often the essential elements which determine the failure or success of these efforts. These beliefs or understandings involve different levels of the organisation: structural, functional, group, interpersonal and intrapersonal. Since change can happen within any organisation on so many different levels, there is no clear and neatly drawn theory of change (Senge, 1990). This is obvious when we examine the literature. Change theories often fall under the domain of theories of organisations because this is where change efforts are principally focused. In this chapter, I will focus on theories concerning change in bureaucratic contexts as this is most relevant to the situation of the Malaysian educational system. I will also focus on theories of innovations that have been proposed in the field of ESL and language testing. Models or frameworks for explaining change that have been presented in this literature are also examined.

### 2.2.1 Educational and school systems as bureaucracies

Public school systems, in general, have become increasingly bureaucratised over the course of the last hundred years or so (Abbot, 1969). This is very clear when we look at schools and the profession of teaching today. In contrast to the teacher who taught each student every subject at every level in the one-room school house that still existed at the turn of the century in the United States, for example, teaching has become increasingly specialised, especially at higher grade levels (Kliebard, 1988). There has been a continuous expansion of activities and services offered by the school that target specific student needs such as psychological services, career orientation and special education programs. The writing of curriculum and teaching guidelines, the administration of schools and the activity of teaching have become clearly divided in the educational system. Education ministries, school boards, teachers’ associations or unions have also established rules that guide the conduct of their members and set standards to ensure a certain level in the performance of tasks. School personnel are hired and compensated based on strict regulations concerning training, qualifications and competence - teaching is now considered a professional career with fixed compensation and benefits. In fact, the educational system in which schools are situated at present can be termed a highly developed bureaucracy.

The same phenomenon has happened to the Malaysian school system, except that the changes happened over the past fifty years, when the responsibility for educational matters was
transferred from the colonial offices in London to the local government. However, within the last twenty years or so, there has been an intensification in the process due to the importance placed on the role of the school system in the nation’s modernisation efforts. The center of the Malaysian educational bureaucracy is the Malaysian Ministry of Education (MMOE).

2.2.2 Main characteristics of a bureaucracy

In order to understand change efforts in Malaysia it is important to grasp the idea of what a bureaucracy entails. According to Weber (1978), a bureaucracy is a rational, structural arrangement for accomplishing large scale administrative tasks. In the Weberian paradigm, bureaucratic organisations embody certain characteristics that ensure planned and efficient functioning. One important characteristic is that of specialisation. In many modern educational systems, there is a clear division between those who decide on the educational goals and plan the curriculum, that is, the authorities and curriculum specialists respectively, and those who implement the curriculum, the teachers. In such a system, curricular objectives and subject content are centrally planned. Textbooks are also either prepared by the central authorities or officially approved by them. Teachers are required to cover the specified content, usually with the use of official textbooks, in order to help students reach the target objectives.

Within a bureaucratic paradigm, decision-making power is greatest at the highest levels. Therefore, decisions flow from the top to the bottom levels of the hierarchy. Change efforts then, can also be seen within this framework as a process that flows from top to bottom. This means that changes are initiated by those who are in positions of authority and are implemented by those under their control or supervision. Figure 1 below illustrates how the flow of action is presumed to take place within the different levels of an educational system: change efforts initiated at the top of the hierarchy move progressively down to the bottom as those in authority at every level enforce the implementation of these changes. It can be seen that although directives for change come from the top, those who interact with students to enact the change within classrooms are teachers. This manner of introducing change is not particular to Malaysia and is, in fact, common in many Asian educational contexts (Lim, Gan & Sharpe, 1997; Wall, 1997, 2005; Cheng, 2002; Wang, 2008; Adamson & Davison, 2008; Burton, Daroon,
Raimaturapong & Siripong, 2008). In many of these countries, Education Ministry officials plan and roll out nationwide changes either to pedagogy or new curricula, and teachers are then given the specifications and guidelines for implementation.

*Figure 1. Top down implementation of changes*

Wise (1988) terms the bureaucratic top down view of change implementation “hyperrational” and notes that, in fact, change initiatives that do not take into consideration local context and culture will usually run into problems at the stage of implementation. Sarason (1996, 2003) agrees that those introducing change should take the institutional culture or factors related to the work context of teachers into account. Sarason (2003) points out that those wishing to reform education should seriously reconsider how to support and re-order educational priorities, provide and sustain contexts for the productive learning and developmental process of teachers, and also include all those who will be affected by educational policies in the formulation and decisions
about those policies. For many educators, one of the key elements in the endeavour of educational change is getting teachers to actively engage in the ideas underlying any educational reform and having them implement these changes in their daily teaching practices (Sarason, 1990; Hargreaves & Fullan, 1992; Hargreaves et al, 1998). The factors that support changes in teacher beliefs and teaching behavior should also be carefully considered since educational reforms ultimately depend on what teachers decide to implement in their classrooms: teachers should be respected as professionals, and change efforts should take into account what teachers as professionals need in order to successfully negotiate a reform (Petrie, 1990; Darling-Hammond & Sykes, 1999).

2.2.3 Educational change and washback theory

In recent years there has been a trend towards improving subject matter teaching through the implementation of examinations, especially those defined as “high-stakes” assessment. These efforts are usually part of attempts to introduce changes into the educational system by putting novel pedagogical theories and practices in place; they are related to educational innovation and contribute to building theories on how such innovation occurs. The research that examines the link between the use of examinations and how these impact the way teachers carry out teaching activities in the classroom is particularly pertinent to the PPSMI policy and to this study since the MMOE has chosen this route to influence the teaching and learning that happens in Mathematics and Science classrooms. In the area of second language education, the term “washback” (see section 2.3.6.1 for a detailed definition) is frequently used to describe the alignment of classroom practices to meet the requirements of a new exam. While the main focus here will be on the area of ESL, studies from general educational literature that are relevant to the topic will be included in the discussion as well.

In this study, the terms assessment and tests are used interchangeably with examination, as has also been done in educational literature. Although assessment has also come to include the evaluation of schools or education systems, this aspect will not form a part of the following
discussion. Here, the primary focus of the discussion will be on what is commonly termed, “high-stakes exams”. Assessment is often called “high-stakes” if it has real or perceived effects on the life or academic opportunities of students (for example, a college entrance examination which determines whether students have access to higher education) and consequences for teachers and schools (such as a test whose results determine whether specific schools or school programmes continue to receive funding) (Popham, 1987).

Before going on to consider the various studies that have been conducted concerning examinations and change in classroom teaching and learning, the following sections examine the history of testing in educational systems and how the functions of assessment have evolved over time. In this way, we can situate testing in the educational context and thus, better understand the reactions that they provoke within the teaching profession.

2.3 Literature on assessment and washback

2.3.1 What is assessment?

Kellaghan and Greaney (2001) specify that the term assessment can refer to “any procedure or activity that is designed to collect information about the knowledge, attitudes, or skills of a learner or group of learners” (p.19). In schools, teachers or examiners normally carry out the assessment, but this can also be done by the learner himself or herself. Assessments exist in many forms. They may be oral, written, aural, practical or even observational. Cheng (2002) affirms that in many societies, “the relationship [of public exams] to the curriculum, teaching, and learning and their effect on individual opportunities in life are of vital importance.” (p. 91) How and why is this so? The answer lies in the multiple intents for which examinations are designed and used.

2.3.2 Exams: A multi-purpose tool

Gipps (1999, 2002) contends that assessment is a social activity with many roles, which can only be understood if the contexts – social, cultural, economic and political – in which it is
embedded are also taken into consideration. Kellaghan & Greaney (2001) concur that assessment is used for multiple purposes. These include describing the students’ progress and identifying learning problems; guiding students in their choice of courses or vocational options; motivating them by providing goals and targets; certifying that they have attained an expected level of competence and selecting students for a higher level of education. The most common of these is that of selection, a purpose the public examination has fulfilled since its earliest recorded form in the Han Dynasty in China. However, according to Eckstein and Noah (1993), as societies evolved, so too did the role of the public examination. In considering the development of examination systems across many countries, these authors note that in industrial capitalist societies of the nineteenth century, with a growing middle class and an ever-increasing demand for skilled workers, examinations became a means of accessing socially or financially privileged professions. It, therefore, was used for the function of certification and also to prevent patronage appointments to coveted positions: tests were developed as a result of an increasing belief in science and rational forms of organisation, providing a logical and apparently fair basis for selection (Broadfoot, 1996).

Gipps (1999, 2002) points out that the development of intelligence tests added a new dimension to the utilisation of tests. In the early part of the twentieth century, testing became associated with the concepts of intelligence and with the assessment of innate ability, leading to a widespread belief that it was possible to scientifically measure both achievement and potential in a context-free, absolute manner. As these tests were used to determine which children were educable and which others needed special schools, they became a tool for allocating children and resources to schools. In addition, standardised, norm-referenced tests became increasingly popular as a means of determining students’ skills or knowledge at various levels of schooling. Pellegrino, Baxter and Glaser (1999) note that in the United States, for example, by the 1950s, “standardized, norm-referenced achievement test batteries had become an established part of educational practice, and their use was as prevalent as that of aptitude test batteries, if not more so” (p.318). These achievement tests were, for the most part, “objective tests”: reliable, replicable, multiple choice tests that did not necessitate “subjective” judgement. According to Gipps (1999), the development of these tests was seen as scientific and progressive because objective tests ensured selection on the basis of academic merit, thus contributing to social equity. Broadfoot (1996), in reviewing the development of the measurement paradigm, remarks
that this was “a specific response to the pressing need for a trustworthy and widely acceptable means of rationing educational opportunity according to some idea of merit.” (p.35)

2.3.3 Driving change in the educational system through the use of exams

From the description above, it can be said that assessment serves important gate-keeping functions: students, teachers, parents and all those involved in any educational system often have no choice but to be attentive to the contents and requirements of examinations. Consequently, as Andrews (2004) points out, because of the general perception that assessment, especially high-stakes assessment, is used to make crucial decisions that impact life opportunities such as education or employment, these kinds of assessment can be extremely powerful in influencing curriculum and making changes in the educational system. According to Cheng and Curtis (2004), “…tests are viewed as the primary tools through which changes in the educational system can be introduced without having to change other educational components such as teacher training or curricula.” (italics original, p. 6)

Teaching, learning and then testing: these used to be the three steps that followed each other in the educational process. Increasingly, however, with the widespread use of high-stakes public examinations, testing is more often than not leading the way in this process. This approach seems to be the method of choice in many countries. Linn (2000), for example, lists four reasons why assessment is so appealing to policymakers in the United States as a means of introducing change. Firstly, assessment is cheap compared to other measures such as reducing class size, hiring better qualified teachers or increasing instructional time. Secondly, it is convenient because it can be externally mandated: “It is far easier to mandate testing and assessment requirements at the state or district level than it is to take actions that involve actual change in what happens inside the classroom” (p. 4). Third, reform via assessment is politically advantageous because it can be implemented rapidly, that is, in the term during which the elected officials hold office. Finally, test results can be held up as evidence of improvement since test scores normally move up in the initial years of implementation. This is because teachers tend to focus more on the areas covered in the new assessment.
Chapman and Snyder (2000) have reported on various attempts at improving the quality of instruction via high-stakes exams as well. In examining the literature on international efforts in this direction, what they found were five propositions which under-girded these efforts. Test scores can be used:

a) to redirect resources to low achieving schools/geographic areas  
b) fashion and channel teaching practices in the desired direction  
c) to motivate teacher improvement in terms of teaching practices  
d) to pinpoint areas which need remediation  
e) make cross national comparisons in order to justify better funding for a country’s educational system (pp. 458 – 466).

2.3.4 Critiques of assessment and its uses

However, as Lohman (1997) remarks, the accuracy, meaningfulness and fairness of tests are increasingly challenged. High stakes exams, especially, have come under fire. Spolsky (1981, 2007), reminds testers of the weaknesses that are inherent in every modern approach to language testing. He is of the opinion that the psychometric approach gives rise to tests that measure what is easily quantified and measurable, but avoid questions about what it is that is really being tested. An example could be the use of language tests to determine the linguistic, and supposedly the intellectual, development of children who speak a non-standard version of the language. The results of these tests can, unfortunately, then be used to label these students as developmentally “slow” or intellectually deficient. As Labov (1972) has ably demonstrated, closer scrutiny of the non-standard productions of some of these children can indicate that their propositional logic and argumentation skills are, in fact, at par with or even more advanced than those of their peers who speak the standard variety. Work by Rea-Dickens et al. (2009) examining the written production of children in mathematics and science classrooms in the African educational context has also provided evidence in this direction. Moreover, tests that use a psycholinguistic/sociolinguistic approach are confronted with the difficult task of trying to account for the validity of their tests: Henning (1987) mentions that when the term valid is used to describe any test, it should be accompanied by the preposition for. Spolsky (1981) discusses the ethical dimension of those tests used to make life-altering decisions and suggests that high
stakes test should be used with care. Shohamy (2007) agrees: for her, high-stakes tests are powerful, double-edged tools since they can have great impact, both positive and negative, on the lives of test-takers. Linn (2000) for example, comments on the statewide introduction of minimum competency testing (MCT) in Florida, which was implemented at a fairly swift pace. The differential passing rates obtained by African-American, Hispanic, and White students have stirred up debates concerning equity in high-stakes exams – who has the opportunity to learn? Should high-stakes exams be introduced when students have not had an adequate opportunity to acquire the knowledge that is necessary for passing the test? Moreover, Linn also points out that for MCT and other high-stakes tests, “it is difficult to determine if the gains are specific to the tests or if they can be validly generalized to broader constructs the tests are intended to measure” (p. 6). Smith (1991), who conducted a large-scale qualitative study on the impact of external testing in elementary schools, lists the negative effects of this practice, such as a reduction of instructional time because teachers focus on preparing students for a test; a narrowing of the curriculum and the modes of instruction; and a potential reduction in the capacity of teachers in terms of teaching content or using methods and materials that do not conform to standardised testing formats. It is as a result of these challenges that studies have been conducted to examine more specifically what impact testing has on the classroom, teachers and students.

Language testing specialists like Bachman (2000) advocate having standards of professionalism and codes of ethics to prevent the misuse of tests. Such codes would specify the responsibilities test developers have of informing test users regarding the characteristics of any particular test and appropriate uses for it. In return, test users would need to educate themselves on the qualities of the test they use and determine the suitability of a test for their own context. Turner (2001) has called for more studies concerning the impact that second language testing and rating have on stakeholders at various points within the cycle of teaching, learning and assessment. Bachman and Palmer (1996) suggest that the usefulness of a test should be evaluated based on six complementary qualities. In order for a test to be truly useful, test developers have to find a balance among the qualities of reliability, construct validity, authenticity, interactivity, impact and practicality. For them, three principles should guide the work of test design and development. The first states that the overall usefulness of the test, not the individual qualities, have to be maximised. The second calls for a combined evaluation of the overall effect all the qualities, taken together, have on the usefulness of a test. Finally, the third principle points
to the fact that there is no all-purpose formula for the appropriate balance of test qualities; each test context will determine the right equation.

Chapman and Snyder (2000) list five emerging issues which have to be taken into account when trying to use high-stakes testing to spark/induce change:

a) Teachers do not necessarily understand which of their instructional practices, if changed, might lead to improvements in student test scores.

b) Teachers may not have the necessary content knowledge or pedagogical skills to meet new demands

c) Changing the test in order to change instruction, if not done with care, may cause students, teachers, and parents to consider the system as unfair.

d) The logical path by which information on test results is expected to impact teacher behaviour is often indirect; much of the voltage is lost during the transmission.

e) Enlisting teacher and parent support for change may not succeed as a strategy, if the changes are too complex, or are perceived as adversely affecting the balance of advantage across test takers (p.470 –471)

2.3.5 Arguments in favor of using tests to improve education

However, there are also proponents of using exams as a means of improving teaching and learning in schools. Popham (1987) believed that high-stakes exams could lead to educational improvement if the tests themselves were well designed and implemented. He points out that “teachers tend to focus a significant portion of the instructional activities on the knowledge and skills assessed by such tests” (p.680). So tests could conceivably be designed in such a way that teachers would focus on teaching activities that are considered to be of value or good for student learning. He terms this kind of assessment measurement-driven instruction (MDI). Tests would have to meet five conditions in order to fulfill the requirements of MDI. They must:

1) be criterion referenced
2) contain knowledge and skills that are considered important
3) have a manageable number of objectives
4) encourage teachers to think about designing effective instructional sequences
be accompanied by instructional support to help teachers meet the demands of the test (pp. 680 – 681)

In the area of language testing, Morrow (1991) states that one of his main concerns with developing a “good test” is how to draw on good classroom practices in order to propagate them to other classrooms. According to him, “this conscious feedback loop between teaching and testing, in terms not only of content but also approach, is a vital mechanism for educational development” (p.112). Messick (1996) agrees: “Ideally, the move from learning exercises to test exercises should be seamless. As a consequence, for optimal washback, there should be little if any difference between activities involved in learning the language and activities involved in preparing for the test.” (p.241 –242) [for a definition of washback, see section 2.3.6.1] Indeed, educators have emphasized the need for the curriculum, instruction and assessment processes to all work together to promote student learning (Pellegrino, Chudowsky and Glaser, 2001; Solomon, 2002). Second language researchers such as Canale and Swain (1980) have suggested that communicative language tests should consciously be designed to bring about positive washback. Recent research on second language classroom learning stresses the need for alignment of assessment, curriculum, teaching and learning practices (Rea-Dickens, 2004; Colby-Kelly and Turner, 2007). These authors argue for the need to implement formative assessment that includes and empowers the learners in the evaluation process in order to increase their level of achievement.

2.3.6 The importance of studying washback

As can be seen from the discussion above on the purposes for which exams are used in educational systems and the support or critique surrounding it, this is an issue that is still widely debated. Be that as it may, as Cheng (2004) points out, teaching and testing will probably become more closely linked in more complex manners in the future. Movements such as the standards-based educational reforms occurring in the United States, that favor accountability through testing, is one example of how teaching is increasingly tied to testing. In Hong Kong, Andrews, Fullilove and Wong (2002) have found that during the last four years of secondary schooling, the focus is still on preparing students to pass the mandatory public examinations; in
fact, the developmental work on the new English Language syllabi in Hong Kong deliberately targets a positive washback effect of the examination on classroom teaching.

Therefore, it is important to conduct studies that examine what is actually happening in schools and classrooms, because, as mentioned in Wall (1997) and Bailey (1996), the claims about test consequences are sometimes based more on assumptions than on empirical evidence. As such, studies which provide empirical evidence showing how innovations in exams or testing affect teaching and learning in classroom are crucial to validating these claims.

2.3.6.1 Terms used to define changes due to exam implementation

Two terms, impact and washback, are commonly used to describe the effect that examinations and tests have on the educational system and the society in general. In fact, washback is considered a form of test impact and refers more specifically to the impact of exams on teaching and learning. Alderson and Hamp-Lyons (1996) state that washback is the influence that writers on language testing, syllabus design and language teaching believe a test will have on the teaching that precedes it. However, Hughes (1989) (cited in Bailey, 1996) defines washback more generally as the effect of testing on teaching and learning. Messick (1996) elaborates on this, defining washback as “the extent to which the test influences language teachers and learners to do things they would not otherwise necessarily do.” (p. 241)

This effect can be either positive or negative. Washback is considered to be positive when a test or exam helps teachers and students learn the concepts and skills specified in a certain curriculum. It is negative when teachers begin to narrow the curriculum to only those items that will be tested (Frederiksen, 1984), when it places constraints on teacher creativity, and leads to cramming and lower aspirations on the part of students (Popham, 1987). Frederiksen (1984) also specifies that washback is negative when teachers do not place the emphasis on skills that require complex thinking. Haladyna, Nolan and Haas (1991) raise the possibility of test score “pollution”. This happens when the scores of students increase because they have learned how to take the test, not because they have increased their ability in the construct being tested. As a result, the validity of the test itself could be called into question.
In the past, it was assumed that good tests would lead to good teaching practices in class. This would in turn promote student learning. The opposite would be true of a badly designed test. On the other hand, Cheng and Curtis (2004, p.8) note:

> Whether the effect of testing is deemed to be positive or negative should also depend on who it is that actually conducts the investigation within a particular education context, as well as where, the school or university contexts, when, the time and duration of using such assessment practices, why, the rationale, and how, the different approaches used by different participants within the context.

Alderson and Wall (1993), who have contributed groundbreaking work in this area, argue against what they call “a naïve deterministic view” (p. 118) which assumes that the qualities of a test, in itself, are sufficient to bring about change. For them, washback is a very complex phenomena which needs to be carefully studied, especially in an empirical manner, in order to have a better understanding of how it happens and how it can be measured. They also point to the importance of having baseline information in order to make valid comparisons between what happened before and what has changed after the implementation of a new test. Wall and Alderson’s 1993 study on Sri Lankan secondary schools is, in fact, one of the first washback studies to provide baseline data, prior to the implementation of a new test. This data could then be compared to the changes that happened after the implementation. They came up with a series of fifteen Washback Hypotheses that could take into account different factors that influenced washback (p. 120):

1) A test will influence teaching
2) A test will influence learning
   [Hypotheses 1 and 2 refer to the most general level of washback]

3) A test will influence what teachers teach
4) A test will influence how teachers teach
5) A test will influence what learners learn
6) A test will influence how learners learn
   [Hypotheses 3 and 4 refer to the effect on teaching content and methodology, and consequently in Hypotheses 5 and 6 to how and what learners learn]

7) A test will influence the rate and sequence of teaching
8) A test will influence the rate and sequence of learning
   [Hypotheses 7 and 8 deal with how the speed and order of what is taught and learned is affected]
9) A test will influence the **degree** and **depth** of teaching  
10) A test will influence the **degree** and **depth** of learning  
[Hypotheses 9 and 10 relate to the washback effect on the quantity and quality of teaching and learning]

11) A test will influence attitudes to the content, method, etc. of teaching and learning  
[Hypothesis 11 deals with attitudes and behaviors]

12) Tests that have important consequences will have washback  
13) Tests that do not have important consequences will have no washback  
[The two hypotheses above refer to how the purpose of the test or what test scores are used for will influence washback]

14) Tests will have washback on **all** learners and teachers  
15) Tests will have washback effects for some learners and some teachers, but not for others  
[Hypotheses 14 and 15 consider whether individual differences will lead to differences in the washback effect]

Researchers in the field of language testing have heeded the call for more empirical studies since then and more studies that examine what happens in classrooms have effectively been conducted. In the following section, we will consider the different studies that have been conducted on washback, mainly but not exclusively in the area of language testing.

### 2.3.6.2 Washback studies: methodologies and results

The literature on washback studies is increasing and the methods employed for data gathering in these studies is diverse. Some of these methods include surveys, interviews, self-reports, classroom observations, and document analyses. Summaries of several of these studies, focusing mainly on their context, questions, methodology and findings, are given below. Both cross-sectional and longitudinal studies are included. However, this is not meant to be an exhaustive list of all studies that have been carried out on washback. Rather, it is a sampling of studies that are representative of what has been done to date.
2.3.6.2.1 Cross-sectional studies

Andrews (1995) conducted a study on the addition of an oral component to the Hong Kong Use of English Examination (UE). Administered in the final year of secondary schooling in Hong Kong, students need to pass this examination in order to gain admission to universities. Two groups, the designers of the UE oral component and the teachers responsible for implementing it, were asked to complete a questionnaire in which they had to rate the importance of 25 potential strategies for preparing students for this examination. He then compares the perceptions of examination designers to the perceptions and experiences of teachers. What he found was that changing the examination can change what teachers teach and the amount of time they devote to a specific component, but it does not seem to have a profound influence on how they teach.

Alderson and Hamp-Lyons (1996) examined TOEFL preparation classes for evidence of washback. The study was conducted at a specialised language institute in the USA. They were interested in finding out more about how teachers describe the way they teach to prepare their students for the TOEFL test. They held one group interview and four individual interviews with teachers to obtain teacher perceptions of TOEFL and found that their attitudes towards the test were mainly negative. They also observed two teachers teaching both the TOEFL preparation classes and non-TOEFL preparation classes. They found substantial differences between these two kinds of classes. Alderson and Hamp-Lyons conclude that the washback effect was not caused only by the test. The test had an effect on what and how teachers taught, but the authors could not account for why they did so. Lack of teacher training specifically for teaching TOEFL, test preparation materials and the demands of students could all contribute to the washback effect.

Snyder et al. (1997) investigated the experience of Uganda in trying to change teachers’ classroom practices by manipulating high-stakes testing. They looked at the extent to which a new version of the Primary Leavers Examination, implemented by the Uganda Ministry of Education, led teachers to change their teaching practices. The revised version was used to encourage teachers to increase the cognitive aspect of their instruction, and therefore, it was intended as a means to change instructional practices. Snyder et al. conducted interviews and classroom observations as the tests were being introduced. Sixty teachers and 15 head teachers
across 31 classrooms in 16 schools participated in the study. Principally, they found that teachers could not always adjust to the demands of a new test even if they understood its requirements. The authors speculate that there is no particular linkage between what an examination asks and what a teacher does. They also found that teachers felt threatened by the new pedagogical approaches they were asked to experiment with.

Watanabe (1996, 2004) conducted a washback study that focused on the high stakes English entrance examinations for Japanese universities. He used an experimental design to compare the teaching practices of two teachers in order to see if the entrance examinations pressured teachers to use grammar translation. Both teachers were giving courses at high schools and also at Japanese cram schools (yobiko). In the high school, he observed them teaching regular and exam preparation classes. At the yobiko, he observed the teachers giving exam preparation courses for two different universities. Interviews were held immediately before the observation to gather background information about the teachers. Post-observation interviews were also conducted following each observation. From the data, he found that the washback effect was much weaker than he had hypothesized – washback is only one of several factors influencing teaching practices in class. In fact, Watanabe postulates that the teachers’ educational background, their beliefs about effective teaching methods and also, the timing of the observations, that is, how close the examinations were to the time of observation, could be important factors influencing how washback happens.

Greene (2006, 2007) looked at preparatory courses in the United Kingdom for students taking the IELTS Academic Writing Component (AWC). He observed two types of classes using a modified version of COLT: he noted and coded activities in classes doing IELTS AWC preparation and regular EAP classes in UK institutions for a period of twelve weeks. He did not find a significant washback effect – statistical analyses showed that the classes were essentially similar in terms of time spent on specific writing activities. He postulates that the test design of a high-stakes exam does not have strong washback effect in these institutions; teaching in EAP courses could be influenced more by institutional variables such as the teachers’ level of professional training, and teacher factors such as their beliefs about effective learning.

Shih (2007) and Pan (2009) both examined the effects of English exit certification in Taiwan. Shih (2007) focused specifically on the General English Proficiency Test (GEPT) and was particularly interested in the washback effect on learners. She conducted her study in two
vocational institutions of higher education. Interviews with department chairs, English teachers and students as well as observations of GEPT preparation or English courses along with documents and records were the principal sources of data. The results indicate that this test had various but limited washback effects on the learning of participants. From the results, she proposed a modified version of Bailey’s (1996) model of washback, which focused on student learning (See section 2.3.6.4.3).

2.3.6.2.2 Longitudinal studies

Li (1990) [as cited in Wall, 1997, 2005] conducted a study of a secondary school leaving examination administered in China – the Matriculation English Test (MET). This high stakes examination had been introduced to replace an older, less valid and less reliable English test. Her methodology involved analyzing 229 questionnaires completed by teachers and teaching-and-research officers. She also analyzed test results and student writing. Her findings were that there was positive washback from the MET in three areas:

1) materials: a greater use of imported and teacher designed materials which matched the examination requirements;
2) content: more classroom time was given to practising the four skills of listening, speaking, reading and writing instead of phonetics, grammar and vocabulary; and
3) student interest: students showed more interest in after-class learning of English.

Shohamy (1993) reports on three longitudinal washback studies she conducted concerning the implementation of three different language tests in Israel and the impact each had on its respective educational system:

i) The first study involved the introduction of an Arabic test by the Ministry of Education. Her research focused on finding out if the test changed teaching practices or student attitudes, and also if there was a long-term impact on teaching. She reviewed teaching materials, interviewed teachers and analyzed student questionnaires and observed lessons. The findings show that there were bigger differences in the initial period of test implementation in terms of materials, class activities, use of mother tongue during
teaching and the atmosphere in class. These effects were far less after four years of implementation.

ii) The second study looked at the introduction of an EFL oral test. Shohamy observed and interviewed fifteen teachers. These teachers were divided into two groups: experienced (five years and more) and novice (three years or less). Her results show that experienced teachers were more likely to teach to the test, basing their teaching of oral language on the test, while novices found that the test permitted them to be more creative with activities.

iii) The final study examined the introduction of an L1 reading comprehension test towards which teachers had reacted negatively. Shohamy interviewed teachers and analyzed materials produced after the introduction of the test. She found that new materials tended to resemble the test and more time was spent on reading comprehension across the curriculum. Teachers were bitter about the manner in which implementation of the test had occurred, and bitter because they feared that the system would punish them for poor results.

The overall findings, according to Shohamy, indicate that teaching materials and methods cater to the test, and that teachers who have been in the system longer will tend to use the test as teaching guide and curriculum.

Cheng (1997) studied the washback associated with a revision of the English Language examination of the Hong Kong Certificate of Education Examination. The study took place from January 1994 to November 1996 and consisted of three phases:

1) General observation and interviews with participants from decision-making bodies, textbook publishers, principals, department heads, teacher and learners

2) Large scale surveys of teachers and students that occurred in 1994 and 1995

3) Baseline case studies that consisted of classroom observations of nine teachers followed by main case studies of three teachers. Follow up interviews were also conducted with the three teachers

Although the Hong Kong Examinations Authority intended to create a positive washback effect through the innovation, Cheng’s findings indicate that changes occurred mainly at a superficial
level: the content of teaching and the materials used changed rapidly but there was not much evidence of fundamental changes in teaching practices and student learning.

Wall (1997, 2005), reported on the results of a four-year project in Sri Lanka. The study looked at the effects of implementing a new curriculum and reinforcing the changes by having a new O-level examination (This is the exit level examination for Sri Lankan secondary schools). Wall and the team of designers collected data at three different stages of implementation:

1) baseline data – prior to the implementation. Information was obtained through analysis of official documents, interviews and questionnaires
2) during initial implementation – data collection involved classroom observations, examination results and questionnaires
3) full implementation – classroom observations and group interviews with teachers provided the data for this phase of the study.

Wall found that although teachers liked the match between curriculum and testing, many other factors, such as the teachers (mis)understanding of the requirements of the new curriculum, lack of resource materials, level of difficulty of the examination vis-à-vis the ability levels of the students and prior teaching practices, hindered implementation of certain aspects of the curriculum.

Turner (2002, 2006, 2008) investigated high-stakes test impact at the classroom level in the province of Quebec. She looked at the implementation of a new ESL speaking exam at the Secondary Five level. She wanted to find out if

1) the introduction of provincial ESL speaking exam procedures affected teacher beliefs
2) the introduction of provincial ESL speaking exam procedures affected teaching practices
3) there would be a change or pattern in the relationship between teacher beliefs and behavior over time
4) the introduction of provincial ESL speaking exam procedures affected student beliefs

The methodology involved obtaining baseline evidence and evidence after implementation through interviews and classroom observations. Data collection lasted for six months and happened over three time periods. By triangulating the data from the three periods, she found
that there was evidence of predictable washback for individual teachers. This evidence, both on the conceptual (beliefs) and instrumental (behavior or practice) level varied across teachers depending on their initial beliefs and practices. The teachers in this study did not resist the proposed changes implemented via the speaking exam. Instead, they sought to align the required curriculum with classroom teaching and assessment. However, this could partly be attributed to the fact that some of the teachers had participated in prior efforts to develop a rating scale and therefore felt a certain sense of ownership in the ongoing innovations. As a result, feedback and critique was of a more constructive nature. On the other hand, teachers were selective about the changes they elected to adopt – these were chosen with regard to their own established classroom practices and professional stances or beliefs. This reaction seemed to be part and parcel of their professional repertory. The teachers did, however, have difficulties coping with the different goals of classroom-based assessment as opposed to those of the high-stakes provincial exam. She suggests that the results point to the need for better alignment between assessments and the different purposes they are used for (p. 23). The study also found that student beliefs were affected by the changes.

Table 1 below summarises the sample of studies discussed above. We can see, at a glance, the type of study carried out, the context and type of exam that was implemented, the research question(s) posed by the study, how data was collected, the results and issues or problems that the researchers were still grappling with at the end of the study.
<table>
<thead>
<tr>
<th>Type of study</th>
<th>Context &amp; Type of exam</th>
<th>Research question</th>
<th>Data collection methods</th>
<th>Results</th>
<th>Issues/problems</th>
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<td>Cross sectional</td>
<td>Hong Kong, Oral component of Hong Kong Use of English Examination (UE)</td>
<td>How do test designers (innovators) and teachers (implementers) perceive the new test?</td>
<td>Questionnaire concerning perceptions of test designers vs. those of teachers</td>
<td>The results indicate a difference in what is taught and how much time a component is taught</td>
<td>Perceptions of exam designers and teachers sometimes do not match</td>
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<td></td>
<td>United States TOEFL Specialized language institute in USA</td>
<td>How do teachers describe the way they prepare students for TOEFL? Do differences in teaching practices exist because of TOEFL?</td>
<td>1 group interview and 4 individual interviews Classroom observations of 2 teachers’ TOEFL &amp; non-TOEFL courses</td>
<td>Teachers tend to perceive TOEFL negatively There is a difference in what and how teachers teach due to test, but why?</td>
<td>Lack of teacher training for TOEFL, test preparation materials and student demands could be cause of “negative” washback?</td>
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<td></td>
<td>Uganda, Primary Leavers Examination (PLE)</td>
<td>How do teachers adapt to new version of PLE?</td>
<td>Interviews and classroom observations in initial phase of implementation</td>
<td>Teachers cannot change ways of teaching even if they understand exam requirements. They feel threatened by new pedagogical approaches</td>
<td>Teachers struggle to understand implications of test changes for classroom practice</td>
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<td>Type of study</td>
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<td>Japan, English Entrance Examinations for Japanese universities</td>
<td>Watanabe (1996)</td>
<td>Do teachers feel pressured to use the grammar translation method of teaching English in Japan because of the entrance examinations?</td>
<td>Pre- &amp; post-observation interviews Classroom observations</td>
<td>Washback effect occurs but is much weaker than hypothesized</td>
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</tr>
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<td>United Kingdom, IELTS Academic Writing Component</td>
<td>Greene (2006, 2007)</td>
<td>How might the design of the IELTS Academic Writing Component be expected to influence instruction?</td>
<td>8-12 weeks of observations of exam (E) and non-exam (NE) academic English classes using modified version of COLT, post-observation interviews (with teachers)</td>
<td>1) NE courses put more emphasis on students’ academic subjects – but classes essentially similar 2) E classes involved more mention of IELTS tasks and requirements</td>
<td>Differences between classes are due to institutional variables or teacher variables, rather than to test design</td>
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<td>Taiwan, GEPT Institutes of Higher Education</td>
<td>Shih (2007)</td>
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<td>Document analysis, interviews and observations</td>
<td>The GEPT had varied, limited washback effects on the learning of participants.</td>
<td>Limited effect because 1) GEPT has little immediate effect on students’ lives 2) the participants in the study were English majors – so they did not study for GEPT because their proficiency level was already high 3) students did not know how to prepare for the exam or had nowhere to practise 4) students personal commitments interfered with exam preparation 5) Students’ personal characteristics</td>
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<td>Type of study</td>
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<td>Longitudinal</td>
<td>China, Matriculation English Test (MET) Li (1990)</td>
<td>How powerful is the MET in transforming teaching and learning?</td>
<td>Questionnaires, test results, student writing</td>
<td>Positive washback in 3 areas: materials, content and student interest</td>
<td>Test is powerful because of its status and its positive influence on teaching and learning</td>
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<td>Israel (3 studies of 3 different tests): 1) Arabic test 2) EFL oral test 3) Hebrew L1 reading comprehension test Shohamy (1993)</td>
<td>What impact does the implementation of new tests have on teaching and learning?</td>
<td>For each test 1) analysis of teaching materials, teacher interview, student questionnaires and classroom observations 2) classroom observations and interviews 3) teacher interviews and analysis of teaching materials</td>
<td>Materials and teaching methods tend to become aligned to a new test. More experienced teachers tend to teach to the test</td>
<td>Novices and more experienced teachers can react very differently to a new test. Manner of implementation can affect attitude of teachers toward test</td>
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<td>Hong Kong, English Language Examination of Hong Kong Certificate of Education Examination Cheng (1997)</td>
<td>What are washback effects of an exam innovation?</td>
<td>Questionnaires, interviews and classroom observations (case studies)</td>
<td>Rapid change of content and teaching materials</td>
<td>Fundamental changes in teaching practices and student learning do not accompany change in content and materials</td>
</tr>
<tr>
<td>Type of study</td>
<td>Context &amp; Type of exam</td>
<td>Research question</td>
<td>Data collection methods</td>
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| Sri Lanka     | Sri Lankan O-level Examination | What are effects of a new curriculum, reinforced by parallel changes in exams, on teaching and learning? | **Baseline**: Document analysis, interviews, questionnaires  
**Initial phase**: Classroom observations, exam results, questionnaires  
**Full implementation**: Classroom observations and group interviews | Teachers adopt new textbooks and like the match between the test and the curriculum | Teachers did not fully understand requirements of new curriculum.  
Teachers had difficulty in changing previous teaching practices.  
Examinations too difficult for ability level of students. |
| Quebec        | Secondary Five ESL speaking exam | Did the introduction of the new exam affect student beliefs, teacher beliefs and teaching practices?  
What is the pattern of change between teacher beliefs and behavior over time? | Interviews and classroom observations over 3 time periods: baseline and two periods after implementation | Evidence of predictable washback for individual teachers  
Student beliefs also affected | Teachers struggle to align the goals of classroom and high-stakes exams: need for a better alignment between the two types of assessment. |
2.3.6.3 Discussion of studies: methodologies and results

What does this sample of studies tell us about washback effects? First of all, we can say that washback studies have been conducted on a variety of examinations in many different countries. They indicate the prevalence of using examinations as a means of affecting teaching and learning in classrooms. The results from this sample of studies have also provided, in some measure, responses to a few of the Washback Hypotheses posited by Wall and Alderson (1993). The results from these studies of high stakes examinations tend to support Hypothesis 12 (Tests that have important consequences will have washback), but since studies on low stakes examinations were not included, it cannot be said that there is support for Hypothesis 13 (Tests that do not have important consequences will have no washback).

What they also show us is that, in many cases, the implementation of new examinations does influence what happens to teaching and learning in classrooms. From Table 1, we can see at a glance that the strongest evidence of positive washback is in the content area of teaching. So it would seem that these results support Hypothesis 1 (A test will influence teaching), Hypothesis 3 (A test will influence what teachers teach) and Hypothesis 5 (A test will influence what learners learn): in a wide range of contexts, teachers seem to be able to adopt the required content and even to design new materials that reflect the requirements of the test. On the other hand, due to the many different contexts, methodologies and research designs used for the studies, the results are difficult to compare. Two studies might report similar findings; for example, Cheng (1997) and Li (1990) found that contents and materials used in class changed as a result of test implementation. Cheng’s findings come from classroom observations while Li’s are from self-report questionnaires. Are the two kinds of data comparable? Are the factors that exerted an influence to make these changes happen the same in both contexts? Since variables such as availability of textbooks and other materials from commercial publishers or the quality of materials issued by the Ministry of Education might vary from one context to the next, it would be difficult to conclude that the same washback was a result of similar factors as well. Turner (2008) has highlighted the fact that
contextual features of a particular educational system or institution may indeed impact on the kind of washback effect that occurs.

Again, by looking at Table 1, we can see that evidence of deeper changes, such as those involving a change in teaching or learning behavior, are harder to observe in classroom contexts. Although the empirical studies that Wall (1997, 2005) called for are being done, the results often indicate that the researchers have observed and recorded the process and effects of implementing a new test or exam. However, although detailed, in depth discussions of the possible factors at work and how the interplay of these factors could have brought about the results observed often conclude these reports, the discussions are not conducted within any framework or model that could explain patterns of causes or variation. As Cheng & Curtis (2004) noted, when using an examination as a lever for educational change, there can also be unintended and accidental side effects since causes and effects are often enmeshed in complex patterns. However, the key issue remains, as to “how those forces within a particular educational context can be teased out to understand the effects of testing in that environment, and how confident we can be in formulating hypotheses and drawing conclusions about the nature and scope of the effects within broader educational contexts.”(Cheng & Curtis, 2004; p. 9) This is one area that needs further development; if any specific links are to be made between the washback effect of exams or tests on teaching and learning, more detailed explanations or models for explaining washback need to be constructed.

The various methodologies used in this area have mainly been surveys, interviews and observations. In this respect, Watanabe (2004a) has pointed out, there are perhaps effects on teaching and learning that interviews and observations alone or combined may not be able to capture. Cheng (2002, 2004) has mentioned the importance of considering factors such as a society’s goals and values, the educational system itself, as well as approaches to teaching and learning within the system in washback analyses. They both suggest that ethnographic, triangulation methods should be carried out to push the boundaries of what can be discovered about the washback effect. Empirical evidence from these types of data collection efforts should provide stronger, more comprehensive bases on which to theorise washback models.
Efforts in this direction have already begun. Over the past two decades, several models have been proposed concerning washback. In the next section, some of the models that have been developed are presented.

2.3.6.4 Models of Washback

Washback models, in general, have been adapted from models or frameworks suggested in language testing, ESL and educational innovation literature. Some specific models that have been proposed in washback literature, and how these were developed, are discussed in this section.

2.3.6.4.1 Bailey’s Model

Hughes (1993) ideas on how washback can be conceptualized have been seminal in the development of washback models. He suggested that it was important to clarify the washback effect by distinguishing between participants, process and product. Under the category of participants, he groups students, administrators, test developers and publishers. He defines process as actions that participants take that may contribute to the process of learning. This includes the processes of materials development, syllabus design, changes in pedagogical approaches, learning or test-taking strategies and so forth. Product refers to what is learned and the quality of that learning.

Based on his suggestions and her review of the literature, Bailey (1996) proposed a washback model that integrated these ideas. Bailey’s model is depicted in Figure 2. This model is an early attempt at theorising washback, but is not empirically grounded. Cheng’s (2002) model, discussed next, built on this theoretical model along the same lines proposed by Hughes (1993) [participants, process, product]. Her model, however, was innovative in that it was grounded in empirical research evidence from educational change taking place in the Hong Kong context.
2.3.6.4.2 Cheng’s Model

Cheng (2002) came up with a model based on her study of the Hong Kong Certificate of Education Exam (HKCEE). Her model is specifically for the Hong Kong educational context. A diagram of the model she proposed is shown in Figure 3.
Cheng (2002) obtained empirical data from a longitudinal study using a mixed methods approach that emphasized the importance of context, setting and subject frames of reference to examine the washback effect of the new Hong Kong Certificate of Education Examination in English HKCEE. She looked at changes to the public examination system in Hong Kong, specifically to the HKCEE and the impact on teacher as well as student behaviours in the classroom. Three major research questions were explored over three phases of this study. These questions are listed below:

- **Phase I** - What strategies did the Hong Kong Examinations Authority (HKEA) use to implement the examination change?
- **Phase II** - What was the nature and the scope of the washback effect on teacher and learner perceptions of aspects of teaching for the new examination?
- **Phase III** - What was the nature and scope of the washback effect on teacher behaviour as a result of the new examination?

Using the classroom behaviour of teachers preparing students for the previous version of the HKCEE as a comparison, Cheng made several assumptions or hypotheses about the changes that would take place. It was assumed that due to the new exam requirements, teachers would:

1. assign students more opportunities to practice activities that develop their linguistic knowledge and communicative capacities
2. allocate more time for learner activities especially role-play and group discussion
3. talk less, allowing students to talk more
4. take shorter and less frequent turns in class
5. use more authentic materials and rely less on textbooks or exam practice books.

From the results of her data analysis, Cheng came up with the washback model shown in Figure 3. While the study discusses the prior attitudes towards teaching and learning, and subsequent attitudinal changes concerning the new exam after the implementation, it does not provide any explanation as to how this occurred. In her discussion of the model, Cheng cautions that this is a rather simplistic and ideal model of the washback (test/exam impact) process. It does not take into account many factors that are beyond the educational context even though they exert some kind of influence or pressure on the teaching and learning that goes on in schools. Cheng acknowledges that other factors, such as a society’s goals and values, the educational system itself, as well as teaching and learning theories and practices within the system, should be considered in washback analyses. In her opinion, more studies devoted to looking at different aspects of washback would be needed to provide an overall understanding of how this phenomenon affects teaching and learning within a specific context.

2.3.6.4.3 Shih’s model

Shih (2007) has also proposed a washback model that builds on that of Bailey (1996). Her model was also empirically developed, based on her study of the implementation of the General English Proficiency Test (GEPT) in Taiwan. Her data comes from her interviews with participants and in-class observations in Institutions of Higher Learning in that context. This model focuses only on the washback effect on student learning. Shih’s model is presented in Figure 4 below.
Shih focuses on three major factors having an impact on washback on student learning that she found based on her data – extrinsic factors such as socio-economic factors, school and educational factors and personal factors; intrinsic factors such as personal characteristics and personal perceptions of the test; and test factors such as the stakes of the test, its content and the status of the language tested. Each factor outlined in the model is broken up into various components and each of these components can interact with any of the others within a factor or across factors to produce different student reactions to the GEPT. Shih mentions, for example, that the socio-economic component may have an effect on the school and educational component.
Wall (1996, 2000) has recommended looking at theories and frameworks from educational innovation for models. One that is of particular interest for extending the washback models proposed earlier is Henrichsen’s (1989) model of educational innovation. Wall (2005) used this framework for the analysis of data from her Sri Lankan study. This model draws upon work from the diffusion of innovations perspective based mainly on the communication theories of Rogers (1983) and Rogers & Shoemaker (1971). It also uses linkage theory, which emphasizes two-way connections between the eventual users of an innovation and resource systems or outside agencies (Refer to Havelock’s 1969 linkage model as cited in Henrichsen, 1989 and Markee, 1997a, 1997b). Henrichsen (1989) combines these theories to create a Hybrid Model.

2.3.6.4 Henrichsen’s Hybrid Model

According to Rogers (1983, p.5)

Diffusion is the process by which an innovation is communicated through certain channels over time among members of a social system. It is a special type of communication in that the messages are concerned with new ideas. Communication is a process in which participants create and share information with one another in order to reach a mutual understanding.

Diffusion is regarded as a kind of social change, the process by which alteration occurs in the structure and function of a social system. Social change occurs when new ideas are invented, diffused and adopted or rejected, with their accompanying consequences.

The innovations framework is based on the concept of uncertainty (the perceived availability of a number of alternatives relative to the occurrence of an event) and information (information is something which reduces uncertainty): the innovation – decision process is essentially an information seeking and information processing activity in which the individual is motivated to reduce uncertainty about the advantages and disadvantages of the innovation (Rogers & Kincaid, 1981).

Four main elements in this model are stated below:

1) Innovation – the idea/practice/object is new if it is perceived to be so by the individual or unit
   The perceived characteristics of innovations influence their rate of adoption.
a. Relative advantage (economic, social prestige, convenience)- this relates to the degree to which an innovation is perceived as better than the idea it supersedes. The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption is going to be.

b. Compatibility – this refers to how consistent the innovation is perceived to be with existing values, past experiences and needs of potential adopter. An idea that is not compatible with the prevalent values and norms of a social system will not be adopted as rapidly as an innovation that is compatible.

c. Complexity – this has to do with the degree to which an innovation is perceived as being difficult to understand and use. In general, new ideas that are simpler to understand will be adopted more rapidly than innovations that require the adopter to develop new skills and understanding.

2) Communication channels – These are the means by which messages get from one individual to another. These can be mass media (one to many) or interpersonal channels (one to one). Interpersonal channels are usually more effective in getting people to adopt innovations.

3) Time – This refers to the period during which users know about and adopt or reject the proposed innovation. The stages in this process usually involve knowledge, persuasion, decision, implementation and confirmation. Time also involves relative earliness/lateness of adoption and rate of adoption (how many people begin implementing changes within a given time)

4) a Social System – The structure of a social system affects diffusion and adoption of innovation. Opinion leaders and change agents are crucial to the change process. The behaviour of opinion leaders often reflect the orientation of the system vis-a-vis change. Change agents, on the other hand, are often marginal or external to the social system. They try to influence others to adopt new ideas, and often use opinion leaders to help them do so.

The consequences of innovation can be:

1) desirable (having a functional effect on the social system) or undesirable (producing a dysfunctional effect on the social system)

2) direct (changes to individual or social system as an immediate response to innovation) or indirect (second order result of the direct consequences)

3) anticipated (recognized and intended results) or unanticipated (unintended consequences)
Most change agents hope for desirable, direct and anticipated consequences, but cannot predict either its unanticipated consequences or the subjective perception of the innovation.

Henrichsen (1989) examined data from efforts to reform the Japanese English Language Teaching (ELT) system carried out by the English Language Exploratory Committee over a period of twelve years. This committee attempted to change both the materials and also the way teachers taught English as a Second Language (ESL) from 1956 -1968. He calls the situation under which these changes happened directed contact change (Rogers & Shoemaker, 1971). It means that “agents from outside a social system purposefully introduce an innovation from an external source in order to achieve goals that they (not the intended users of the innovation) have set” (pp. 8-9). Henrichsen used a historical approach to studying this change situation – this included studying committee and ministry documents, correspondence between members of ELEC and also reactions in the media such as newspaper reports. From his analysis, he proposed the change model shown below. This model takes into account antecedent factors, the process of actually implementing the changes as well as the consequences of the implementation. The model proposed by Henrichsen is shown in Figure 5.

As seen in Figure 5, Henrichsen’s model is able to account for the components proposed by Hughes (participants, process and product). It includes other factors that Cheng (2002) had previously suggested be included in washback studies, such as the educational system, and the teaching and learning practices within a system. The multiple elements outlined in Shih’s (2007) model may also be accounted for under the categories proposed in this model.
2.3.6.5 The effect of time on the washback effect

Wall (2000) has pointed out that washback is usually part of a process of educational innovation. This process is often long and complex and passes through many stages. Fullan (1991) speaks of three phases of innovation: initiation, implementation and continuation. He points out that sometimes, innovations could be judged to have failed when in fact, not enough time has passed to allow a full diffusion and implementation to have taken place. If we consider the sample of longitudinal studies, we notice that the longest study, Wall (1997, 2005) took four years. Within this period, the first year or so involved baseline data collection while the final year was focused on analyzing the data from the initial phase of implementation. Therefore, the study looked at the first two years of policy implementation. In Cheng’s (2002) study, which was over a period of about three years, the first two years were spent interviewing key change agents and
documenting prior teaching and learning practices. This means that the study actually examined evidence of changes that happened only during the first year of implementation.

This could possibly indicate that the results we are obtaining from these washback studies are primarily about the effects of initial implementation only. What are the changes then that happen over the full span of the implementation process? Longitudinal studies in the future, that focus on the mid- and long-term effects of exam implementation, might be needed to answer this question.

2.3.6.6 The teacher factor in washback effects

Teacher perception, teacher attitudes and teacher beliefs are often mentioned in these studies as well (Rea-Dickens, 1997; Cheng, 2004; Watanabe, 2004b). What has been noted in the results are the behaviors of teachers in response to examination changes. However, as Shavelson and Stern (1981) argue, examining only teacher behavior is incomplete. There is a need to examine the link between teacher intentions or beliefs and how this translates into action (Tsui, 2003; Woods, 1996). By doing so, predictable variations in teachers’ behaviour that result from differences in goals, judgments and decisions can be better accounted for. According to Shulman (1986, 1987) research that links teachers’ intentions to their behaviour provides a sound basis for educating teachers and implementing educational innovations. [See also Clark, 1992; Clark & Peterson, 1986; Goodfellow, 2000; Cimbricz, 2002]

Studies by Green (2006, 2007) are starting to examine this facet of washback. Research by Johnson (1992), Nyawaranda (1998), Sato and Kleinsasser (1999), Tan (2008), Turner (2006, 2008, forthcoming) and Wang (2008) have shown that teacher factors influence teaching practices in the classroom: teacher beliefs are consistent with their prior experience and instructional approaches. There is, therefore, an increasing realisation in the field of assessment that the “teacher factor” is fundamental to the kind of washback effect that takes place in the classroom.
Having reviewed the literature on educational change and washback, the final section of this chapter looks at the research that has been done concerning the use of content-based instruction (CBI) for language learning. The PPSMI policy is, in fact, a variant of the CBI approach in that it wishes to improve the English language capacities of students while they are learning the content of science and mathematic subjects. Research on English for Academic Purposes (EAP) in Mathematics and Science classrooms for English Language Learners (ELLs) is also included because EAP is considered a subset of CBI-driven programs. This body of literature is taken into consideration because the quasi-totality of students in Malaysia are English Language Learners, and what they are expected to learn in the mathematics and science classrooms is EAP.

2.4 Literature on Content-Based Instruction (CBI) for Language Learning

2.4.1 Rationale underlying CBI

In CBI, language curriculum is based on the academic needs of students. The order in which linguistic elements are taught follows the sequence determined by a particular subject matter. This approach aims to eliminate the artificial separation between language instruction and subject matter classes which exists in many educational settings. Other terms that are used to designate CBI are Content Based Language Teaching (CBLT), Content Based Language Learning (CBLL) or Content and Language Integrated Learning (CLIL).

Crandall (1987) has noted that the use of content for teaching languages is not new. In fact, Mackey (1978) suggests that this method of combining both content and language learning can be traced back almost 3000 years to the Romans and Greeks who often conducted instruction in a second or non-home language. Brinton, Snow and Wesche (2004) have mentioned that there is historical evidence of ability to learn other languages through sufficient exposure from the anecdotal accounts of travelers who traded and lived.
in foreign countries. More recent interest in this pedagogical approach has been the result of several different movements.

In the first language context, the impetus for anchoring language teaching in content came from the language across the curriculum movement (Bullock Report, 1975 as cited in Crandall, 1987). Those who advocate this perspective find that there is a reciprocal relationship between language and content learning. Therefore, learners need to be encouraged not to only learn to read and write, but also write to learn and read to learn. The application of these concepts in the educational system demands a cross-curricular focus and subsequently, necessitates cooperation between language teachers and subject matter teachers.

2.4.2 Krashen’s Theory: The Monitor Model and Comprehensible Input

In second language learning, the most influential theory underlying CBI has been Krashen’s (1981, 1982, 1985) theory of the Monitor Model and comprehensible input. There are five hypotheses underlying this theory.

2.4.2.1 The acquisition vs learning hypothesis

Krashen postulates that there is a difference between learning as opposed to acquisition. Acquisition takes place in context-rich, communicative events where the learner is actively trying to construct meaning (1984). Language use happens without the learner being consciously aware of the rules. Language learning, in contrast, refers to the system of language rules that are explicitly taught – this makes students think about the rules when they are using language.

2.4.2.2 The natural order hypothesis

This hypothesis suggests that there is a natural order to acquiring a language: certain elements are acquired before others. This order of acquisition is similar in the first language (L1) and the second language (L2), despite individual variation.
2.4.2.3 The monitor hypothesis

When a student consciously learns the rules of a language, an internal editor or monitor of learners’ production is activated when they use the language. This happens if there is enough time and the learners know the correct rules to be used.

2.4.2.4 The input hypothesis

This hypothesis account for how learners progress from one stage of development to another. According to this theory, in order for acquisition to happen, the learning context must also allow the students to have multiple opportunities to understand and use the language in meaningful situations. When learners work to understand linguistic input which is comprehensible (i) but has new structures or vocabulary features, they move along to the next step in the developmental continuum (i + 1).

2.4.2.5 The Affective Filter hypothesis

The Affective Filter pertains to the emotional aspects of language use such as attitude, motivation, anxiety and self-confidence. When the learner has a negative attitude towards the language or is feeling anxious, the level of the Affective Filter is high and can block or impede language acquisition. Therefore, his Monitor Model suggests that along with providing comprehensible input, care should be taken to lower the anxiety levels of learners. This lowers their Affective Filter, facilitating acquisition. For Krashen, having students engage with texts and activities that are meaningful to them and relevant to their needs is a good way of reducing anxiety. He also stresses natural acquisition opportunities that are just structured enough to make them comprehensible to the learner.

2.4.3 CBI: Multiple forms and multiple contexts

Content-based language instruction can take on many forms and actually occurs in various contexts. In adult education and in the business world, for example, Language for Specific Purposes (LSP) is a commonly used model. It involves pragmatic, experience-
based instruction that prepares learners for work-related language demands. In fact, English for Specific Purposes (ESP) and English for Academic Purposes (EAP) are subsets of this type of language instruction.

Immersion is another version of CBI, and probably the best known (Swain & Johnson, 1997). Johnson and Swain (1997, pp.6-8) note that immersion is usually characterized by specific features, each of which forms a continuum (see also Swain & Lapkin, 2005). These include:

1) The L2 is a medium of instruction
2) The immersion curriculum parallels the local L1 curriculum
3) Overt support exists for the L1
4) The program aims for additive bilingualism
5) Exposure to the L2 is largely confined to the classroom
6) Students enter with similar (and limited) levels of L2 proficiency
7) The teachers are bilingual
8) The classroom culture is that of the local L1 community

The authors suggest that by matching these features to those of a specific programme, educators can gauge the opportunities as well as possible constraints and problems it might encounter.

On the other hand, within immersion education itself, there are also multiple variants (Genesee, 1987; Swain & Lapkin, 1982). There are early immersion programmes where learners begin learning the second language in pre-school or during the first year of elementary schooling (Lambert & Tucker, 1972; Lim, Gan & Sharpe, 1997; Björklund, 1997), middle immersion with instruction starting during Grade 4 or Grade 5 (Genesee, 1987) and also late immersion programmes (Hoare & Kong, 2008; Lapkin, Swain, Kamin & Hanna, 1982; Johnson, 1997) where students are already adolescents or adults when they start their language learning. Other varieties of language immersion include one-way immersion, with instruction being carried out in one second language, or double-immersion which involves students learning in two second languages (Genesee, 1987; Genesee, Lambert & Lambert, 1983). Dual or two-way immersion has also been implemented. In these types of classes, instruction is carried out in two languages, with the students having either one of these languages as first language. Therefore, when instruction is carried out in one of the target languages, some of the students are being
immersed in their L2 while the others are being taught in their L1 (Potowski, 2004; Fortune & Tedick, 2008). When all subject teaching and teacher-student interactions are conducted in the target language, this is described as total immersion (Lambert & Tucker, 1972; Swain & Lapkin, 2005). However, immersion can be also partial, with students learning one or two subjects through the medium of a foreign or second language.

2.4.4 Support for CBI – the immersion studies

Lightbown and Spada (2006) have commented on the attractiveness of the CBI approach for educational planners because of its “two for one” value – in CBI programmes, learners can learn the subject matter and the target language at the same time. It allows extra instructional time for the target language to be worked into school schedules without extending often fully occupied school hours.

The popularity of CBI has been enhanced by research that has consistently reported positive results for the students participating in these types of instruction, especially in the early immersion context. Met (1994) points out that foreign language immersion studies have shown how students can develop content knowledge at the same time as they develop language skills. Numerous Canadian immersion programmes demonstrated that English-speaking students schooled in French not only attain higher levels of proficiency in French than in any other school based model of second language instruction but do so without any detrimental effect on their native language, academic or cognitive development (Genesee, 1987, 2004; Swain & Lapkin, 1982). Turnbull, Lapkin and Hart (2001) have also reported that the academic achievement of immersion students is comparable to that of students who study the same subject in their first language. In terms of language outcomes for content-based instruction learners compared to learners taking the target language as a subject, the former develop a higher level of proficiency in the target language especially in terms of comprehension skills (Genesee et al., 1985; Krashen, 1984). Lazuruk (2007), in his review of the advantages of French immersion, also signaled that this type of instruction could be associated with other cognitive benefits such as mental flexibility and divergent thinking. He points to research by Peal and
Lambert (1962) who tested 10-year-old balanced bilinguals (students who are equally fluent in two languages) and monolinguals. Their results show that the bilingual children outperformed the monolinguals, especially on tasks related to mental manipulation, reorganization of visual patterns, concept formation and symbolic flexibility. These results are supported by recent research demonstrating that bilinguals often offered more flexible, more original and more elaborate answers to open-ended questions than monolingual peers (Baker, 2006). Baker (2000) associates this mental flexibility with the fact that bilinguals are able to access two or more words for an object or idea. Since each word carries its own particular associations, bilinguals therefore have a broader capacity for free association when it comes to ideas and concepts. Bialystok (2001) attributes bilinguals’ creative thinking to their enhanced metalinguistic awareness, in other words, their ability to reflect upon and analyse features of language.

There have been results from several studies indicating that students achieve slightly better proficiency when they start early. Wesche et al. (1986) looked at students in four Canadian universities and examined the students’ proficiency in French, their attitudes towards the language and their use of it. They found that while early immersion students did better on the listening and speaking measures, they found no differences in the written measures. Morrison and Pawley (1986), who looked at the French proficiency of Grade 12 students, similarly found that early immersion students had slightly higher scores than students from late immersion though both groups demonstrated high proficiency overall. Day and Shapson (1996), who looked at French immersion students in British Columbia, found that both groups were successful in achieving provincial French language requirements. These students also did well in science, maths and English when compared to their peers in the regular English programme. Lyster (2007) points out that in terms of the “earlier is better” question in immersion, the results need to be interpreted with caution since the profiles of late immersion learners in terms of motivation and academic achievement are very different from those of early immersion learners.

On the other hand, the drawbacks of immersion programmes have also been pointed out. Researchers have observed that the production of immersion learners may be non-nativelike in terms of grammar, lexicon and sociolinguistic appropriateness (Genesee, 1992; Harley, 1984). For example, students from French immersion classes rarely use
“vous” (formal ‘you’) as compared to native French speakers, even in contexts that require this form (Mougeon & Rehner, 2001). Pellerin & Hammerley (1986) looked at the production of Grade 12 immersion students and found that 53.8% of sentences produced contained errors. They compared their results to those of Spilka (1976) who found that 52.2% of Grade 6 immersion students’ sentences contained errors. For them, their results substantiate what has been pointed out in other research – that there is a tendency for the errors to become ingrained (fossilization) among immersion students.

These results show that especially in the early immersion context, despite minor shortcomings, CBI seems to be successful on the whole. However, not all CBI programmes take place within an immersion context. In fact, in many educational systems, the more common CBI approaches used are mainstreaming of ELL or sheltered content instruction. Issues and problems concerning CBI that have been raised are discussed in the following paragraphs.

2.4.5 Support for CBI but...

As mentioned earlier, Krashen’s (1984) theory of language acquisition has been influential in the development of content based approaches to teaching and learning. Therefore, certain assumptions have been made concerning CBI, one of which is that language does not need to be taught directly to learners: it is enough to provide students with comprehensible input in meaningful contexts. In effect, Swain’s (1996) observation of immersion classrooms has noted that often, content teaching occurs with little or no overt attention given to learners’ use of language (Allen et al., 1990; Swain & Carroll, 1987).

Cummins (1979, 1981), on the other hand, claims that a classroom context in which no attention is paid to providing L2 learners with linguistic support when teaching content, is detrimental to these learners’ cognitive and linguistic development (see also Echevarria & Graves, 1998). He argues that within the context of bilingual education, it is necessary to understand the development of bilingual proficiency and the link between
language proficiency and academic achievement. He has developed a theoretical framework that addresses these issues.

2.4.5.1 Cummins’ Theoretical Framework Part One

Cummins’ theoretical framework contains two parts. The first concerns the development of interpersonal linguistic skills and academic linguistic skills in ELLs, and the necessity to differentiate between these two. The second part examines the role that the ELL’s L1 plays in supporting the development of the L2. The two parts of this framework and their implications with regard to CBI are explained in greater detail below.

2.4.5.1.1 Relationship between language proficiency and academic achievement

In one part of his theory, Cummins (1979, 1981, 2000) examines the demands of communicative tasks, conceptualized along two continua (see Figure 2.6 below). The horizontal continuum refers to the degree of contextual support available for expressing or comprehending meaning. The vertical continuum involves the extent of intellectual or cognitive complexity required by a communication situation.

![Figure 6. Cummin’s continua of demands of linguistic tasks](image-url)
In context-embedded language use, visual and/or para-linguistic cues are usually available to support what is expressed in language. In context-reduced situations, there are few cues present in the context to support meaning. Therefore, what is said or written must be linguistically explicit and detailed enough to accurately convey the message. Based on this model, Cummins argues that two different kinds of language proficiency exist - Basic Interpersonal Communication Skills (BICS) and Cognitive Academic Language Proficiency (CALP). Cummins (1981) highlighted the need to make this distinction after reanalysing large-scale language acquisition data from the Toronto Board of Education. The results of his analysis showed that there was a lag of several years, on average, between the attainment of socially appropriate fluency in L2 and the attainment of grade norms in academic aspects of L2. BICS are language skills used in interpersonal/informal situations whose extra-linguistic and linguistic contexts provide relatively easy access to meaning. Tasks that require BICS would be located in quadrant A of the model. He finds that most learners attain proficiency in BICS fairly quickly, within a year or two of instruction. CALP is required in less contextually rich (context-reduced) situations, and is much more difficult to master than BICS. Studies conducted by Bialystok and Hakuta (1994) and August and Hakuta (1997) support these claims. CALPS is the kind of proficiency learners need most when they are engaging with academic texts and class lectures. These types of tasks would be located in quadrant D of the model. He notes that for the majority of these learners, direct teaching of the language in the academic context is necessary in order to achieve the required levels of academic language proficiency. This is especially true of students whose linguistic environments do not provide them with additional models, especially of the cognitive academic type, in the target language.

2.4.5.1.2 Pedagogical issues regarding the relationship between language proficiency and academic achievement

Snow, Met and Genesee (1989) concur with Cummins. For them, it is unlikely for proficiency in the target second or foreign language to appear simply because content is being taught through that language. In fact, they emphasise the importance of having
language and content teachers collaborating to bring about the desired objectives: “The specification of language learning objectives must be undertaken with deliberate, systematic planning and coordination of the language and content curricula.” (p.204)

Studies on the teaching of EAP in Mathematics and Science classrooms involving ELL learners tend to support these claims. Research from the area of mathematics and science teaching points to the idea that mathematical and scientific discourses are specific registers (Halliday and Martin, 1993; Pimms 1987), each with their own fields, audiences and modes of communicating. In his work with children’s development of mathematical understanding, Pimm (1987) noted how words used in mathematical contexts may differ greatly from their ordinary meanings. Some examples are words such as power, radical, product, moment and integrate. According to Martin (1993, p.168), “one of the most important pieces of technology used by scientists, and one that is often overlooked, is language.” In order for successful learning of mathematics and science to occur, students must first master the language of science (Lemke, 1990). Lemke lists the skills that students must acquire in order to function appropriately in these domains – the need to learn how to observe, compare, classify, analyse, discuss, hypothesise, theorise, question, challenge, argue, conclude, generalise and report – all using the language of science. This is not easy to do, even in the students’ L1. The impact of language proficiency on content mastery is shown in a study conducted by Dawe (1983). In this study, the correct use of logical connectors was the one factor that differentiated between the students who could reason mathematically and those who could not. The results were consistent across both ELL and native English speakers.

Crandall (1987) has observed that the mastery of mathematics and science registers becomes more complicated when the students are learning these subjects in their second language. For example, one of the principal characteristics of the syntax used in mathematical expressions is the lack of one-to-one correspondence between mathematical symbols and the words they represent. This particularity poses considerable difficulty for ELL students, especially beginners or those with low proficiency, who tend to read and write mathematical sentences (presented either in symbols or in words or both) in the same manner in which they read and write standard orthography. An ELL who reads or hears the expression, “eight divided by two” and translates it in word for word order
would produce the mathematical expression incorrectly as $8\sqrt{2}$; the correct expression is $2\sqrt{8}$.

Brown and Kelly (2007) point out as well that the technical style employed in scientific discourse may be difficult for ELL because these students have to learn words and language as applied to concepts unfamiliar in their daily lives. For them, “learning to engage in the discourse of science requires developing new repertoires for interaction with people, texts, technologies, knowledge and assumptions about the world.” (p. 283).

In addition, Scherer et al. (2009) have remarked that many scientific texts are written for a highly literate audience, making them inaccessible for those who do not possess the requisite skills. This is especially true of second language learners who may not have access to the same kinds of linguistic resources as first language speakers. Barwell (2005a) observed that many subject teachers do not have any specific training in language education. He finds that while there is support provided to ELLs such as materials and detailed guidance in terms of learning English, there is very little that specifically addresses integrating content learning and language learning. While he is referring to the situation of mainstreaming in the UK, this is true of other contexts as well.

Fortunately, this is starting to change. In much of the recent work on mathematics and science teaching, there is an increasing awareness of the need to scaffold the learning of ELL students with specific reading and writing strategies (Richardson Bruna & Gomez, 2009). In their research project with ELLs, Scherer et al. (2009) designed a program that included textual support strategies (annotation) and tools (reading journals) that allowed students to pay attention to the structure and details of science texts. They found that the students of the teacher who most consistently applied these methods showed improved results on a standardised reading test. Fang and Schleppegrell (2008) have stressed the role mathematics teachers play in introducing their students to disciplinary knowledge and the importance of text as the primary medium for producing, storing, communicating and critiquing this knowledge; teachers have to develop expertise to help students engage with texts in their domain. Valdez and Svedkauskaite (2002) similarly propose that ELLs need to be made aware of the specificities of scientific discourse: it is characterised by long noun phrases, the use of the passive voice and a specific sequence of steps, all of
which are not common in ELL’s ordinary day-to-day experiences of their second language.

However, what is problematic, when language is expected to be learned alongside subject matter in classrooms, as Arkoudis (2005) has observed, is that teachers often define their pedagogic knowledge through the lens of their subject disciplines. This is especially true of teachers in secondary school and higher levels in the educational system. Therefore, as Creese (2005) remarks, teachers see themselves as having separate roles: the EAP teachers engage in language work while the subject teachers focus on subject content. Her ethnographic research on ELLs who had been mainstreamed into regular classrooms in the UK demonstrated that even though language and content were supposed to be developed in these classrooms, this was not the case. Instead, she found that the majority of language work was focused on defining key concepts in content areas; there were very few instances of teachers explicitly addressing linguistic forms. She also found that both language and subject teachers lacked an understanding about how language works to create meaning. As such, these teachers did not use opportunities for extending language work to their full potential. Barwell (2005a, 2005b) contends that this dichotomous view of language and content is problematic for several reasons. First, by separating language from content, this implies that once students master the language, learning content is fairly straightforward. Second, it leads to a view of language as a conduit or portal, thereby obscuring the role that language plays in construing the subject. Thirdly, language and content are depicted as static entities, ignoring the role that teachers and students have in engaging with both these domains to create meaning. Finally, it does not take into account the social context and institutional structures in which the teaching of all language and subject courses are embedded. Indeed, Arkoudis (2003, 2006) found that content area subjects were given more priority and therefore, usually ranked higher in the curriculum hierarchy among administrators, teachers and students. This perceived difference in their relative importance affected the kind of pedagogical planning and collaboration that took place between the teachers of these subjects.

Swain (1988) has pointed out as well that teachers focused on teaching content may not elicit much student production. Even in immersion classes where the goal is
communicative competence, Swain (1985) remarked that students speak relatively little and rarely need to give extended answers. This could be due to the traditionally held idea that for subjects such as history, geography, mathematics or science, there is a ‘body of knowledge’ (content) that exists independently of teachers and learners. Teaching a subject involves a transfer of this knowledge from the teacher into the learner, and language is the conduit through which the transfer occurs: learning is therefore the acquisition of content (Barwell, 2005b). Contemporary thinking about language and subject learning, on the other hand, sees language as a resource for meaning-making and participation in various communities of practice (Lave, 1988; Lave & Wenger, 1991; Wenger, 1998). It is through dialogue and interaction with other members of their community of practice that learning occurs (Vygotsky, 1986; Wells, 1999, 2000). Within this paradigm then, language and meaning are mutually constitutive: learners need to have the opportunity to engage in oral and written discourse in their classroom community in order to engage with ideas and to create their own understandings of the subject domains. Short (n.d.) stressed the importance of giving ELL students opportunities for classroom interaction and participation. In fact, she recommends reducing teacher talk to provide more time for students to speak. Tchudi & Tchudi (1983) note that having students write in content areas is useful for student learning because it helps them structure their thoughts and develops all language skills. They recommend that writing in content areas should be explicitly taught. Schleppegrell (2002) agrees. She points out that the specificities of academic writing need to be taught because the register features required for academic assignments differ significantly from those of ordinary spoken interaction. Nonnative speakers are disadvantaged because they have limited resources in English and less experience with the genre and register expected in the assignments. To help these students, instructors need to engage students in interactively co-constructing meaning while modelling appropriate and effective ways of realizing intended meanings at sentence and clause level.

Focusing too much on content may also result in teachers directing their students’ attention only to “key words” in an attempt to make students “get the content”. Huang and Normandia (2008) notice that this is common practice among math teachers. It is intended to help less linguistically proficient students solve word problems: students are
trained to select a mathematical operation for solving the problem when they recognize a key word. However, Clement & Bernhard (2005) point out that word problems are often presented to help students develop mathematical reasoning skills. By having students focus on key words in isolation, teachers are simplifying the complex process of problem solving. Students may indeed solve specific problems but fail to develop the desired reasoning skills.

2.4.5.1.2 Cummins’ Theoretical Framework Part Two

2.4.5.1.2.1 The role of the first language (L1) in developing second language (L2) proficiency

The role of the first language (L1) in the second language classroom has been widely debated in the past. Cummins (1986) supports the idea of teachers using the L1 to support second language learning in their classes. He postulates that there is a Common Underlying Proficiency (CUP) for all language learning. He calls this hypothesis the Linguistic Interdependence Principle, which can be stated as follows (Cummins, 2000):

To the extent that instruction in Lx is effective in promoting proficiency in Lx, transfer of this proficiency to Ly will occur provided there is adequate exposure to Ly (either in school or environment) and adequate motivation to learn Ly.

This principle has implications for language teaching and learning. It means that if learners are experiencing problems in the early stages of learning a second language, they might be helped by allowing the use of the L1 in the learning environment. In other words, if students are having difficulties learning in the L2, it makes sense to promote literacy development in their stronger language (L1), then work to transfer these skills into their weaker language (Cummins, 2000). Cummins (1991) finds that there is evidence of the interdependence of literacy-related or academic skills across languages (Lanauze & Snow, 1989; Jimenez, Garcia & Pearson, 1996; Nguyen & Shin, 2001; Riches & Genesee, 2006): the better developed children’s L1 conceptual foundation, the more likely they are to develop similarly high levels of conceptual abilities in their L2
(Collier, 1987; Saville-Troike, 1984; Hakuta & McLaughlin, 1996). He postulates that learners must first attain a specific threshold in terms of Cognitive Academic Language Proficiency in their L1 in order to benefit from the effects of a positive transfer. He suggests therefore that for certain categories of learners, such as minority language students, immersion may not be a suitable pedagogical option.

Cummins’ suggestions have been taken up in other forms of CBI such as sheltered content instruction and content-integrated courses. In sheltered content courses, a subject matter course is taught to a segregated class of ELLs in the target language by a content area specialist, sometimes with supplementary language modules to help students with second language problems. Content-integrated instruction involves two linked courses – a language course and a content course - where students experiencing problems learning content in a second language are given additional linguistic help. The use of the L1 as a support for student learning is an important aspect of these types of courses (Echevarria & Graves, 1998; Merino & Hammond, 2002). For Cummins (1986, 2000) the use of the L1 comports a social dimension as well. Willig’s (1985) meta-analysis of students in bilingual programs across the US showed that students who were taught in their L1 performed better, in language and non-language achievement tests, in both English and L1, than students who had been taught using only their L2. They also demonstrated better self-confidence and positive attitudes toward school. Krashen and Biber (1988) have observed the same effects in bilingual education in California.

Even with L1 support however, there are concerns as to the suitability of CBI programs for all students, especially in more advanced educational contexts. This is because the inherent linguistic and conceptual complexity of the content which is presented in these courses may make learning difficult if the student has not attained a certain level of language proficiency. Marsh, Hau and Kong (2000) looked at the academic achievements of late immersion (high school) students in Hong Kong. They noted that the kind of comprehensible input that can be presented to students with low language proficiency is limited. This, coupled with the students’ inability to grasp complex and abstract ideas in the L2, disadvantages them compared to what they could achieve if learning in their L1. Brinton, Snow and Wesche (2004) studied sheltered content courses and also content-integrated courses in a university context. These authors
have observed as well that when considering whether students should be placed in these types of courses, their level of L2 proficiency should be taken into consideration:

“If their skills are not adequate for understanding the lectures and readings with reasonable efficiency, they will fail at the subject matter and not learn very much language either. Such students are better served by regular ESL and FSL courses and other subjects given in their own language.” (Brinton, Snow & Wesche, 2004; p.48) [emphasis added]

2.5 Conclusion

The review of educational change in bureaucratic contexts shows that in these systems, change is implemented in a top down manner. However, although ideas about educational innovation may originate at the top of the educational hierarchy, teachers are the ones who are ultimately responsible for implementation decisions in classrooms. Efforts to support and encourage the desired change should, therefore, carefully consider the needs and work contexts of teachers.

The washback literature demonstrates that efforts to mandate educational innovation through changes in testing or assessment have been tried out in many different contexts and educational systems. The centrality of the teacher’s role in determining change in teaching and learning practices is once again highlighted in these studies. Although varied methodologies have been employed in the study of this phenomenon, there have been calls for the inclusion of an ethnographic component in examining washback. Ethnographic data, triangulated with data obtained using other methods should provide stronger, more comprehensive empirical evidence on which to build washback models. Furthermore, the literature review has shown that even though studies have been conducted on testing and washback in several Asian countries, there has been no study so far focusing specifically on this subject in the Malaysian educational context.

The literature on CBI has made it evident that while this approach seems to offer a good avenue for students to simultaneously acquire language and knowledge in subject areas, there are also many factors which may impede the learning of either language or content. Two important factors highlighted in the literature are the second language
proficiency of students and the lack of attention paid to using the learner’s L1 to scaffold their L2 learning. Studies of both immersion and EAP in mainstreamed classrooms have demonstrated as well that the teaching efforts in many of these classrooms are not equally distributed: content continues to be the principal focus, with much less attention paid to the role of language in construing subject matter. These three bodies of literature have shown us the level of complexity that a change such as the PPSMI policy involves. The studies illustrate the various elements that need to be taken into consideration when studying such a change and they also demonstrate the multiple demands that are made on those who ultimately implement this policy in the classrooms.

The following chapter, Chapter 3, provides the educational context for the implementation of PPSMI and the efforts made by the MMOE to support the transition process.
CHAPTER 3

The Malaysian Educational Context

3.1 Introduction

Malaysia is a multi-ethnic, multi-cultural and multi-religious country. After five decades of independence from British rule, it is undergoing rapid industrialisation. In present day Malaysia, as was the case during the colonial period, education is regarded as a vital tool in the task of social advancement, preparation of human resources and social engineering. In a report on the development of education in Malaysia, the MMOE specifically states that “the national five-year development plans from the mid-1960s onwards] ha[ve] always identified the education sector as one of the main mechanism[s] in moving the nation ahead” (MMOE 2004, p.20). The objectives of the five-year National Economic Plans remain fostering harmony among its diverse ethnic groups, addressing the socio-economic gap between urban and rural areas and restructuring Malaysian society to reduce social and economic inequalities. These concerns continue to foreground the nation’s economic and educational development planning.

The presence of English, a non-indigenous language, in Malaysia’s educational system is a heritage of British colonial rule. English is taught as a second language in Malaysia’s public education system. However, although English is written into its founding constitution as the official second language of Malaysia, the importance it should be given in national and public affairs has always been controversial. This is due to its being associated with British rule, thereby making English the language of the colonisers. On the other hand, Malaysia as a nation is driven by the dream of socio-economic development and modernisation. In fact, Malaysia has a blue print called Wawasan 2020 [Vision 2020], promulgated by one of its former prime ministers, with this intent in mind. This master plan intends for Malaysia to achieve developed nation status by the year 2020. After having developed from an agrarian to an industrial economy in the first four decades after independence, Vision 2020 intends to move Malaysia towards a knowledge economy (K-economy). With this in mind, government planners have set in motion aggressive efforts to develop the pre-requisites of such an
economy, namely an adequate supply of skilled human resources, a strong base in Science and Technology and the building up of technological infrastructure (Badaruddin, 2002). In order to achieve this level of development, policy makers are confronted with the fact that English is becoming more and more important as a language for disseminating scientific and technological knowledge, accessing global economic opportunity and maintaining competitiveness. Malaysia’s entry into the global market as a signing nation of GATT (General Agreement on Trades and Tariffs, or more commonly known as the Free Trade agreement), has also given the impetus to increasing the role of English in its economic and educational sectors.

With the looming shadow of the GATT coming into full force in 2007, and worried that its labour market and economy would not remain viable, unprotected, against increasing international competition, the government of Malaysia began experimenting with increasing the use of English in its education system (The Economist, January 15, 1994). This culminated with an official policy announcement in May 2002 by the Minister of Education that Mathematics and Sciences, which had formerly been taught in the national language, Bahasa Malaysia, would be taught in English. This policy is popularly known by its Malay acronym, PPSMI (Pengajaran dan Pembelajaran Sains dan Matematik dalam Bahasa Inggeris [English as the language of instruction for Mathematics and Science]). Official implementation of PPSMI began in 2003. This policy had three entry points into the educational system: Standard One (Grade One), Form One (Grade Seven) and Lower Form Six (Grade Twelve).

This chapter will first discuss the education system in which this policy change is set, since it has important implications for policy implementation. A brief historical overview is provided before the present educational system is described. It will then go on to examine the PPSMI policy.

### 3.2 The Malaysian Educational System

#### 3.2.1 Historical background: The colonial system

Under British colonial rule, four types of educational programmes were permitted to exist, each with its own language of instruction, curriculum and standards (Wong &
James, 2000). These programmes are described below. Note that English was specifically taught only in the English medium schools.

1) Malay medium
   The majority of Malays in villages and rural areas were educated in what were called “pondok” (hut) schools. These were one-room schools where the students mainly learned to memorize the Quran and also how to read and write using Arabic script from a teacher, an “ustaz” learned in the Islamic holy scriptures. The maximum duration of the schooling was usually six years, or more or less up to primary level. Students who wished to continue their studies could go on to local madrasahs (religious schools), go abroad to Egypt, or continue in English medium schools.

2) Chinese medium
   The Chinese community had their own schools, where all the subjects were taught in Mandarin. The curriculum, textbooks and even the teachers, were imported directly from China. Therefore, students learned the Chinese language, history and culture exclusively. There were two levels of schooling – primary and secondary – but for higher education, students had to either go abroad to mainland China or Taiwan.

3) Tamil medium
   The children of the Indian community, whose parents largely worked in rubber estates, frequented estate schools. These were located within the plantation grounds and were established by plantation owners or companies for the children of workers, most of whom were Tamils from South India. The language of instruction in these schools was Tamil, and the students learned the basics of reading and writing in Tamil script. If they wished to continue their education, students then had to transfer to English medium schools.

4) English medium
   English medium schools were established by the British in order to train local manpower to meet their needs for lower level administrative posts in the colony. Elite English medium schools, such as The Malay College Kuala Kangsar (MCKK), were established by the British for the sons of royalty, dignitaries and other Malay leaders. These institutions were therefore the training ground of future leaders and intellectuals in the Malay community. These schools were structured according to the British model. Students completed six years in primary school, five years in secondary and two years in pre-university/college. However, tertiary education was only available in Britain itself. In the later part of English rule, students could attend University of Malaya, the only local university, since it offered courses in English. English medium schools were often located in the urban centres and were frequented largely by the non-Malays, who saw it as a means of social mobility within the colonial administration. Teachers, textbooks and curricula were controlled by the colonial office in London. These schools also relied heavily on examinations and examiners from British institutions to certify its students.
As can be seen from the above description, education was far from a uniform process for all concerned: subject matter, language of instruction, environment, standards, teaching materials and methods varied enormously among different types of schools.

3.2.2 The educational system at present

This fragmented education system was to change, slowly but inevitably, after the independence of Malaysia in 1957. The Razak Report (1956) recommended the integration of these disparate schools into one national education system. English medium schools would be gradually phased out starting in 1970. The last English medium schools in Peninsular Malaysia were converted to Malay-medium schools in 1982. All national schools, financed by the government, would use Bahasa Malaysia (or Bahasa Melayu), the Malay language, as their medium of instruction. Therefore, all subjects, from History to Mathematics had to be taught using Bahasa Malaysia. English would be taught in all schools as a second language. Students whose mother tongue was not Malay could, if they wished, study their own language in what is called “Pupil’s Own Language” (POL) courses. The curriculums of all schools were standardised and specified by the MMOE, but the educational model was still based on the former British system of 6 – 5 – 2 – 4 (six years in primary, five in secondary, two in college/high school and four in university). Chinese and Tamil would continue to be used as languages of instruction in private schools, but these schools would still follow the national curriculum guidelines. All students would receive a general education until their third year of secondary school, Form Three. Beyond that point, through a process called streaming, students would be placed in classes within specific categories such as Pure Sciences, Humanities, Economics and so on. While certain core subjects would still be learned in common, each stream offers subjects specific to itself.

As can be noted from the description above, the education system in Malaysia is highly centralised. The Malaysian Ministry of Education (MMOE) is responsible for the school system from primary to university level. Therefore, all matters pertaining to education such as teacher training, the drawing up of subject syllabi and the administration of national exams are under its jurisdiction. This national system has
always relied on the use of standardised, nationwide exams as performance indicators and also as gatekeepers, in terms of accessing higher levels of education. At primary school level, all students sit for the UPSR (Ujian Penilaian Sekolah Rendah [Primary School Studies Exam]) at the end of their Primary Six. The results of this exam are often used to select students for entrance into premier schools or Science Schools (elite boarding schools that are fully funded by the MMOE). At secondary level, there are two mandatory national exams: one at the end of Form Three (Secondary Three) called the PMR (Peperiksaan Menengah Rendah [Lower Secondary Exam]) and another, an exit exam, at the end of Form Five (Secondary Five) called the SPM (Sijil Pelajaran Malaysia [Malaysian Education Certificate]). The Form Three exam is often used as a means of streaming students into the Humanities, Sciences, Economics or vocational fields of study. On the other hand, regardless of how students do on the PMR, they are automatically promoted to Form Four. The Form Five exam, however, serves a gatekeeping function in terms of deciding who gets access to college and pre-university education. Since available places in the established Malaysian universities are limited, this has often resulted in intense exam pressure, especially at Secondary Five and High School/college level, for students to do well in these national exams so as to obtain entrance into one of these institutions.

3.2.3 Schools in Malaysia: the urban – rural contrast

Historically, there have always been important differences between urban and rural schools. These contrasts were a result of intentional colonial policy and the unequal distribution of resources within the territories under British rule. An excerpt from a speech by O.T. Dussek, a former principal of the Sultan Idris Training College, one of the few teacher training colleges available at the time, reflects the linguistic policy fostered by the British during the colonial era. (New Straits Times, 23 November, 1935, cited in Long, 2004; pp. 100 -101)

Malay schools must be conducted for Malays who will and must stay in their villages. They must not have any relationship and meeting
point with English: the English language and the vernacular are incompatible. In fact, there are two Malayas. One, an urban Malaya which speaks English, and the other, a rural Malaya which speaks the local language.

The British had learned from their colonial experience in India, where an armed uprising demanding free compulsory education for the local population occurred in Calcutta in 1857. It was led by English educated intellectuals. They were, therefore, interested in keeping the local population content and docile; the colonial administrators felt that encouraging the largely Malay rural population to broaden their horizons by learning English would result in discontent and social agitation.

While there was a direct policy to keep English education in rural Malay schools to a minimum, the colonial government also focused their resources on providing infrastructure such as schools, hospitals, roads, electricity and water pipelines more intensively in the urban areas because these were usually the administrative centres. The concentration of infrastructure and resources in urban areas exacerbated this gap between the kind of education available in cities or towns and other outlying areas. In general, schools in urban areas had better physical facilities, were more likely to have better trained teachers and also had better teaching supplies in terms of books and other teaching materials.

These policies were discarded after Malaysia gained its independence. The Malaysian government has implemented a uniform curriculum for all schools in the country, but structural differences continue to exist: a local newspaper reported that certain schools in remote areas of Malaysia lacked basic amenities such as electricity and running water (The Star, 2005). However, the Malaysian government has been actively working to improve the situation by building new schools and equipping them with science labs, computers and so forth - the gap is starting to close between urban and rural area schools.

3.2.4 Secondary School Teachers in Malaysia: Qualifications and role in the classroom

All teachers in Malaysian public schools are in the employ of the central government. They are considered part of the civil service. The Malay term used to designate civil servants, “kakitangan kerajaan”, literally translated means “the arms and legs of the
government”. It is indicative of the role that they are expected to play in terms of implementing government policy – in all formal communications such as letters or memos, members of the civil service typically sign off with the phrase, “yang menurut perintah” (one who follows orders). Therefore, teachers, as civil servants as well, must “menurut perintah” (follow orders) and “akur” (submit) to the directives of central planners from the MMOE.

Teachers in secondary schools are trained either in public universities or in teacher training colleges. However, teachers for the upper secondary level are often university graduates. Two types of teacher training programmes are usually available in Malaysia’s public universities (Lee, 2004). In the first type, teacher candidates take academic courses as well as teacher training courses concurrently. Upon graduation, they are awarded a Bachelor of Science (Education) or a Bachelor of Arts (Education). In the second type, students first complete a specific degree before doing a one-year diploma in education. The time taken to complete the teaching degrees varies from three to four years. B.Ed degrees are also available to college-trained teachers who wish to upgrade their qualifications. The six mandatory components in the teacher-training curriculum are listed below:

1. Teacher Dynamics – these include language and thinking skills, Islamic/moral education, environmental awareness and Islamic civilization
2. Knowledge and Professional Competence – this component covers educational psychology, pedagogy, guidance and counselling, and familiarity with Malaysia’s educational context
3. Subject option and specialization knowledge – this aspect refers to knowledge about the areas they are majoring in and any minors or electives they may choose
4. Self-enrichment – this covers physical education, health education and also art education
5. Co-curricular activities – this component familiarises students with how to manage co-curricular activities, sports, uniformed units and so on.
6. Practicum – this component usually takes place after students have completed most of their courses and gives teacher candidates practice teaching in schools for about ten to fifteen weeks, depending on the programme.

In Malaysian society, as in many other Asian societies in general, the teacher is held in high esteem by the community. According to Musa (2003, p. 87), “The undue reverence students have for their teachers and professors still exists today. This is common in Asia, a reflection of the culture of reverence towards elders generally.”
Teachers are expected to be experts in the subjects they teach as well as role models, motivators and counsellors for their students (Noor, 1994). They are often considered to be “surrogate parents” to the students when the latter are in school. While this is slowly changing, the teacher is still seen as an authority figure and repository of knowledge. Therefore, in schools, there is still an emphasis on instilling discipline and obedience among the students. Teaching and learning is also still very much seen as a process involving transmission of knowledge from teacher to student. As such, in many Malaysian classrooms, the teacher plays a central role as disseminator of knowledge.

3.2.5 Secondary school students in Malaysia: age range and expected role

The typical secondary school students range in age from approximately thirteen years of age in Form One to seventeen in Form Five. Students in Lower Form Six and Upper Form Six are nineteen and twenty years old respectively.

Students are expected to listen when the teacher speaks, write down notes provided by the teacher, practice the sums and homework assigned and ask questions about what they have been taught if they do not understand. Students are not expected to play an active role in leading their learning process in the sense of actively pursuing topics that are of personal interest to them. Nor are they asked to contribute to creating knowledge in their classroom community. In fact, the biggest expectation laid on students by both parents and teachers, is to demonstrate that they have learned what has been taught by doing well on tests and exams.

All students are also required to participate in at least one sport (volleyball, badminton, soccer etc.) and one society (Tamil Language Society, Debating Club, History and Geography Society, for example) or uniformed unit (School Band, St-John’s Ambulance, Foot Drill Unit, Military cadets, etc.). When students apply to pre-university programmes, ten percent of the total points used to rank their application will come from their participation in these activities. Certain students, usually those who are performing well academically, are selected to be class monitors or prefects. Class monitors and prefects perform the function of helping teachers with tasks such as collecting homework
and bringing them to the staffroom, making announcements, keeping students in order during assembly or making sure students obey school rules.

3.2.6 Classroom interaction

With the use of tests and exams as the sole measures of assessment of coursework, these values lead to teacher centred, test/exam driven classrooms, where the priority is to “score” (obtain excellent results, namely, an “A1”) during the exams. Although the MMOE is attempting to introduce alternative forms of pedagogy such as inquiry learning and school-based evaluation into the system, the success of these efforts remains to be seen.

3.2.7 Form Four and Form Five requirements for Science and Technology streams and Social Science streams

At the Form Four and Form Five level, all students must take Core Group subjects and Compulsory Group subjects. They also have the choice of taking Elective Group subjects as well (Malaysian Ministry of Education, 2008). The six Core Group subjects imposed by the MMOE are Bahasa Malaysia, English, Mathematics, Science, History and Moral Education/Islamic Education. Although they are not tested on these, students must also take two compulsory subjects, Physical Education and Health Education. Students in the Pure Sciences or Engineering Sciences will usually take Biology, Chemistry, Physics and Additional Mathematics as well. Those who are in the Vocational/Technical stream may opt for subjects such as Additional Science, Industrial Engineering, Information and Communication Technology and so forth. What this means is that students end up taking ten or more subjects. In fact, since the SPM examinations became open certificate exams – where students can register for as many subjects as they want – in 2000, there has been a trend among students to take fifteen, sixteen or even twenty and more subjects, with the objective of setting a record number of A1s in the SPM. A local newspaper covering the results of the 2007 SPM cohort, for instance, reported on the student who obtained the most As, 21 (20 A1s and one A2) that year and another high achiever who had 16 A1s (The Sun, 2008)
It should be mentioned here that since the lower secondary exit exam, the PMR, has no gate-keeping function, all Form Three students are automatically promoted into Form Four, regardless of their results. Students who have the best results are usually streamed into the science options while those with the weakest results end up in the Arts or Humanities. In the past, only students who had at least a B for Mathematics and a B for Science in their PMR were permitted to take up the science options. However, the government, in its desire to produce more students in the scientific and technological domains, relaxed the criteria for entry into the science streams. Now, students who have a C in Mathematics and a C in Science may opt for the Science stream as well.

In the upper secondary cycle, the cognitive demands and workload placed upon students increases significantly. This is especially true for those who are streamed into any of the science options. For them, this move constitutes a major step up in terms of the difficulty level of the scientific and mathematical concepts that students are required to learn. In the lower secondary cycle, students only have one (General) Science and one (General) Mathematics course. These courses cover broad ideas and applied mathematical and scientific concepts. The Form Four and Five Mathematics and Science core subjects are a continuation of these two courses that students took at the lower secondary level. However, subjects such as Additional Mathematics, Physics or Chemistry, are entirely new courses for students who enter now into more specialised domains, each of which has a vocabulary proper to the field. The level of abstraction encountered in the concepts presented in these subjects is also much higher. The concept of a mole in Chemistry, for example, and its importance in chemical reactions, or the relationship between force, mass and acceleration in Physics, and how these concepts can be applied, requires of the students a much higher capacity for abstraction, analysis and synthesis. The increase in subject-related cognitive abilities required of students is accompanied by a parallel increase in demands made on linguistic capacity as well. At the lower secondary level, the PMR Mathematics and Science exams are solely in multiple choice format. However, as described in the section below, this is not the case for the SPM exams for Mathematics and Science subjects.

During PMR, students sit for a maximum of eight subjects. For the SPM, it is usual for students to take a minimum of ten subjects. Studying for ten or more subjects can
constitute quite a challenge especially for those who opt to take subjects such as Biology, Physics, Chemistry, as the syllabus for each subject contains multiple topics and sub-topics. Examples of the topics and sub-topics that make up the Form Four Physics and Form Five Mathematics syllabus respectively are given below.

Learning Area 1: Introduction to Physics
1.1 Understanding Physics
1.2 Understanding base quantities and derived quantities
1.3 Understanding scalar and vector quantities
1.4 Understanding measurements
1.5 Analysing scientific investigations

Learning Area 7: Probability II [Mathematics]
7.1 Understand and use the concept of probability of an event
7.2 Understand and use the concept of probability of the complement of an event
7.3 Understand and use the concept of probability of combined event

3.2.8 The school year and time restrictions on students and teachers

Although teachers and students supposedly have two years to prepare for the SPM, the school year for Form Four students actually does not begin till late March. This is because PMR results are released in December, but students with good results are offered places in various key schools and boarding schools from January until February. Therefore, the number of students in a Form Four class may change from week to week as students receive and accept or reject various offers to be placed in those elite schools. Enrolment only stabilises in March.

3.2.9 SPM Mathematics and Science exams: content and format

For the high-stakes SPM examinations, students are tested on content that they have learned throughout the whole two-year upper secondary cycle. While the emphasis may shift from one topic to another, with more questions on one particular topic than another during a given year, students are expected to be ready to answer questions based on any topic of the syllabus. The SPM examinations accord a fixed percentage of questions to
specific cognitive levels based on Bloom’s Taxonomy\(^1\): fifty percent is allocated to mid-
level (application and analysis) questions, thirty percent to low level (knowledge and
comprehension) questions and twenty percent to high level (synthesis and evaluation)
questions.

The Malaysian Examination Syndicate (MES) is in charge of preparing and selecting
examination items, printing out the exams and ensuring that they are securely delivered to
the right examination centres. It also trains examiners for marking the exams. These
examiners are normally experienced teachers of the specific subject they are asked to
evaluate. Every subject has a Chief Examiner and a team of examiners to do the marking.
The MES furnishes a marking scheme for each paper that examiners correct. The
marking scheme often contains key words that the examiners are supposed to look out for
in student responses. They are expected to adhere to the scheme when allocating points to
student responses. Examiners for the MES are bound by an oath of secrecy and are not
allowed to divulge any information concerning the exam or the marking scheme that is
used in the evaluation.

The MES is also responsible for compiling all student scores across the nation and
transforming raw scores into final letter grades of A1, A2, B, C, D, E or F. Specific,
compulsory formats of assessment are used for evaluating each subject. For the science
subjects such as Biology, Chemistry or (General) Science, the final grade of each student
is obtained from summing up the scores of four component evaluations. Paper 1 consists
of fifty objective type (multiple choice) questions, where each question is accompanied
by four answer choices: A, B, C or D. An hour and fifteen minutes is allocated for
answering this paper. Paper 2 (focusing on recall of facts and calculations) and Paper 3
(focusing on experimental skills and application of theoretical concepts) contain
subjective type questions. The first type, the structure question, usually requires students

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\(^1\) Bloom’s taxonomy (Bloom et al., 1956) classifies cognitive ability into six levels. These levels range
from lower order thinking skills to higher order thinking skills. At the lowest level is knowledge, which
basically involves the capacity to recall information. The five other levels, in ascending order, are:
comprehension, application, analysis, synthesis and evaluation.
to name specific parts of an apparatus or provide short answers in the form of phrases. The essay type question necessitates longer, reasoned responses of at least a paragraph or more. Charts, graphs or drawings may be used to support their answers. Students are given two hours and thirty minutes to answer Paper 2 and one hour and thirty minutes for Paper 3. The final component of the evaluation – practical laboratory work – is not conducted under isolated, timed conditions. MST are asked to select the best three of each student’s laboratory reports over the entire Form Four year and to submit these marks. The practical component makes up ten percent of the total score. This type of assessment is fairly recent and forms part of a school-based evaluation initiative of the MMOE which is aimed at diversifying the means of evaluating students.

For Mathematics, however, the evaluation is composed of only objective questions (Paper 1) and structure questions (Paper 2). Paper 1 consists of forty objective questions, also with four answer choices. Students are given one-and-a-half hours to complete it. Paper 2 is made up of questions which require students to demonstrate how they arrived at a specific response (the working) by writing out each step of their calculations. For Additional Mathematics, however, neither Paper 1 nor Paper 2 present objective questions; students are required to show how they have worked out the calculations to reach the answers given. The sums in Paper 1 are shorter and require more direct, straightforward calculations, while those in Paper 2 are longer and necessitate application of mathematical concepts/formulas. (For an example of SPM Mathematics and Science questions, see APPENDIX J)

Tests and exams in schools reproduce the format of exams set by the MES. In fact, each state now prepares its own standardised Trial Exams modelled on the SPM exams. The Trial Exams take place about two-and-a-half months before the actual SPM and they are frequently used by MST to gauge how well their students will perform in the SPM. What is interesting to note is that while all the major public exams such as the UPSR, the PMR and the SPM are in bilingual format, the MMOE has mandated schools to conduct their monthly tests and term exams in English only since PPSMI policy implementation began in 2003.
3.3 Measures to support MST during implementation of PPSMI

Various steps have been taken by the MMOE during the process of implementation to support the MST in making the transition (Chan & Tan, 2005). Specific steps have also been made to support students in their learning process.

3.3.1 Language testing for MST

In the earlier stages of implementation, MST were called up for language training and testing without any prior screening of their previous linguistic qualifications. However, this indiscriminate testing of MST has since been stopped. The MMOE has specified that only teachers who do not have a credit in their SPM results or a Malaysian University English Test (MUET) band score of 3 and below are required to sit for the test.

As part of the ongoing process of implementing PPSMI, MST who do not fall into the exemption categories mentioned above are required to take English language proficiency tests by the MMOE. The test used is a version of the MUET, scored on a band-scale of 1-6. These are the actions that are supposed to be taken based on the results which teachers obtain for their test:

Bands 1 & 2: These MST must re-sit the test at a later time. They are required to attend 60 hours of English for Mathematics and Science (EMS) courses and complete the self-access learning (SAL) module [For details on EMS and SAL, see section 3.3.6 and 3.3.5 respectively]

Band 3: Those in this range are encouraged to re-sit the test. It is mandatory for them to attend the EMS courses and complete the self-access learning (SAL) module

Bands 4 & 5: MST with a score of 4 and 5 are exempted from participating in the EMS courses and do not have to do the SAL module (though they are encouraged to do so by the MMOE). However, they are asked to stay involved in the buddy support system.

Band 6: Those who obtain this score become resources for their peers. They are “critical friends” within the buddy system (see 3.3.4).
3.3.2 The English Language Training Centre (ELTC)

The English Language Training Centre (ELTC), whose primary function is to provide in-service language training for Mathematics and Science teachers, was set up by the MMOE as part of PPSMI implementation as well. The ELTC was mandated to improve the competence of MST so that they would be able to perform optimally in the classroom and outside it. During the second step of the implementation, the ELTC used a “cascading effect” system to train and transfer knowledge to an ever larger number of personnel within the state educational ministries and schools. For MST of very low proficiency level, the ELTC set up a Language Immersion Programme (LIP).

3.3.3 In-service language training (ETeMS)

Using an ESP approach, the ELTC developed a programme, English for the Teaching of Mathematics and Sciences (ETeMS). Teachers are called up by the District Education Department to attend this course in specific training centres, usually hotels with convention facilities. Since ETeMS courses last from two – four weeks, MST are given leave to be absent from school during this period of time. While the courses delivered within this programme have evolved somewhat due to teacher feedback, the initial focus of this programme was not on how subject content should be delivered in English. Rather, it was to develop the MST’s language skills for accessing information in texts. The programme consisted of two major components: 240 hours of face-to-face instruction along with self-instructional packages.

3.3.4 Buddy support system

A Buddy System was also set up to support the teachers within their teaching environment. Within this system, the MST who is weak in English, the Buddy, is assigned a “critical friend” – someone who is competent in English. This critical friend can be another MST who is fluent in English or an English teacher. In some cases, the buddy may have both these teachers as critical friends. These critical friends function as resource persons who help their buddies solve problems related to language use. Buddy
and critical friend are asked to meet at least twice a month, usually before or after school hours. They are required to have a minimum of four hours of meetings or activities per month. A senior English teacher is usually in charge of coordinating these activities for both English teachers and MST. Written and signed reports of these meetings must be handed in to school administrators every month. Senior Assistants then write a quarterly report on the functioning of the Buddy system for the District Education Department.

3.3.5 Self Access Modules (SAL) for independent language learning

Courseware designed to help teachers in language learning is also available to MST. These language learning lessons, called Self-Access Learning modules, were designed by the Teacher Education Division, MMOE to allow teachers to learn English at their own pace. As mentioned already, only those teachers who are at levels 1, 2 and 3 of the MUET proficiency test are required to complete this series of modules. New teachers who have never taken the proficiency test are recommended to work through the modules as well. Each module is composed of eight themes which are organised into three components: language awareness, reading and writing. MST are told to put in about 5 hours a week and roughly 40 hours per module. They are required to complete 3 modules in all – beginner’s, intermediate and advanced - within six months. MST must fill in a form, SAL Form 1, in duplicate copies, recording their use of the SAL modules and submit it to school administrators every two weeks. The latter are required to monitor the progress of MST by checking these forms and keeping copies of them for random verification by the MMOE, State Education Department or District Education Department officials. Every two months, the school is asked to make a summary of the reports on the use of the SAL modules. The summary is to be given to the District Education Department. MST are required to hand in all their SAL Forms 1 when they re-take their MUET proficiency test. These forms are to be handed in with their exam script. The SAL forms are a component of the evaluation of this proficiency test.
3.3.6 English for Mathematics and Science (EMS)

The Teacher Education Division has also come up with another module called English for Mathematics and Science. This module was conceived to be delivered as a ten-day, two-phase course, facilitated by English teachers. The module is principally made up of seven sections: grammar, pronunciation, vocabulary, classroom, communicative skills, public speaking and instructional language. Activities covering the four skills areas of Listening, Speaking, Reading and Writing are proposed as well. The main focus of the EMS module is to develop teachers’ basic communicative skills and build up their confidence in using English. It is also targeted at enhancing MST’s ability to use classroom language and terminology accurately in order to allow students to follow their lessons effectively. By doing so, it hopes to help teachers in their classroom interactions and the teaching and learning processes.

3.3.7 Laptops, CD courseware and LCD projectors

As part of the PPSMI policy, the MMOE has also made efforts to bring technology to all schools, even those in outlying areas. Most schools have at least one computer lab and all labs are outfitted with an LCD projector. Every MST has also been given a laptop (Notebook) and schools have been furnished with CD courseware. The MMOE produced these teaching CDs in lock step sequence with the gradual implementation of the policy. Therefore, courseware for Form One M & S subjects was made available sometime in 2003, courseware for Form Two in 2004 and so on. Using their laptops, MST are encouraged to create their own teaching materials in English, surf the Internet for content and teaching ideas, and also access other sites for improving their English proficiency. The courseware provided by the Ministry includes explanations of the various ideas and concepts associated with each of the topics teachers are supposed to teach as well as games and interactive activities to do with students. All the course material provided by the MMOE is in English.
3.3.8 *Courses in technology and computer usage*

Teachers involved in PPSMI implementation are also called up for courses to improve their technological and computer knowledge. These kinds of courses are especially important for MST who are not technologically up-to-date. The courses teach MST how to navigate specific software which may be useful for creating teaching materials such as Power Point or Internet Explorer, how to make digital movies, do internet searches, make hyperlinks and so forth.

3.3.9 *Financial and other incentives for MST*

All MST and language teachers are also receiving what is termed BISP [Bayaran Insentif Skim Perguruan (Teacher Incentive Payment Scheme). The amount is equivalent to five percent of the basic salary of these teachers. They are receiving this financial compensation because, as teachers involved in implementing PPSMI, they are required to put more work into learning the language, participate in additional activities after school and also put in extra hours in terms of teaching preparation. They can use the money to buy teaching aids to help themselves or help the students improve their English. They may also use this amount towards English courses in private learning/tuition centres. Dictionaries and grammar books have also been provided to MST to aid in their learning process.

3.4 Support measures for students

3.4.1 *New textbooks*

In cooperation with private publishing companies, the MMOE set guidelines for producing new M & S textbooks in English. These new textbooks replaced the former BM versions. They are written using simple words and short sentences, accompanied by multiple illustrations. The MMOE has made these textbooks available to students, free of charge, under the book loan scheme offered by all national and national type schools.
3.4.2 English for Science and Technology

A new subject, called English for Science and Technology (EST), was introduced into secondary schools. EST courses are taught by the English teachers. As opposed to the regular English language course focusing on linguistic and literary elements that students already take, this new subject focuses on English for technological and scientific purposes. For example, in the Form Four EST syllabus, students are asked to read texts on scientific topics, identify definitions, main ideas or supporting details, transfer information from texts into chart form, expand on notes taken, draw conclusions from facts given and carry out reference work. Grammatical elements such as modals, conditionals, passive voice and so forth are included in the course as well. While listening, reading and writing are all component skills specified in the syllabus, the emphasis of the course seems to be on teaching students M & S study skills such as grasping main ideas of a text or being able to present ideas concisely in note form. EST was compulsory for all Science stream students until 2007, but has since been made an optional subject.

3.4.3 English Language camps

Schools are also asked to organise English language camps for their students. The task of planning and leading these language camps often falls on English teachers. These camps may take place during school holidays or weekends. The activities in these camps are not necessarily academically focused. They are usually meant to be a way to make English fun and accessible to students.

3.4.4 Mathematics and Science camps

The MMOE also encourages schools to organise additional activities to promote students’ learning in M & S. Some schools hold day camps for M & S for this purpose. These camps are supposed to spark student interest in the subjects via interactive games, quizzes and other ways.
3.4.5 Gerak Gempur (Exam Drills)

The MMOE intermittently holds “Gerak Gempur” activities via the JPN. Students are asked to do sets of exam questions for M & S subjects. The questions sets are provided by the MMOE. While this serves the ministry as a means of gauging the progress of students, the MMOE also sees it as a way of making students aware of the SPM questions and helping MST and students in exam preparation.

3.4.6 Program Intervensi

The Intervention Programme is actually a basic revision and exam preparation course that the MMOE introduced for the first time in the year this study was conducted. It is mandatory for schools to run this programme, although there seems to be some leeway on how it can be conducted (either with individual classes or the whole form).

This basic revision and exam preparation course that the MMOE introduced for the first time that year was not welcomed by all MST. A few MST pointed out that this programme was good for teachers who did not have any revision plans or useful for weaker students because it addressed very basic, general skills. On the other hand, those who had actually come up with their own programmes thought theirs were better because it was targeted more specifically at the SPM exams.

Moreover, the materials for implementing it came very late in the school year. The late arrival of the review materials caused scheduling problems for MST who had already planned their own exam review sessions: many end-of-year exam review plans by MST into disarray because the time they had allocated for their own programmes was now taken up by the Intervention Programme.

3.5 Timeline of implementation

In 2003, within one year of the policy announcement in 2002, secondary MST teaching Form One classes Mathematics and Science subjects were required to begin delivering
their courses, which had previously been taught exclusively in Bahasa Malaysia, in English. As this first cohort of students moved up in the secondary system, teaching of M & S was progressively conducted in English at Secondary Two, Three and so on until all students were learning these subjects in English by 2007.

3.6 Conclusion

This chapter has presented the historical factors that shaped the Malaysian educational system, and the current forces that continue to drive educational policy. While the Malaysian educational system has progressed tremendously in the fifty years after its independence, the linguistic, structural and socio-economic situations created in urban and non-urban contexts during its colonial past persist and are aspects that need to be taken into account in considering the implementation of educational change.

From the review of efforts deployed by the MMOE to train and support teachers, it is evident that much thought and planning as well as a vast amount of resources have been devoted to developing the linguistic and pedagogical skills of teachers under PPSMI. However, instead of starting only at Standard One and slowly moving up the grades, the MMOE has decided on a rapid pace of implementation for PPSMI with three entry points (Standard One, Form One and Lower Six Form) at the same time. This means that the MMOE is asking teachers who were educated in Bahasa Malaysia, trained in the subject matter in Bahasa Malaysia and taught Mathematics and Science for many years in this language to become proficient in English fairly quickly. Moreover, as mentioned above, the Malaysian educational system is heavily examination oriented. At the upper secondary level, it requires all students to pass mandatory public exams in order to access subsequent levels of instruction. Students, therefore, must also attain a given level of content and language proficiency in order to succeed in these high-stakes exams.

How are all these factors impinging on the implementation of the PPSMI policy? This is what my study aims to explore. The next chapter will present the methodology that was used to conduct the research.
CHAPTER 4

Methodology of the study

4.1 Introduction

In this chapter, first, the research questions guiding my study are presented. This is followed by the methodology for data collection, the instruments used and why, the participants and the sources of data. Finally, details concerning the data collection procedure and the process of data analysis are described.

4.2 Research questions

My study posed several questions relative to the implementation of PPSMI. The focus is on the MST because, as mentioned in Chapter 2, teachers are the main change agents in most educational systems. Therefore, relative to PPSMI, their perceptions and pedagogical choices determine what kind of content based instruction takes place in M & S classrooms. They are also a key factor in deciding the type of washback effect that happens in classrooms.

As stated in Chapter 1, the broad research objectives aim to see how MST are coping with the linguistic requirements of the PPSMI policy five years after initial implementation, how their teaching practices being modified as a result of trying to prepare students for the bilingual SPM exam and what factors play a role in influencing classroom practices during this process. Six research questions were posed relative to these research objectives. The first two questions concern MST’s perceptions of the policy and the bilingual SPM format. It is important to explore MST’s beliefs and perceptions concerning the PPSMI policy since these aspects influence what MST decide to implement in their classrooms. The other four questions focus on the process of change in classroom practices and the factors that impact on this process. The specific questions under investigation are presented below. For each of these questions, there is an interest in seeing whether urban and out-of-town MST respond in similar or different ways:
1) How do MST perceive the change in language of instruction policy? What are these perceptions based on? Are there differences between urban and out of town (OOT) MST?

2) How do MST perceive the new exit exam? What are these perceptions based on? Are there differences between urban and out of town (OOT) MST?

3) What changes (or perhaps, does not change) in their classroom practices as the school year progresses and the students get closer to taking the exit exam? Are there differences between urban and out of town (OOT) MST?

4) Why do these changes in teaching happen? Are there specific factors which are determinant in the context examined? Are there differences between urban and out of town (OOT) MST?

5) If changes do occur, how do they happen? What is the learning process that these MST go through when they make the transition from their former teaching methods to the ones required by the new policy? Are there differences between urban and out of town (OOT) MST?

6) How do MST change their teaching practices to accommodate the requirements (format and content) of the new exam? Are there differences between urban and out of town (OOT) MST?

4.3 Methodology

A mixed methods approach was used both for data collection and for data analysis in this study (Tashakkori & Teddlie, 2003; Creswell, 2009). The review of the literature has demonstrated that there are multiple facets of change and washback that occur at the systemic level as well as within the school and classroom contexts. It was felt that this methodology would be best suited for capturing the complexity of the processes inherent in educational change. Greene (2007, p.20) has noted that “[t]he primary purpose of a study conducted with a mixed methods way of thinking is to better understand the complexity of the social phenomena being studied.” She includes, under this capacity to generate better understanding, the ability to enhance the validity or credibility of findings; broader, deeper and more inclusive comprehension that does justice to the complexity and inter-relatedness of human activity; and the engaging of multiple perspectives and
lenses to challenge accepted or conventional ideas. As Johnson and Onwuegbuzie (2004) have stated, mixed methods research is “inclusive, pluralistic and complementary…[it] take[s] an eclectic approach to method selection and the thinking about and conduct of research.” For them, what is primordial is the research question; research methods are solutions that work to answer the research question(s) best.

In line with these mixed methods ways of thinking, the study combines methods that are quantitative as well as qualitative in nature. A complex research design was used for collecting both quantitative and qualitative data. This means the data collection process tried to ensure that there could be comparisons made between and within all designated levels and categories across data collection periods and also across the different kinds of data whenever possible. This iterative process made it possible to generate new questions for various participants as the year progressed and also allowed me to find contradictions and “puzzles” (Greene, 2007) in terms of the PPSMI policy, its implementation and what impact the latter was having on teaching and learning in MST’s classrooms.

4.3.1 Research design: Timeline of data collection and data analysis

The mixed methods research design that was used for this study is presented visually in Figure 7. This figure shows how quantitative data (QUAN in the white rectangles) and qualitative data (QUAL in the white rectangles) were collected at different stages throughout the data collection process. Each stage of data collection is marked by the shaded grey rectangles. The black arrows indicate how the data collected at each stage had an impact on the subsequent phases of data analysis and collection.

The analysis of qualitative and quantitative data, represented by the shaded grey ovals, is concurrent with data collection within each stage. However, the light grey arrows show how data analysis also moves back and forth across the different data collection periods or stages.

This research design is principally a sequential exploratory triangulation design (Creswell & Plano-Clark, 2007). It is sequential because phases of data collection follow each other in a specific sequence over time. When regarded horizontally at each stage, this design has concurrent elements, with quantitative and qualitative data collection
happening at each stage. However, when looked at vertically, from pre-fieldwork to T1 to T2 to T3 and post-fieldwork, there is a sequential movement from qualitative to quantitative and back across the different stages or periods of data collection.

Also, as can be seen from Figure 7, the starting point of data collection at the pre-fieldwork stage is qualitative and exploratory. It was important to explore the context because PPSMI is a relatively new policy and the educational system had never before used a bilingual format for its high-stakes exams. Therefore, many elements of the context and implementation measures were not known.

The light grey arrows joining the ovals from Stages 3 to 5 also indicate how data is triangulated within each stage and also across the different stages. Although data analysis from the pre-fieldwork and post-fieldwork stages informed the interpretation of data gathered during fieldwork, arrows showing this relationship are not indicated in order to maintain the visual clarity of Figure 7.

Table 2 provides a specific timeline of when each data collection period took place. It also lists the various sources of data, both quantitative and qualitative, that were obtained throughout the entire data collection process. The data collection and data analysis procedures are explained in greater detail in sections 4.3.6 and 4.3.7 respectively.
Figure 7. Mixed methods research design for the study
Table 2 *Timeline for data collection and the types of data from various sources*

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4.3.2 Instruments

The instruments used for collecting quantitative and qualitative data are described in this section. The quantitative instrument is described first, followed by descriptions for qualitative instruments.

4.3.2.1 Quantitative data

To obtain quantitative data, a survey using a two-part questionnaire was used. For more details on the questionnaire, see APPENDIX A for the English version and APPENDIX B for the BM version during the first period of data collection (T1) and APPENDIX C and APPENDIX D for the English and BM versions respectively during the third period of data collection (T3).

The first section asks teachers for information concerning MST’s academic background, teaching experience and school linguistic environment. The second section comprises 31 statements. Each statement is accompanied by a four-point Likert scale. An example of one of the questions as it appears in the questionnaire is given below:

13) **English** is the best language for teaching Mathematics and Science.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Agree</td>
<td>Strongly agree</td>
</tr>
</tbody>
</table>

Comments: ________________________________________________________
__________________________________________________________________

This scale was deliberately set up to avoid ambiguity, that is, no fence sitting, in MST’s responses. The comments space was provided after each statement so that teachers could give a more nuanced view of their choices. One page is provided at the end for extended comments. Two versions, one in English and the other in Bahasa Malaysia, were made available to participants.

The statements in the questionnaire were formulated to represent six specific clusters:

1. What teachers think of the policy of teaching Maths and Science in English [S1, S2,
2. Their perception of the support/resource provided to aid policy implementation [S3, S8, S9, S10]

3. Their perception of their own linguistic competence [S4, S6, S16, S17, S20, S21] and content mastery [S15]

4. Their impressions of students’ content mastery and linguistic competence [S5, S7, S11, S12, S18, S19, S22, S23]

5. Their opinion of the SPM examination papers as testing instruments [S24, S25] and

6. Their perception of students’ exam preparedness [S26, S27, S28, S29, S30]

These clusters had been determined based on the literature on educational change which states that factors such as personal ability, support and resources, as well as factors within the teaching environment such as student ability and exam pressure can impact the capacity of teachers to effect change in their own practice.

Statement number 31 is a “stand alone” item. It was built into the questionnaire to allow the researcher to have some flexibility in terms of asking MST their opinions concerning new measures or announcements made by the MMOE. (These sudden changes happen when the MMOE adjusts implementation measures in order to improve MST’s linguistic proficiency or students’ academic performance.) Therefore, statement 31 for T1 and statement 31 for T3 are not the same. The scores for this statement are not taken into account for the statistical analyses conducted on T1 and T3 data.

Most, but not all of these statements were usually constructed as matched pairs to see if MST had any preference or saw any difference between English, the present language of instruction and Bahasa Malaysia, the language of instruction they had used in the past. An example of such a pair is given below:

S18: My students are able to verbally formulate and express ideas related to the content of Mathematics or Science courses in English clearly.

S19: My students are able to verbally formulate and express ideas related to the content of Mathematics or Science courses in Bahasa Malaysia clearly.
The numbers selected by MST for the statement are used as scores for each cluster of statements. The higher the score for each cluster, the more positive the perception of the MST is concerning that particular factor. Also, the higher the total score for all the items, the more positive the teacher’s experience is of PPSMI and its implementation.

4.3.2.2 Qualitative data

Several instruments were used to collect qualitative data. These are described in greater detail below.

4.3.2.2.1 Questionnaires

The written comments of MST were of two types. The first were shorter comments, responding to each individual statement, S1 – S31. The second were longer comments that MST made at the end of the survey. These were MST opinions, and sometimes suggestions, on the policy in general.

4.3.2.2.2 Classroom observation grid

MST were observed and videotaped while doing classroom teaching in two case study schools. An observation grid was filled in as teaching occurred. For details concerning the observation grid, please refer to APPENDIX E.

This observation grid was created to capture the presence or absence of specific kinds of teacher behaviour which were considered helpful in the implementation of PPSMI during classroom teaching. These types of behaviour included the use of advance organisers, providing verbal and non-verbal linguistic support for students, supplying audio, visual and/or multimedia support of concepts being learned, appropriate use of manipulatives or equipment, and also any other kinds of supportive pedagogical behaviour.

4.3.2.2.3 Interview questions

The format as well as the kinds of questions posed to participants during interviews is presented in the sections below.
4.3.2.3.1 MST interviews

In the interview with MST during T1, the researcher used a small set of questions. For details on some of the interview questions, see APPENDIX F. These questions were designed to:

1) find out about the teachers’ academic background and teaching experience,
2) elicit MST’s impressions of the PPSMI policy
3) explore their views of the school administration and the resources available for aiding implementation
4) obtain information about their students’ socioeconomic and linguistic backgrounds as well as their academic performance due to the implementation of PPSMI
5) inquire about their views concerning the bilingual SPM exam papers and students’ exam - preparedness

Before the start of each interview, I reiterated the purpose of the study, and reminded participants that although they had signed consent forms, they were free to withdraw from the study at any time. These interviews were digitally recorded.

4.3.2.3.2 Student interviews

Form Four and Form Five students from the two schools were also interviewed in small groups. For details on the student interview questions, see APPENDIX G. The protocol used with MST, described in 4.3.1.2.3.1 above, was also employed with the students. Although some questions were prepared in advance, these sessions with students were more open-ended as I wanted to explore what students thought of their experience of learning M & S in English. The group interviews for SMK Gaharu were all digitally recorded. In SMK Kayu Manis, these interviews were all recorded during T2, the second period of data collection. However, for the final period of data collection, T3, the interview with one group was not recorded because some of the students had looked uncomfortable with the digital audio recorder on the table during their T2 interview.

Interview data was iterative, in the sense that, although new queries arose based on classroom observations and new developments in terms of policy implementation, the same issues were re-visited over T1, T2 and T3 to see if MST and student views and opinions had changed over time.
4.3.3 Choosing data collection instruments

4.3.3.1 Why surveys?

The survey method was chosen as one of the means of obtaining data because it was important to get an impression of how MST in general felt about the policy in its fifth year of implementation. Also, since PPSMI is a nationwide policy, the survey allowed for the possibility of variation in perception depending on the region studied. Given the constraints of time and resources, the survey could provide an overview that would serve as an important backdrop to the specific details observed in the case study schools.

4.3.3.2 Why case studies?

The choice of the case study as a method of data collection was influenced by the particular embeddedness of educational policy as it takes place within a school culture. This, therefore, necessitated the study not only of the phenomenon but also the context. Stark and Torrance (2005) comment that this method aims to “engage with and report the complexity of social activity in order to represent the meanings that individual actors bring to those settings and manufacture in them.” By placing myself in the daily routines and working conditions of MST, the case study allowed for better comprehension of how factors such as support of school leaders, pedagogical resources, time, student ability and other demands placed on these teachers play a part in how they decide to implement PPSMI in their classrooms. However, as Ragin and Becker (1992) have mentioned, the boundaries of a case do not stop at the physical delimitation of the school compound. For them, in addition to studying the actions of participants, it is important to examine the social and historical context of action as well.

4.3.3.3 Why interviews and observations within the case studies?

In many ways, interviews and observations are a natural complement to the case study context. This is because the researcher is in the participants’ daily activity contexts, which makes it easier to see what participants do and consequently, to ask them questions about what they do.
Taylor and Bogdan (1998) specify that interviews are useful in research contexts where the researcher’s interests are fairly well-defined. It is the case with this study, since the focus of the research is specifically the PPSMI policy and the impact of its implementation. Johnson & Turner (2003) have remarked on the advantage of the interview as compared to the questionnaire – the interviewer (researcher) is able to ask the interviewee (participant) for more details or clarification if they feel that a response was not clear. I decided on interviews with MST in order to obtain more insight into how individual teachers felt about their own process of policy implementation. It was felt that this method gave teachers a voice in expressing what they experienced in their specific context. The semi-structured format allowed me to introduce elements I considered as important, but also gave me and the MST the freedom to explore other topics as they arose in the conversation. The interviews were also crucial in giving voice to students, those in the educational system who, in the end, are most affected by this change in policy. In the case of students, the group interview format was chosen because it was felt that students would be less shy speaking to me when there were other peers around. I also felt that the group format would offer students more anonymity.

Classroom observation was another method of choice because these observations are the key to understanding, not how the PPSMI policy is supposed to unfold, but how it really is unfolding in Malaysian classrooms. As Taylor and Bogdan (1998, p. 90) note, “no other method can provide the depth of understanding that comes from directly observing people and listening to what they have to say at the scene.” Observations permitted a more in-depth look at the practices that MST described in their interviews and also provided a window on student abilities and how they are reacting to this policy. Moreover, it also allowed the validation of teacher impressions of their own classroom teaching against the responses of their students: did these converge or diverge? The triangulation of teacher, student and researcher perspectives provided a more balanced, reliable portrait of what actually happens in class.

Jones and Somekh (2005) list some of the difficulties involved in conducting observations, namely that it is practically impossible to record all the researcher’s impressions, and also, that the researcher is engaged in the multiple processes of collecting sensory data while interpreting and making sense of observed behaviour and
events. Taking this into account, therefore, choices were made beforehand regarding what were points of interest to observe and record. The concrete result of these choices was an observation grid of the essential elements to look out for as teaching took place in class (See APPENDIX E).

4.3.4 Sources of data

The instruments described above yielded multiple sources of data. These include:

- Survey results: The results from a questionnaire administered to MST in three states consisted of both quantitative (scores) and qualitative (comments) types of information.
- Interview transcripts from digitally audio-taped interviews and notes from unrecorded interviews
- Coded and transcribed videos of classroom observations
- Observation grids of classroom teaching
- Informal chats with teachers and students
- Field notes
- Field documents

4.3.5 Participants

The participants for the study can be divided into two categories. The first category of participants took part in the survey. The second category of participants came from the two case study schools. Details about these two categories of participants are provided below.

4.3.5.1 Quantitative Data (Survey)

The participants who filled out the survey were Form Four and Five MST in 41 secondary schools from three states on the West Coast of Peninsular Malaysia. These states were chosen to each represent one of the zones along the West Coast—North (Penang), Middle (Perak) and South (Johor). The schools of these MST were either
classified as urban or out-of-town (OOT). These teachers taught either the Sciences (Biology, Chemistry, Physics, Science) or Mathematics (Additional Mathematics, Mathematics) or a combination of these subjects. Table 3 shows the number of urban and out-of-town schools from each state:

Table 3 Number of schools per state

<table>
<thead>
<tr>
<th>STATE</th>
<th>URBAN SCHOOLS</th>
<th>OUT-OF-TOWN (OOT) SCHOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PENANG</td>
<td>9**</td>
<td>6</td>
</tr>
<tr>
<td>PERAK</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>JOHOR</td>
<td>7*</td>
<td>8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>22</td>
<td>20</td>
</tr>
</tbody>
</table>

* During T1, one of the urban schools in this state lost the surveys due to a clerical error. This school was subsequently dropped from the T3 survey.
++ During T3, one of the urban schools experienced a problem with the postal service and the researcher did not receive the questionnaires that were sent. This school was dropped and replaced by another school.

4.3.5.2 Qualitative Data (Case Studies)

The MST for the case studies came from two of the twelve schools in the middle state of Perak. All names of schools, principals, teachers and students used in this study are pseudonyms. The pseudonyms I have given to the two schools are Sekolah Menengah Kebangsaan Kayu Manis or SMK Kayu Manis (Kayu Manis National Secondary School) and Sekolah Menengah Kebangsaan Gaharu or SMK Gaharu (Gaharu National Secondary School). Like the majority of schools in Malaysia, both are public day schools financed by the government. SMK Kayu Manis is located in an out-of-town
area and SMK Gaharu is a town school. The participants from both schools are shown in Table 4.

**Table 4 Participants in SMK Kayu Manis and SMK Gaharu**

<table>
<thead>
<tr>
<th>SMK Kayu Manis</th>
<th>SMK Gaharu</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 F4 &amp; F5 MST</td>
<td>6 F4 &amp; F5 MST</td>
</tr>
<tr>
<td>Buddy System Coordinator</td>
<td>Buddy System Coordinator</td>
</tr>
<tr>
<td>Head of M&amp;S panel</td>
<td>Head of M&amp;S panel</td>
</tr>
<tr>
<td>Exam coordinator</td>
<td>ESL teacher</td>
</tr>
<tr>
<td>13 F4 and F5 students</td>
<td>10 F4 and F5 students</td>
</tr>
<tr>
<td>Principal</td>
<td>Principal</td>
</tr>
</tbody>
</table>

The following paragraphs provide more general details concerning the participants in both schools.

4.3.5.2.1 *SMK Kayu Manis participants*

As indicated in Table 4, in SMK Kayu Manis, the principal, seven MST, the Buddy System coordinator, the Head of the Math and Science panel and the exam coordinator participated in the study. The pseudonyms of the seven MST who participated in the study and the subjects they teach are listed below in alphabetical order:

- Mr. Ang – Chemistry (Form Five) 5ST1, 5ST2 and Form Six classes
- Mr. Ho – Physics (Form Five) 5ST1 and Form Six classes
- Encik Nasir – Maths and Additional Math (Form Four) 4ST1
- Mr. Ramachandran – Maths and Additional Math (Form Five) 5ST1 and 5VT1
- Puan Sarjit – Science and Biology (Form Five) 5VT2
- Puan Sharifah – Maths (Form Four)
- Puan Zaitun – Chemistry (Form Four) 4ST2
Of the seven MST, complete data sets, meaning interviews and class observations for all three periods of data collection, are only available for Mr. Ang, Mr. Ho and Puan Sarjit. For Encik Nasir and Mr. Ramachandran, interviews were conducted during T1, T2 and T3. However, Encik Nasir’s class was doing their final exams and Mr. Ramachandran was summoned out of school during T3. Therefore, classroom observation was not possible during that data collection period. Puan Sharifah and Puan Zaitun were interviewed and observed during T1. However, Puan Zaitun was too busy to participate further on in the year and asked to be dropped from the study. Puan Sharifah asked to be only interviewed during T2 and T3. The principal, Encik Syafirul, and the exam coordinator, Puan Eliana, were interviewed during T3. The Head of the Math and Science panel, Mr. Chan and the Buddy System Coordinator, Puan Salwa, were interviewed during T1.

Group interviews were also conducted with thirteen Form Four and Five students. The pseudonyms given to students interviewed are listed below:

- **5ST1**: Hong Teck, Chong Ming, Mokhtar, Farid, Halimi, Salina [T2 and T3 interviews]
- **4ST1**: Fauziah, Azlina, Nurhidayah, Syimah [T2 and T3 interviews]
- **4VT2**: Leela, Boon Hui, Syamsul [T2 interview]

Interviews were also conducted with a group of Lower Six Form students but the data will not be presented here.

### 4.3.5.2.2 SMK Gaharu participants

In SMK Gaharu, the principal, six MST, the Head of the Math and Science Panel, the Head of the English Panel and Buddy System coordinator, the IT coordinator and one ESL teacher participated in the study. The pseudonyms of the six MST and the subjects they teach are listed below in alphabetical order:

- Mrs. Chia – Add Maths and Maths (Form Four) 4S1
- Encik Hamdan – Add Maths and Maths – (Form Five) 5S1 and 5KS2
- Puan Salmiah – Chemistry – (Form Four and Lower Six Form) 4SE1 and Lower Six
- Puan Shafina – Chemistry – (Form Four) 4SE1 and 4SE2
- Mr Wong – Physics – (Form Five) 5S1 and 4S1
- Encik Yusri – Add Maths - (Form Four) 4S1

Of the six MST, only two complete data sets were obtained – from Mrs Chia and Encik Hamdan. Mr. Wong and Encik Yusri were both interviewed during T1, T2 and T3. However, Mr. Wong’s class was attending exam preparation sessions and Encik Yusri had already completed his syllabus during T3 data collection. Puan Salmiah was interviewed and observed during T1 and T3, but had been relieved of her Form Four class in order to take charge of a Lower Six Form Chemistry class in the middle of the year. Puan Shafina had been recruited to participate during T2 because the researcher wanted to see how teaching for a Form Four Chemistry class proceeded during the middle of the school year. Although she spoke to the researcher after class observation concerning the PPSMI policy, she declined to be interviewed. The principal, Encik Shukri, was interviewed during T3. The Head of the Math and Science Panel, Puan Halimah, and the Head of the English Panel, Encik Amiruddin, who was also the Buddy System coordinator, were interviewed in T1. So was the IT coordinator, Encik Tarmizi. The ESL teacher, Mr. Yip, was interviewed and observed teaching (no videotaping) during T1.

As in SMK Kayu Manis, group interviews were also held with students in SMK Gaharu. The pseudonyms given to the nine students who participated in the interviews are provided below:
- 5S1: Ru Jie, Shahril, Surinderan (T2 and T3 interviews)
- 5KS2: Karim, Hafizi, Mohandas (T2 and T3 interviews)
- 4S1: Wei Yang, Muralee, Khalid (T2 and T3 interviews)
4.3.6 Data collection procedure

4.3.6.1 Getting ethical approval

The first step in the whole data collection process was getting ethical approval from McGill University to conduct research. This certificate allowed research to be conducted for a year. A renewal for the ethical certificate was obtained because the entire duration of the study, from the process of getting approval to fieldwork itself, exceeded one year.

4.3.6.2 Getting permission to do research in Malaysia

Prior to doing field work, I was required to go through the Economic Planning Unit (EPU) within the Prime Minister’s Department and the Educational Planning and Research Department (EPRD) to get a Research Pass from these bodies to conduct research in Malaysia. As part of the requirements for obtaining a Research Pass, I was required to submit a proposal, provide proof of funding and also find a local research counterpart in a Malaysian university who would ensure that I worked in accordance with the rules set down by the EPU.

Through a friend, I met Dr. Ong Saw Lan, a lecturer in the School of Educational Studies, Universiti Sains Malaysia, who agreed to take on the role of local research counterpart. Through the various phases of the study, I kept Dr. Ong informed of my plans, as required by the EPU. As part of the EPU approval process, I also was registered as a visiting researcher in Universiti Sains Malaysia. Specific restrictions on how data could be interpreted and reported were also set by the EPU in this letter (See APPENDIX H on sensitive issues).

While the first contact with EPU personnel was via e-mail and subsequently by phone, I was required to go in person to the offices of the EPU in Putrajaya, the government administrative city, to submit the application. I would be able to obtain the permit, if all went well, on the same day. After verifying that all was in order, the EPU issued the Research Pass upon payment of a processing fee. I was expected to display the pass, which resembled a large ID tag, with name, photo, title of the study and validity.
dates, when I presented myself at any of the data collection sites. The entire process, from first contact to the emission of the Research Pass took about six months.

With Research Pass in hand, I obtained a Professional Visit Pass from the Malaysian Immigration Department. This immigration document permitted me to stay for the entire duration of the data collection process without leaving the country. The next step was to go to State Education Departments in three states to seek permission for data collection in schools. This process was fairly rapid because I went in person to the State Education Departments’ offices. Upon verification of the necessary documents, the officers of these departments issued a letter of introduction for the attention of principals or senior assistants. Each of the letters gave the department’s approval, stated the name of the researcher, the title of the research project and the initial source of permission – EPU. However, every state also placed specific restrictions on the research project. One state, Penang, for example, stipulated that no research could be conducted with students who were in the exam grades, that is, Forms Three, Five and Upper Six. This automatically ruled it out as a possibility for qualitative data collection.

4.3.6.3 Duration of the study

Data collection took place over the course of one school year from the months of January to November. Three periods of data collection were designated. The first period, $T_1$, was at the beginning of the school year. Data collection started in late January and ended in mid April. The second period, $T_2$, was in the middle of the school year. Data collection in $T_2$ ran from July to August. The third and final period of data collection, $T_3$, happened at the end of the school year, when the SPM exams are just about to take place, from October to November.

4.3.6.4 Data collection process

4.3.6.4.1 Pre – fieldwork

Before fieldwork began, there was an initial phase where qualitative data on the context in which PPSMI was being implemented was examined. This was necessary
because PPSMI is an ongoing policy and I was interested in knowing how educators and the public perceived it at that point in time. It was also important because the MMOE often made changes or announced new strategies to improve the implementation of PPSMI. The data included documents such as country reports on the state of education in Malaysia and newspaper articles reporting on press conferences called by the MMOE concerning PPSMI or information regarding the performance of students in Maths and Science on public examinations. Informal conversations with friends who had children in the educational system and family members in the teaching profession also helped to ground the research more clearly in its context.

4.3.6.4.2 Fieldwork: T1 and T3

The process of data collection during T1 and T3 was similar, alternating between quantitative and qualitative. It began with the administration of the survey in the two states situated in the northern and southern Malaysian states where the case studies were not located. This was by design as well as by necessity. Firstly, it was by design because it was felt that the insights provided by survey responses would be helpful in broadening the scope of questions posed to case study participants and providing further insight into what was being observed in the case study schools. It was also by necessity because the distance of these two states from the case study sites made it impractical in terms of time and financial resources to conduct the two kinds of data collection concurrently in all three states. However, in the state where the case studies were located, the surveys were administered in the same period of time that I was conducting the case studies.

4.3.6.4.3 Fieldwork: T2

During T2, data collection was qualitative only. Therefore, I was able to focus on the two case studies. It was in T2 that I managed to chat informally with students in the school corridors and obtain the first group interviews with students. Although a survey had been planned for this data collection period as well, it was dropped because I had noticed in T1 that teachers, especially those involved in PPSMI implementation, had
extremely busy schedules. In the states where data collection took place, I was also in competition with local graduate students whose principal means of data collection was the survey method. This meant that teachers could be solicited to answer two or three surveys in the space of one or two months. Since data for T3 was critically important for the purposes of this longitudinal study, the planned T2 survey was cancelled in order to minimise the risk of attrition during the final period of data collection.

4.3.6.5 Fieldwork procedure

4.3.6.5.1 Survey Administration

In every state, from lists provided either by the state or district education department, two groups of schools were selected. Each of these groups was designated either urban or out–of–town. Within each group, for every state, there were a minimum of six and a maximum of nine schools. The first group refers to urban area schools, meaning that they are situated in towns or cities with a high population density, a good system of infrastructure and public services. The second group consists of out-of-town schools in areas with low population density. These schools are located in areas where infrastructure and public services, while they exist, may be less extensive or of a relatively lower quality.

Batches of 6 – 30 questionnaires were hand delivered to each school between late-January and early March, 2007 during the first period of data collection. In order to get permission to have these distributed to MST, I was required to meet either the principal or one of the senior assistants. During the meeting, I would present my research pass and the letter from the relevant JPN (State Department of Education) and explain the purpose of the research. The questionnaires were left with the principal, senior assistant or Head of the Math and Science panel in every school. The number of questionnaires to be completed was determined by these individuals based on their estimate of the number of MST they had in the school. The choice of language for the questionnaires was usually made by these individuals as well and not by the teachers themselves. These questionnaires were either collected in person or returned by mail using a stamped, self-
addressed envelope which I had provided. The same procedure was repeated for the third period of data collection.

4.3.6.2 Recruitment of case study schools

The case study schools were recruited from among the schools surveyed. As mentioned earlier, schools from the one of the states were automatically ruled out due to the interdiction by the state department regarding research in exam year classes. This was the first state in which questionnaires were distributed. In the second state, I raised the possibility of conducting research with the principals of several schools in the urban area before one of these said, “Yes”. The same process was repeated for schools in out-of-town areas.

4.3.6.3 Participant recruitment in case study schools

In order to recruit participants, I obtained a list of teachers who were teaching Form Four and Form Five M & S from Head of the Mathematics and Science Panel. I approached each MST individually to explain the purpose of my study and to ask if they would be interested in participating. Before any interviews or observations with any of the participants took place, they were asked to sign a consent form (See APPENDIX I).

4.3.6.4 Interview and observation procedures

In each of the case study schools, Form Four and Five MST were observed and interviewed once over three periods of data collection: at the beginning of the school year from January to April, in the middle of the school year from July to August and at the end of the school year, from October to November.

Interviews usually took place during MST’s free periods in the school staffroom or any other available room. The interviews were digitally recorded. Observations of classroom teaching were generally conducted before the interviews, but due to the teachers’ time constraints, this order could not always be respected. Depending on the type of lesson being conducted, these observations took place either in science labs or
classrooms. I always placed myself at the back of the class, out of the direct line of vision of the students, in order to disrupt classroom activities as little as possible. All observations were videotaped. I also completed an observation grid as the lesson progressed. In addition to interviewing and observing the teachers in class, I spent one to two weeks in each school, getting to know more about the school [its history and ethos, and also the physical surroundings], its staff [teaching and support staff as well] and students. Interviews with students took place during the second and third period of data collection. During the first period, they had come to know me better and had become less shy with me when I did data collecting during the second and third period. The students and their parents did not sign consent forms because school administrators did not deem it to be necessary and would not allow these forms to be distributed to the students. For them, permission from the EPU, JPN and the principal were sufficient.

I interviewed English teachers in each school as well because they play an important part in the implementation of PPSMI. For example, the Buddy Support System coordinators in both schools were English teachers. One English teacher who taught EST (English for Science and Technology) in SMK Gaharu was also interviewed and observed (without videotaping) doing classroom teaching. In each school, I attended and took notes on one English for Maths and Science (EMS) training session conducted by English teachers for MST as part of the Buddy Support System in each of these schools. In addition to that, I also sat in on a session of the Intervention Programme at the end of the school year in SMK Kayu Manis.

4.3.6.5.5 Taking field notes

During free time in between interviews and observations, I also made field notes, which constitute additional sources of information. These notes were scribbled onto paper as I walked around the schools. Sometimes, they were written up after informal chats with teachers in the staffroom and school corridors. These chats were helpful in providing insight into certain aspects of the policy, teacher opinions and teaching practices. The notes written up about these chats were then shown to the teacher(s) concerned. If they found that the notes accurately reflected what they had said,
permission was then obtained from them to use this data. Informal conversations with students were sources of qualitative data as well. These talks occurred with individuals and also groups of students. The students often asked more questions than they spoke since they were curious about me and my project. Their lighthearted chatter sometimes provided interesting perspectives on students’ academic motivation and sometimes confirmed, extended or even negated what MST or other teachers said about them.

4.3.6.5.6 Obtaining field documents

In addition, I was able to obtain many kinds of field documents pertaining to PPSMI and its implementation while I was in my case study schools. The two main types are presented below:

1) Field documents 1 (hard copy/paper format) – Thanks to the gracious cooperation of the MST in SMK Kayu Manis, I was able to obtain early versions of the ETeMS training manuals and workbooks. The Buddy Support System coordinator, an English teacher in this school, also kindly made available materials that were used during meetings between buddies and their critical friends as well as a booklet containing the EMS programme and description of activities conducted at a previously held language training camp for students. In SMK Gaharu, I also had access to circulars sent out by the MMOE, JPN or PPD (District Department of Education) that were related to the implementation of PPSMI and the Buddy Support System. I took notes of these documents as I was requested not to remove them from the staff room or make any photocopies of them. When I attended an English for Mathematics and Science session organised by English teachers for MST in this school, I took notes and obtained copies of materials the MST had been asked to prepare and present at this session.

2) Field documents 2 (digital format) – The Heads of the Math and Science Panel in both schools also generously allowed me access to the CDs for PPSMI subjects supplied by the MMOE. Therefore, I was able to view a selection of teaching segments and student activities/exercises and make notes concerning these pedagogic materials. I also obtained a CD of the Self-Access Learning (SAL) Modules that the MMOE provides to help MST improve in English at their own pace and was able to examine that as well. In addition, the Head of the Math and Science Panel in SMK Gaharu gave me an e-copy of the PPSMI implementation plan for the school. This plan had been put together by the members of this panel in order to speed up and strengthen the practice of teaching Mathematics and Science in English.
3) *Field documents 3* – Finally, I also photocopied some SPM bilingual question papers of various M & S subjects from previous years. For sample questions, see APPENDIX J.

### 4.3.7 Data Analysis

Data analysis was a process that was concurrent with data collection within each data collection stage. This was because of the fact that quantitative and qualitative data followed each other sequentially and also because there were three periods of data collection that spanned a period of one school year. Therefore, when the questionnaires were in the process of being returned to me, qualitative data collection had already started. As the results from the questionnaires were being entered and underwent an initial analysis, parts of the qualitative data were also being gathered and undergoing a preliminary analysis. As well, because the qualitative data and quantitative data examined a process of change throughout the school year, data analysis proceeded in iterative loops backwards and forwards. This means that sometimes that I was able to compare data, moving from quantitative to qualitative and back, within the same period to broaden and deepen my understanding of the responses to the questions posed. I was also able to do this across the different data collection periods as the year progressed. Sometimes, this iterative process also raised new questions which were incorporated into the following data collection period or led to more questions which necessitated drawing on various strands in the quantitative and/or qualitative data in order to see a pattern.

#### 4.3.7.1 Quantitative data

**4.3.7.1.1 Questionnaire**

Each questionnaire was marked with a code indicating the state, the zone and the period of data collection. All of them were marked with a specific number as well. Participants’ responses on the Likert scale were entered into a spreadsheet. All missing values were indicated on the spreadsheet using an asterisk. The comments from all participants were grouped according to the statement responded to and typed up on a
separate document. Each comment was coded to indicate the state, zone, data collection period and questionnaire number. I sometimes typed notes to myself beside certain of these comments which either struck me as interesting – a new aspect to follow up on with the qualitative data, contradictory – therefore raising questions to further investigate, or simply supporting what had been seen in classrooms or heard in the interviews. From the information provided in the MST background section, MST were given scores of 1, 2, 3 or 4 according to their years of teaching experience. This score was given a code name – TER. Their responses concerning their schools’ linguistic environment were added up to make one total score. The higher the score given by the MST, the more present English is in the school environment. This score was also given a code name – LER.

4.3.7.1.1 Descriptive statistics

After this initial step, the responses from the participants for each statement were tabulated and converted into percentages. The percentages were then tabulated and graphed to allow a better view and understanding, at a glance, of how the responses were distributed across the two groups of participants. Since the responses are actually on a binary scale, the two categories of agreement (Agree, Strongly Agree) and disagreement (Strongly disagree, Disagree) respectively, were collapsed to allow for easier discussion of the results.

4.3.7.1.1.2 Multivariate Analysis of Covariance (MANCOVA)

Survey questions had initially been grouped into clusters as described above in the instruments section (4.3.1.1). Multivariate Analysis of Covariance (MANCOVA) using the GLM procedure was run on the data to see if there were significant differences in the patterns of response of teachers to the statements. MST’s years of teaching experience, TER, and the school’s linguistic environment, LER, were used as covariates in the analysis. Categorical variables that were of interest were responses by data collection period (T1 and T3), by area (urban or out-of-town) and by subject taught. These categorical variables were coded respectively as Period, Area and Subject.

In order to obtain the dependent variables, first each cluster in the questionnaire was given a code name. These names are listed below:
Then, the scores for individual statements belonging to each cluster were summed up. For example, for cluster 1, concerning policy and implementation, the scores for S1, S2, S13 and S14 were added together to obtain one score for PolicyP. These transformed scores were the dependent variables.

4.3.7.1.3 Exploratory Factor Analysis

An exploratory factor analysis was done to see what the underlying constructs responsible for the pattern of responses by MST were. I was interested in verifying if these constructs corresponded to the clusters of statements that I had established. As a preliminary step, the Kaiser-Meyer-Olkin Measure was used to check for sampling adequacy. Bartlett’s Test of Sphericity was also conducted to see if there were significant correlations among the items examined. These tests were performed to confirm that factor analysis was indeed appropriate for the data set.

4.3.7.2 Qualitative data

4.3.7.2.1 Documents analysis

This step was done prior to field work, concurrently with data collection as it happened in SMK Kayu Manis and SMK Gaharu, and also post-data collection as described in the data collection procedures. These documents were examined to understand the MMOE’s vision concerning the PPSMI policy; the kinds of timelines it imposed for policy implementation; the kinds of training and support provided to MST; SPM exam policy relating to PPSMI; the syllabus for Form Four and Five M & S and English courses; the format of SPM questions; and other relevant details.
These documents were initially sorted into the specific categories of information to which they belonged (for example, policy announcement, SPM exam requirements and so forth). Each document was then analysed to identify sub-categories of interest. These sub-categories were highlighted and then coded for easier future reference. A portion of the information obtained from this analysis has already been presented in Chapter 3 (see 3.2.5 to 3.5).

The types of documents I examined are described below.

4.3.7.2.2 Pre-field work

I surfed the MMOE website often for information pertaining to the overall vision of the Ministry concerning education, information about PPSMI and also for contact information of various state Departments of Education. Since the MMOE often makes policy announcement via press conferences given to reporters, media such as newspapers and television was often scrutinised for articles and reports on changes to and progress reports on the PPSMI policy or results of the students in public exams such as the UPSR or PMR. The letters section and opinion columns of daily newspapers were also perused to have an idea of public reaction to the policy announcements. I also looked at SPM papers from M & S subjects to have an idea of the format and kinds of questions students were asked to answer.

4.3.7.2.3 During data collection

While on site, either in SMK Kayu Manis or SMK Gaharu, I had the opportunity to examine various kinds of texts and documents that MST and English teachers receive in connection to the policy. Information from all these sources was highlighted if paper copies were used or typed onto a Word document if digital copies were provided. They were later compiled and classified by different categories such as support for MST, adjustments to policy and so on. These documents were not analysed in any particular
order – it sometimes depended on when teachers could bring in their materials, if copies of the material were available (teachers could be using the CD courseware for their teaching, for example), and also whether the documents could be removed from the school premises – if this was not possible, then I had to arrange for a time to examine these materials and to return them by the end of the day.

These documents and texts include:

1) circular letters sent by the MMOE or State Education Departments to schools with instructions on implementing the PPSMI policy

2) training manuals used in the earlier versions of ETeMS courses for MST

3) the syllabus requirements for various M & S subjects

4) the syllabus requirements for EST

5) teaching materials – textbooks, CD courseware, exam revision books

6) materials for the Gerak Gempur (Exam Drill for M & S subjects run by JPN) and also the Diagnostic exams

7) forms and documents related to the Buddy system and also EMS

8) programmes for language camps for students

9) calendar of in-school programmes related to exam preparation

10) documents related to the history, vision and mission statements, academic and sporting traditions, staff and students

11) various announcements put up on notice boards around the school

4.3.7.2.4 Post fieldwork

I continued to peruse local newspapers for comments and reactions from the public to PPSMI. Of special interest was the release of the 2007 SPM results in March of 2008
and the facts and figures related to the performance of students. I was also interested in knowing the reaction of parents, students and teachers to these results.

4.3.7.2.5 Interviews

Every interview was digitally recorded. I listened to each interview in its entirety twice to identify points of interest. Then, a selective transcription of the previously identified parts of the interview was carried out. The transcription was read through and specific parts of the text were bolded or highlighted in different coloured fonts. Each colour represents a specific category to which the statements belong. This procedure was followed for every transcript. These statements were later grouped under specific themes that arose as a result of the analysis. A constant comparative method was used to compare individual MST’s responses across data collection periods. The same method was used to compare different MST’s responses within the same data collection period. It was also used to compare and contrast the responses of MST across participants across data collection periods.

4.3.7.2.6 Classroom observations

All classroom observations of math and science teaching were videotaped. Each tape was marked with the code name of the school, the data collection period, the date, the teacher’s code name, the class being taught and the subject taught. It was viewed once as it was transferred onto a laptop and then burned onto a CD. It was viewed again before any coding or transcription began. The initial step towards coding began with identifying and marking out sections of the lesson (introduction, review, explanation, student activity and so forth). Then these sections were viewed to identify parts where teaching had happened in English and where it took place in Bahasa Malaysia. The length of each of these was determined and noted down. This was done to determine the percentage of time teachers spent teaching in one or the other of these languages during the lessons observed. The amount of time spent on teacher talk in the lesson, as compared to student talk, was also recorded. After this, I re-read the observation grid that had been filled in
during classroom observation. The grid often has notes on specific incidences of language use (by both students and teacher) that happened during teaching. It was therefore helpful as an advance organiser of sorts for more detailed coding. Each section was viewed several more times to determine how teachers transition from one language to another: Was it code-switching, translation or something else? Did it happen unprovoked? Was it prompted by a student’s verbal request? Did students respond using sentences, phrases or just one or two words? Were students able to participate in English during the lesson? How much time did teachers spend teaching in English as opposed to teaching in BM? These were some of the aspects that were of interest.

After the videos were coded for linguistic events, the observation grid was read again for notes on mention of the SPM, and/or tips on answering SPM questions or doing past year SPM questions with students in class. The videos then underwent another viewing to determine how or if MST prepared their students for the SPM in their teaching. For each MST, their pattern of language use and exam preparation during classroom teaching was compared over the three data collection periods. These patterns were compared across MST within the same school as well as between the two case study schools.

The results of the quantitative and qualitative data collected are presented respectively in Chapters 5 and 6.
CHAPTER 5
Presentation of Quantitative Results

5.1 Introduction

In this chapter, the quantitative results of the study are presented. The basic statistics and responses (in percentages) to each statement of the questionnaire are reported first. The responses are not presented in numerical order. Instead, for better comprehension and coherence, they are reported in the categories previously mentioned in the instruments section, 4.3.2.1. These categories and their code names (for statistical analyses) are provided below:

1. MST perception of the policy of teaching Maths and Science in English: PolicyP
2. MST perception of the support provided to aid policy implementation: SupportP
3. MST perception of their own linguistic competence and content mastery: TLComp
4. MST impressions of students’ content mastery and linguistic competence: SLComp
5. MST opinion of the bilingual SPM examination papers as testing instruments: TestQ
6. Their students’ exam preparedness: ExPrep

In terms of the descriptive statistics, although all percentages were calculated to three decimal places, for the purposes of this presentation, all percentages reported have been rounded off to the nearest whole number. Results from two other statistical analyses, MANCOVA and factor analysis, follow respectively.

5.2 Results

5.2.1 Survey questionnaires

In this section, the basic statistics about the survey itself – number of copies distributed, how many copies per period of data collection and so forth are provided. This is followed by the results obtained from survey participants.
5.2.1.1 Survey distribution figures

Table 5 shows the number of copies distributed in each language to MST and also the rates of return. For the questionnaires, the response from Form Four and Five MST during both periods when they were administered was good: the rates of return are fairly high.

Table 5 Questionnaire distribution by language and rate of return during T1 and T3

<table>
<thead>
<tr>
<th>Data collection period</th>
<th>Number of copies distributed</th>
<th>Returned</th>
<th>Rate of return</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>English</td>
<td>Bahasa Malaysia</td>
<td>Total</td>
</tr>
<tr>
<td>T1</td>
<td>275</td>
<td>172</td>
<td>447</td>
</tr>
<tr>
<td>T3</td>
<td>252</td>
<td>198</td>
<td>450</td>
</tr>
</tbody>
</table>

Table 6 gives a detailed breakdown of the participants (MST) who responded to the survey. The number of MST per state, their gender and the subject(s) they teach is given. The figures show that although the number of teachers participating in each state varied during T1 and T3, the total number of participants is almost the same: 366 for T1 and 367 for T3. The ratio of male to female teachers remains the same as well, at approximately 3:1. In terms of subjects taught, most MST (approximately 90%) also seem to teach either Mathematics only or Science only; very few of them teach both Mathematics and Science.

The number of years of teaching experience (TER) and how MST rate their school’s linguistic environment in terms of frequency of English use (LER) is also provided in this table. About 39% of the MST are very experienced teachers with more than 15 years of experience, while at the other end of the spectrum, about a quarter of these MST have between 1 to 5 years of teaching experience.
Table 6 *Number of teachers per state, per subject and levels of MST experience (TER) and school linguistic environment (LER)*

<table>
<thead>
<tr>
<th>Data collection period</th>
<th>State</th>
<th>Gender</th>
<th>Subjects</th>
<th>MST experience (TER)*</th>
<th>School’s Linguistic Environment (LER)+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pen</td>
<td>Per</td>
<td>Joh</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td><strong>T1</strong></td>
<td>144</td>
<td>108</td>
<td>109</td>
<td>84</td>
<td>273</td>
</tr>
<tr>
<td><strong>T3</strong></td>
<td>117</td>
<td>119</td>
<td>126</td>
<td>84</td>
<td>273</td>
</tr>
</tbody>
</table>

*MST’s teaching experience is coded into 4 categories:
1 = 1 - 5 years 2 = 6 - 10 years 3 = 11 – 15 years 4 = More than 15 years
+ The school’s linguistic environment is coded into 4 categories, according to how commonly MST perceive English is used in their school:
1 = Never 2 = Rarely 3 = Sometimes 4 = Often

5.2.1.2 MST responses in percentages, per cluster

5.2.1.2.1 Cluster 1(PolicyP): What do MST think of the policy of teaching Maths and Science in English [S1, S2, S13, S14]?

Table 7 shows MST responses to the Cluster 1 regarding the PPSMI policy. The statements in this cluster are listed below:

S1: Teaching Mathematics and Science in English speeds up transfer of scientific and technological knowledge to younger generations of Malaysians.
S2: By learning Mathematics and Science in English, my students will be better prepared to face the increasingly globalised job market.
S13: **English** is the best language for teaching Mathematics and Science.
S14: **Bahasa Malaysia** is the best language for teaching Mathematics and Science.
Table 7 MST Responses (in percentages) to Cluster 1 statements

<table>
<thead>
<tr>
<th>Statement</th>
<th>URBAN</th>
<th>O.O.T</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>8.57</td>
<td>19.21</td>
</tr>
<tr>
<td>Disagree</td>
<td>5.31</td>
<td>18.30</td>
</tr>
<tr>
<td>Agree</td>
<td>20.95</td>
<td>29.80</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>41.43</td>
<td>32.03</td>
</tr>
<tr>
<td>Missing values</td>
<td>21.26</td>
<td>39.74</td>
</tr>
<tr>
<td>T1</td>
<td>21.26</td>
<td>46.86</td>
</tr>
<tr>
<td>T3</td>
<td>29.05</td>
<td>42.48</td>
</tr>
<tr>
<td>S2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>6.67</td>
<td>9.80</td>
</tr>
<tr>
<td>Disagree</td>
<td>0.97</td>
<td>24.50</td>
</tr>
<tr>
<td>Agree</td>
<td>14.29</td>
<td>25.49</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>37.14</td>
<td>47.02</td>
</tr>
<tr>
<td>Missing values</td>
<td>50.24</td>
<td>47.71</td>
</tr>
<tr>
<td>T1</td>
<td>41.41</td>
<td>21.19</td>
</tr>
<tr>
<td>T3</td>
<td>41.06</td>
<td>16.99</td>
</tr>
<tr>
<td>S13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>8.10</td>
<td>16.56</td>
</tr>
<tr>
<td>Disagree</td>
<td>7.25</td>
<td>15.03</td>
</tr>
<tr>
<td>Agree</td>
<td>28.10</td>
<td>35.10</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>39.52</td>
<td>39.22</td>
</tr>
<tr>
<td>Missing values</td>
<td>41.55</td>
<td>39.74</td>
</tr>
<tr>
<td>T1</td>
<td>23.67</td>
<td>13.81</td>
</tr>
<tr>
<td>T3</td>
<td>23.33</td>
<td>13.81</td>
</tr>
<tr>
<td>S14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>11.43</td>
<td>0.07</td>
</tr>
<tr>
<td>Disagree</td>
<td>12.56</td>
<td>3.92</td>
</tr>
<tr>
<td>Agree</td>
<td>36.67</td>
<td>23.18</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>39.13</td>
<td>30.72</td>
</tr>
<tr>
<td>Missing values</td>
<td>33.81</td>
<td>49.01</td>
</tr>
<tr>
<td>T1</td>
<td>28.99</td>
<td>44.44</td>
</tr>
<tr>
<td>T3</td>
<td>13.81</td>
<td>25.17</td>
</tr>
</tbody>
</table>

From Table 7, MST responses to S1 concerning the general intent of PPSM1 - to make sure that Malaysian youth will have access to the latest developments in science and technology - indicates that MST in urban areas are more inclined to agree this policy will have the intended effect. During T1, about 70% of them agree or strongly agree with the statement. This figure rises to 73% for T3. For out of town MST, their views are about evenly split during T1: a little more than 50% agree or strongly agree while the other half disagree or strongly disagree. This stays practically the same during T3.

Urban MST response to S2 are very strongly positive, even more so than towards S1. During T1, the percentage of urban MST who agree or strongly agree with this statement is almost 79%. In T3, it rises to 91%. Strangely enough, while out of town MST are split in their opinions over S1, they are more supportive of S2. During T1, 68% of out of town
MST agree or strongly agree with this statement, but the figure drops slightly in T3; only 65% agree or strongly agree with this statement.

The responses to S13 show that MST from out of town schools are somewhat divided as to the role of English as a language of instruction for Mathematics and Science. However, they are more likely to think that English is not the best language for teaching Mathematics and Sciences. During T1, approximately 52% of them either strongly disagree or disagree with S13, while 48% agree or strongly agree. The combined percentage for these two categories of responses, strongly disagree or disagree, goes up to 54% during T3. The opposite holds true for urban MST: during T1, almost 63% of them either agree or strongly agree with this statement. This goes up to almost 67% during T3.

Looking at the responses to S14 presented in Table 7, we can see that it is almost the mirror image of S13 responses. In this case, it is the urban MST who are divided about the role of Bahasa Malaysia. During T1, approximately 48% of them disagree or strongly disagree with this statement, while 52% disagree or strongly disagree. The figures remain practically the same for T3. Out of town MST, on the other hand, are supportive of this statement: a little more than 74% of them either agree or strongly agree that this is the best language for teaching Mathematics and Science during T1. However, this support drops to approximately 63% during T3.

5.2.1.2.2 Cluster 2 (SupportP): What are MST perceptions of the support provided to aid policy implementation [S3,S8, S9, S10]?

Table 8 presents the responses of MST to statements in Cluster 2 concerning support measures for implementing PPSMI. The statements within this cluster are provided below:

S3: The Ministry of Education’s training program has prepared me sufficiently well to teach Mathematics and Science in English.

S8: The kinds of teaching material provided to me for teaching Mathematics or Science in English are effective.

S9: The kinds of teaching material provided to me for teaching Mathematics or Science in Bahasa Malaysia are effective.
S10: Having a “linguistic buddy” to help me in English is useful.

Table 8 MST Responses (in percentages) to Cluster 2 statements

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Missing values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T3</td>
<td>T1</td>
<td>T3</td>
<td>T1</td>
</tr>
<tr>
<td>S3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td>5.24</td>
<td>3.87</td>
<td>34.76</td>
<td>24.64</td>
<td>42.86</td>
</tr>
<tr>
<td>O.O.T</td>
<td>6.62</td>
<td>5.23</td>
<td>33.11</td>
<td>20.92</td>
<td>50.99</td>
</tr>
<tr>
<td>S8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td>1.91</td>
<td>0.97</td>
<td>24.76</td>
<td>16.91</td>
<td>60.95</td>
</tr>
<tr>
<td>O.O.T</td>
<td>2.65</td>
<td>3.92</td>
<td>27.15</td>
<td>19.61</td>
<td>66.22</td>
</tr>
<tr>
<td>S9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td>6.19</td>
<td>10.63</td>
<td>28.57</td>
<td>40.10</td>
<td>47.62</td>
</tr>
<tr>
<td>O.O.T</td>
<td>4.64</td>
<td>5.88</td>
<td>17.22</td>
<td>26.14</td>
<td>54.31</td>
</tr>
<tr>
<td>S10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td>4.76</td>
<td>8.21</td>
<td>16.67</td>
<td>12.56</td>
<td>57.14</td>
</tr>
<tr>
<td>O.O.T</td>
<td>4.64</td>
<td>3.92</td>
<td>17.88</td>
<td>18.30</td>
<td>66.89</td>
</tr>
</tbody>
</table>

Table 8 shows that in response to S3, out of town MST generally tend to agree more than urban MST that the courses have been helpful in preparing them to teach in English. During T1, the MST who agree or strongly agree with this statement are 53% and 58% respectively for the urban and out of town schools. During T3, these figures go up to 64% for urban MST and 69% for out of town MST.

From the results for S8, it can be said that MST in both areas seem to find the English teaching materials provided to them to be effective. 71% of urban MST and 70% of out of town MST agreed or strongly agreed that this was the case in T1. During T3, the percentages of agreement for both categories of MST go up: for the urban MST, it is at around 81% while for the out of town MST, it rises to 76%.
In response to S9 concerning the utility of BM teaching materials in their lesson preparations, out of town MST clearly find these more useful than their urban counterparts. During T1, 74% of out of town MST agree or strongly agree with this statement, while only 58% of urban MST do. In T3, the figures for both groups of teachers drop, 68% and 46% for out of town and urban MST respectively, even though the percentage remains high for out of town MST.

For S10, both urban and out of town MST agree: having a “critical friend” helps them to improve their English. The combined percentages for “agree” and “strongly agree” are high in both groups. In T1, urban MST and out of town MST agree or strongly agree with this statement at 73 and 77% respectively. In T3, these percentages remain high for both groups even though there is a slight drop: 71% for urban MST and 74% for out of town MST.

5.2.1.2.3 Cluster 3 (TLComp): What are MST perceptions of their own linguistic competence [S4, S6, S16, S17, S20, S21] and content mastery [S15]?

Table 9 shows the results of MST responses to Cluster 3 concerning teachers’ linguistic competency. The statements included in this cluster are:

S4: My proficiency in English is sufficient to teach Mathematics and Science in that language.

S6: I teach Mathematics or Science effectively in English.

S16: When I teach, I am able to verbally formulate and express ideas related to the content of Mathematics or Science courses in English clearly.

S17: When I teach, I verbally formulate and express ideas related to the content of Mathematics or Science courses in Bahasa Malaysia clearly.

S20: When I teach, I am able to write down ideas/explanations related to the content of Mathematics or Science courses in English well.

S21: When I teach, I am able to write down ideas/explanations related to the content of Mathematics or Science courses in Bahasa Melayu well.

S15: I have a strong mastery of the content I teach in Mathematics or Science class
Table 9 MST Responses (in percentages) to Cluster 3 statements

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For S4, Table 9 indicates that the response from urban MST to this statement is very positive. Those who agree or strongly agree with this statement are at 84% in T1 and 82% in T3. This response is in contrast to that of out of town MST. During T1, barely more
than 50% of teachers agree or strongly agree that their proficiency is sufficient for teaching Mathematics and/or Science in English. The other half, therefore, feel they do not have the requisite proficiency level. However, the combined percentage for “agree” and “strongly agree” rises to 63% for out of town MST in T3.

The results shows that urban MST and out of town MST respond in a diametrically opposed fashion to S6. In general, urban MST are much more likely to feel that they teach M & S effectively in English. 77% of them agree or strongly agree with this statement during T1 and 81% of them chose either one of these responses in T3. As for out of town MST, 58% of them disagreed or strongly disagreed with this statement in T1. Therefore, only 42% were in agreement with S6. The percentage of disagreement drops 6% to 52% during T3.

The responses to S16 indicate the majority of urban and out of town MST tend to agree or strongly agree that they are able to verbally provide explanations in the subject they teach in English. In T1, 79% of urban teachers and 65% of out of town teachers are in agreement with this statement. In T3, these figures are even higher: 84% and 71% for urban and out of town teachers respectively.

When it comes to teaching the content of M & S courses in Bahasa Malaysia, S17, the results provided in Table 9 show both urban and out of town MST are extremely confident in their ability, especially the latter. In both periods of data collection, the percentage of out of town MST who agree or strongly agree with this statement is above 90%: 93% in T1 and 95% in T3. The rates of agreement among urban MST are also very high: during T1, it is at 80% and during T3, it goes up to 90%.

The responses of both urban and out of town MST to S20 indicate that they are also confident of their English writing abilities. At least three quarters and more of teachers in the two categories either agree or strongly agree with this statement in both data collection periods. 83% of urban MST and 75% of out of town MST are in agreement with S20 during T1. During T3, the percentages are 89% and 81% for the two categories respectively.

When it comes to their ability to write in Bahasa Malaysia during teaching (S21), the two groups of teachers express very high confidence in their ability with their responses, as shown in Table 9. For urban MST, 89% of them agree or strongly agree with this
statement in T1 and 86% of them do so during T3. For out of town MST, the figures are remarkably high during both periods of data collection: 96% in T1 and 97% in T3.

Similarly, MST from both urban and out of town areas express a strong confidence in their content mastery of the M & S subjects they teach (S15). 88% of urban MST and 92% of out of town MST either agree or strongly agree with this statement during T1. In T3, these percentages are even higher for both urban and out of town MST, i.e., 93% and 96% respectively.

5.2.1.2.4 Cluster 4 (SLComp): What are MST impressions of students’ content mastery and linguistic competence [S5, S7, S11, S12, S18, S19, S22, S23]?

The results for Cluster 4 concerning students’ linguistic competency are presented in Table 10. The statements found in this cluster are:

S5: My students’ proficiency in English is sufficient to learn Mathematics and Science in that language.

S7: My students learn Mathematics or Science effectively in English.

S11: My students’ Mathematics or Science test/exam performance when responding to a test or exam in English is satisfactory.

S12: My students’ Mathematics or Science test/exam performance when responding to a test or exam in Bahasa Malaysia is satisfactory.

S18: My students are able to verbally formulate and express ideas related to the content of Mathematics or Science courses in English clearly.

S19: My students are able to verbally formulate and express ideas related to the content of Mathematics or Science courses in Bahasa Malaysia clearly.

S22: When my students respond to written assignments in English, they are able to write down ideas/explanations related to the content of Mathematics and Science well.

S23: When my students respond to written assignments in Bahasa Malaysia, they are able to write down ideas/explanations related to the content of Mathematics and Science well.
Table 10 *MST Responses (in percentages) to Cluster 4 statements*

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By looking at Table 10, it can be seen that urban MST are somewhat divided over S5. During T1, only 53% of them agree or strongly agree with S5. In contrast, during T3, 54% of them disagree or strongly disagree with this statement. Out of town MST, however, are in complete disaccord that their students possess sufficient English proficiency for learning M & S. During T1, 85% of them disagree or strongly disagree with S5, and this figure rises to 89% during T3.

Surprisingly, in response to S7, the results indicate urban MST are more likely to select agree or strongly agree as their choice. The combined percentage for these two choices is 62% in T1 and drops to 53% in T3. Out of town MST, on the other hand, generally disagree or strongly disagree with this statement. During T1, the combined percentage for these two responses is 75% and goes up to 80% during T3.

Table 10 shows as well that response patterns for urban and out of town MST to S11 are very similar to those for S7. During T1, 64% of urban MST agree or strongly agree that their students’ exam performance in English is satisfactory. The percentage drops to 57% in T3. For out of town MST, 66% of them disagree or strongly disagree with this statement in T1. This goes up to 73% in T3.

For S12, although both categories of teachers are quite supportive of this statement, out of town MST are far more likely to agree or strongly agree with it. During T1, 68% of urban MST chose these two options. However, only 56% of them do so during T3. 81% of out of town MST are in agreement in T1, but the level of support drops to 70% in T3.

From the results for S18, it could be said that neither urban nor out of town MST are very supportive of this statement. Urban MST are split in their responses: in T1, only 54% of them agree or strongly agree with S18. During T3, the exact inverse is true: 54% of them disagree or strongly disagree with S18. For out of town MST, the figures are practically the same for both T1 and T3: 83 and 82% respectively for each period disagree or strongly disagree that their students can express themselves well verbally in English for the purposes of M & S.

The results also indicate that most MST from both urban and out of town areas tend to agree with S19. In T1, 71% of urban MST and 87% or out of town MST agree or strongly agree with S19. During T3, the figures drop somewhat but remain relatively high: 66% for urban and 78% for out of town MST.
Once again, urban MST are somewhat divided over S22. For both data collection periods, only a little over half of them agree or strongly agree with this statement: 55% are of this opinion during T1 and 53% during T3. Out of town MST, in contrast, generally disagree with S22. During T1, 74% of them disagree or strongly disagree while in T3, 67% of them selected these two options.

In general, urban and out of town MST support S23 across both periods of data collection. However, the level of support is much higher within the out of town MST. In T1, 75% of urban MST and 87% of out of town MST agree or strongly agree that their students write well in Bahasa Malaysia when it comes M & S. The percentages experience a drop during T3: 65% for urban and 82% for out of town MST.

5.2.1.2.5 Cluster 5 (TestQ): What are MST opinions of the SPM examination papers as testing instruments [S24, S25]? 

Table 11 summarises the results for Cluster 5 concerning MST opinions of the SPM bilingual papers as testing instruments. The statements in this cluster are:

S24: The English SPM Mathematics or Science exam questions are instruments that accurately measure my students’ skills and capacities in these subjects.

S25: The Bahasa Melayu SPM Mathematics or Science exam questions are instruments that accurately measure my students’ skills and capacities in these subjects.

From Table 11, we can see that during T1 both urban and out of town MST tend to agree with S24: they think the English version of the SPM exams will measure the abilities of their students well. Slightly more than 64% of urban MST and a little more than 54% of out of town MST agreed or strongly agreed with this statement. However, for T3, the combined percentage for these two categories actually goes up to more than 69% for urban MST but in contrast, drops to approximately 47% for out of town MST.
Table 11 MST Responses (in percentages) to Cluster 5 statements

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For S25, both urban and out of town MST consider the Bahasa Malaysia version of the M & S SPM exams will accurately measure their students’ abilities. During T1, the combined percentage of out of town MST who agree or strongly agree with S25 is very high, almost 85%. So is that for urban MST, approximately 74%. These same percentages drop slightly during T3 to about 84% for out of town MST. However, there is a bigger drop for urban MST; the figure goes down to 64%.

5.2.1.2.6 Cluster 6 (ExPrep): What are MST’s impressions of their students’ exam preparedness [S26, S27, S28, S29, S30]?

Table 12 presents the results for Cluster 6 concerning how prepared MST think their students are for the SPM exam. The statements in this cluster are:

S26: The content of the English SPM Mathematics or Science exams accurately reflects the topics that have been taught in Secondary Four and Five classrooms.

S27: The format of the English SPM exam accurately reflects the class/homework assignments and test/exam items that have been done in class.

S28: In terms of content, my students are going to be well-prepared for the English SPM Mathematics or Sciences exam.
S29: In terms of language skills, my students are going to be well-prepared for the English SPM Mathematics or Sciences exam.

S30: My students’ chances of performing well on the SPM Mathematics or Sciences exam, which are expected to be completely in English this year, are good.

Table 12 MST Responses (in percentages) to Cluster 6 statements

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Table 12 indicates that urban and out of town MST are highly in accord with S26, that is, their classroom teaching reflects the content in the SPM exams. In T1, 78% of urban MST and 81% of out of town teachers either agreed or strongly agreed that this was the case. During T3, the percentages for these two categories are even higher: 96% for urban and 93% for out of town MST.

As for S27, here again, the MST from urban and out of town areas are mainly in agreement with this statement. During T1, 82% of urban and 74% of out of town MST agree or strongly agree that their regular homework, class assignments and tests are representative of the format found in the SPM exams. In T3, these figures exceed 90% for both categories of MST: 94% for the urban MST and 92% for out of town MST.

For S28, the responses of urban MST are more positive than those of their out of town counterparts. In T1, 79% of the urban MST agreed or strongly agreed with this statement, while in T3, 85% of them chose these two options. Their out of town peers, on the other hand, are not as sure of their students’ exam preparedness, content-wise. Only 55% of them agree or strongly agree with S28 during T1. This figure goes up only slightly to about 57% during T3.

The responses to S29 indicate that, in general, urban teachers are more likely to be confident about their students’ English proficiency for M & S. During T1, 66% of them agree or strongly agree with S29 while in T3, this percentage goes up slightly to 68%. The responses of the out of town MST are almost the exact inverse: during T1, 60% of the disagree or strongly disagree that their students are well-prepared to do M & S exams in English. This figure rises to 69% in T3.

From the responses of MST to S30 given in Table 12, it is quite clear that while urban MST are optimistic about their students’ chances of performing well in English-only M & S SPM exams, out of town MST are extremely pessimistic on this point. During T1, only 36% of out of town MST agree or strongly agree with this statement. This figure drops even lower in T3: it goes down to 25%. In contrast, 70% of urban MST support this statement during T1. Like their out of town counterparts, however, the percentage of support drops during the third period of data collection. It is only 63% during T3.
5.2.1.2.7 Results for S31(T1) and S31(T3)

Table 13 shows the results of the stand-alone items, S31 for the first period of data collection, T1 [S31(T1)] and S31 for the third period of data collection [S31(T3)] respectively. The two statements for each period of data collection are given below:

S31(T1): I feel comfortable with the idea of sitting for the English test for Mathematics and Science teachers required by the Ministry of Education this year.

S31(T3): The Gerak Gempur and trial exams for Mathematics and/or Sciences have helped my students prepare for the actual SPM exams.

Table 13 Urban and OOT MST responses in percentages to S31(T1) and S31(T3)

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Missing values</th>
</tr>
</thead>
<tbody>
<tr>
<td>S31(T1)</td>
<td>Urban</td>
<td>12.86</td>
<td>23.33</td>
<td>36.67</td>
<td>13.33</td>
</tr>
<tr>
<td></td>
<td>O.O.T.</td>
<td>4.64</td>
<td>17.88</td>
<td>66.89</td>
<td>9.93</td>
</tr>
<tr>
<td>S31(T3)</td>
<td>Urban</td>
<td>8.21</td>
<td>12.56</td>
<td>57.97</td>
<td>13.53</td>
</tr>
<tr>
<td></td>
<td>O.O.T.</td>
<td>3.92</td>
<td>18.30</td>
<td>63.40</td>
<td>10.46</td>
</tr>
</tbody>
</table>

From Table 13, it can be said that in general, MST from both urban and out of town areas are divided in their opinions concerning S31 (T1). Urban MST are evenly split: 50% of them either agree or strongly agree with T1-S31 while 36% disagree or strongly disagree. What is interesting is the high percentage of missing values for this group of teachers: 13%. Out of town MST are a little more supportive of T1-S31, but not by much: only 56% of them agree or strongly agree with this statement.

As for the MST responses to S31 (T3), they clearly show that the majority of MST, both urban and out of town, are of the opinion that the Gerak Gempur and trials exams do help their students in exam preparation. 89% of urban MST and 92% of out of town MST agree or strongly agree with this statement.
5.2.2 Results from MANCOVA analysis

The design of the MANCOVA is:

Model = Intercept + TER + LER + Period + Area + Subject + Period * Area + 
Period*Subject + Area * Subject + Period * Area * Subject

This MANCOVA uses Period, Area and Subject as categorical variables. The covariates 
are TER (teacher’s years experience) and LER (school linguistic environment). The 
dependent variables are PolicyP, SupportP, TLComp, SLComp, TestQ and ExPrep.

A preliminary step prior to running the MANCOVA was testing that there were no 
interaction effects between categorical variables and covariates. This is to ensure that one 
of the main assumptions of MANCOVA with two covariates, the parallelism of 
regression planes, holds (Stevens, 2002). In this case, it is important that the interaction 
results are not significant.

Table 14 gives the results of these analyses. The results show that none of the 
interactions between the categorical variables and the covariates is significant. For the 
covariate TER, the results are: TER by Period, $F = .955$, $p < .05$; TER by Area, $F = 
1.089$, $p < .05$; TER by Subject, $F = .747$, $p < .05$. For the covariate LER, the results are: 
LER by Period, $F = 1.213$, $p < .05$; LER by Area, $F = 1.016$, $p < .413$; LER by Subject, $F 
= 1.334$, $p < 0.05$.

Table 14 Results from testing parallelism of the regression planes

<table>
<thead>
<tr>
<th>Interaction effect</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>TER * Period</td>
<td>.974</td>
<td>.955</td>
<td>18.000</td>
<td>1850.277</td>
<td>.510</td>
</tr>
<tr>
<td>TER * Area</td>
<td>.971</td>
<td>1.089</td>
<td>18.000</td>
<td>1872.904</td>
<td>.357</td>
</tr>
<tr>
<td>TER * Subject</td>
<td>.959</td>
<td>.746</td>
<td>36.000</td>
<td>2817.589</td>
<td>.864</td>
</tr>
<tr>
<td>LER * Period</td>
<td>.967</td>
<td>1.213</td>
<td>18.000</td>
<td>1850.277</td>
<td>.241</td>
</tr>
<tr>
<td>LER * Area</td>
<td>.991</td>
<td>1.016</td>
<td>6.000</td>
<td>1850.277</td>
<td>.413</td>
</tr>
<tr>
<td>LER * Subject</td>
<td>.928</td>
<td>1.334</td>
<td>36.000</td>
<td>2817.589</td>
<td>.088</td>
</tr>
</tbody>
</table>
5.2.2.1 MANCOVA Results: Main effects

The results of the analysis using the MANCOVA model are presented in this section. Table 15 presents results of multivariate tests from the MANCOVA.

For the categorical variables, the main effect of Period and Area are significant. For Period, the multivariate F value, Wilks’ Lambda, $\Lambda = .964$, $p < .05$. For Area $\Lambda = .960$, $p < .05$. The main effect of Subject is not significant. None of the two-way or three way interaction effects are significant.

Table 15 Results for MANCOVA: Main Effects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value of $\Lambda$</th>
<th>Hypothesis $F$</th>
<th>Error df</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>.964</td>
<td>4.126</td>
<td>6.000</td>
<td>.000</td>
</tr>
<tr>
<td>Area</td>
<td>.960</td>
<td>4.618</td>
<td>6.000</td>
<td>.000</td>
</tr>
<tr>
<td>Subject</td>
<td>.981</td>
<td>1.070</td>
<td>12.000</td>
<td>.381</td>
</tr>
<tr>
<td>TER</td>
<td>.827</td>
<td>23.451</td>
<td>6.000</td>
<td>.000</td>
</tr>
<tr>
<td>LER</td>
<td>.905</td>
<td>11.818</td>
<td>6.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

The main effects of the two covariates TER and LER are significant. For TER, $\Lambda = .827$, $p < .05$. For LER, $\Lambda = .905$ and $p < .05$. This indicates that there is a significant relationship between each of the covariates and the dependent variables.

5.2.2.2 MANCOVA Results: Between subject effects

Table 16 shows that results of between subject effects obtained from the MANCOVA. The results for the Corrected Model show us that there is a significant difference in the means of all the dependent variables except for PolicyP and TestQ. For
the dependent variable SupportP, F = 3.088, p < .05. For TLComp, F = 12.921, p < .05 while for SLComp, F = 8.773, p < .05. Finally for ExPrep, F = 9.564, p < .05.

Table 16 Results for MANCOVA: Between subject effects

<table>
<thead>
<tr>
<th>Source</th>
<th>Dependent variable</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>SupportP</td>
<td>166.785</td>
<td>13</td>
<td>12.830</td>
<td>3.088</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>TLComp</td>
<td>1440.953</td>
<td>13</td>
<td>110.843</td>
<td>12.921</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>SLComp</td>
<td>1309.561</td>
<td>13</td>
<td>100.735</td>
<td>8.773</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>ExPrep</td>
<td>918.908</td>
<td>13</td>
<td>70.685</td>
<td>9.564</td>
<td>.000</td>
</tr>
<tr>
<td>Period</td>
<td>ExPrep</td>
<td>79.064</td>
<td>1</td>
<td>79.064</td>
<td>10.697</td>
<td>.001</td>
</tr>
<tr>
<td>Area</td>
<td>SLComp</td>
<td>120.772</td>
<td>1</td>
<td>120.772</td>
<td>10.517</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>ExPrep</td>
<td>54.012</td>
<td>1</td>
<td>54.012</td>
<td>7.308</td>
<td>.007</td>
</tr>
<tr>
<td>TER</td>
<td>SupportP</td>
<td>132.803</td>
<td>1</td>
<td>132.803</td>
<td>31.964</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>TLComp</td>
<td>775.300</td>
<td>1</td>
<td>775.300</td>
<td>90.377</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>SLComp</td>
<td>438.182</td>
<td>1</td>
<td>438.182</td>
<td>38.159</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>TestQ</td>
<td>8.000</td>
<td>1</td>
<td>8.000</td>
<td>6.042</td>
<td>.014</td>
</tr>
<tr>
<td></td>
<td>ExPrep</td>
<td>307.639</td>
<td>1</td>
<td>307.639</td>
<td>41.623</td>
<td>.000</td>
</tr>
</tbody>
</table>

For the Covariate TER, there is only a significant effect on SupportP (F = 31.964, p < .05) and TLComp (F = 90.377, p < .05). However, for the covariate LER, there is significance for TLComp (F = 27.048, p < .05), SLComp (F = 38.159, p < .05), TestQ (F = 6.042, p < .05) and ExPrep (F = 41.623, p < .05).

Bryant-Paulson post-hoc tests were not conducted for Area and Period because both these categories have only two groups per category.
5.2.2.3 Interpretation of MANCOVA results

In this section, the pattern of means that produced significant results for the MANCOVA are presented visually for each of the categorical variables and the covariates as well. These patterns are then interpreted.

The significant result of the main effect of Period indicates that there are patterns of MST responses that are particular to when the questionnaire was completed, whether at the beginning (T1) or at the end (T3) of the school year. The analysis of between subject effects shows that only the means for ExPrep are significant. The means for ExPrep during both periods of data collection (T1=1 and T3=2) are shown in Figure 8.

![Figure 8](image)

*Figure 8. Means for ExPrep (Exam preparation) by Period*

This is a good indication of the effect that the approach of the SPM examinations has on MST perceptions since it happens close to the end of the school year. The closer the SPM gets, the more teachers tend to focus on exam preparation.

For the categorical variable Area, the significant main effect shows that MST respond differently depending on whether their schools are located in urban or out-of-town (OOT) areas. The significant results for the means of SLComp and ExPrep in terms of between subject effects demonstrate that urban and OOT MST’s perceptions of students’ linguistic competency and their exam preparedness varies as well. Figure 9 shows the difference
between urban MST (1) and out of town MST (2) responses. It can be seen how out of town MST’s perceptions of their students’ linguistic competency is lower than those that their urban counterparts have of their students.

Figure 9. Means of SLComp (Students’ linguistic competency) by Area

We can see a similar pattern as afar as exam preparation is concerned. Figure 10 shows an almost identical pattern. Out of town MST tend to rate their exam preparations lower than their urban counterparts.

Figure 10. Means of Exprep (Exam preparation) by Area
The results from the MANCOVA analysis indicate that MST’s specific level of experience, TER, covaries with the dependent variables. For TER, there are significant effects for TLComp and SupportP. Figure 11 shows the gap of TLComp scores between MST at TER 4 and the MST at TER 1, 2 and 3. The fact that a number of MST in TER 4 (more than 15 years of experience) were probably educated in the English medium accounts for why years of teaching experience is positively correlated to MST’s linguistic competency.

Figure 11. Means for TLComp (MST’s linguistic competency) by TER

For perception of support measures, however, TER is negatively correlated with scores of SupportP as shown by Figure 12. This is probably because the support measures are aimed at those with low English proficiency. MST at higher levels of TER, who are usually more proficient in English probably consider these measures redundant in their case. Figure 44 demonstrates a split between those at TER 1 and TER 2 versus the MST who are at TER 3 and TER 4, indicating that there is a ceiling effect: beyond a certain point, MST no longer feel the support provided is necessary or effective.
Figure 12. Means for SupportP (Implementation support provided by MMOE) by TER

For the covariate LER (school’s linguistic environment with regard to use of English), there is significance for TLComp, SLComp, TestQ and ExPrep. Figure 13 shows that LER is positively correlated to MST’s TLComp scores. This quite possibly indicates that a school’s linguistic environment has some impact on MST capacity to develop proficiency in English.

Figure 13. Means for TLComp (MST’s linguistic competency) by LER

Figure 14 shows a positive correlation between LER and the scores for student linguistic abilities, SLComp. What this points to is that the presence or use of English in
the daily school routine may be a general indicator of students’ ease or comfort with the language.

Figure 14. Means for SLComp (Students’ linguistic competency) by LER

For TestQ, the pattern of correlation to LER is shown in Figure 15. Once again seems to be split into two levels. This could indicate a threshold level of LER with regard to perception of the bilingual SPM exam: at LER 2 and under, the perception of this format is less likely to be positive.

Figure 15. Means for TestQ by LER

ExPrep means are positively correlated to LER as seen below in Figure 16. This is the same pattern as that obtained for SLComp. These results demonstrate that there are probably links between the school’s linguistic environment, and MST perceptions of their
students’ linguistic competence and how prepared the latter are to take the SPM exams in English.

![Figure 16](image)

*Figure 16. Means for ExPrep (Students’ preparedness for SPM exams) by LER*

Having presented and interpreted the results from the MANCOVA, the following sections will present the results from the exploratory factor analysis (EFA) performed on the data.

### 5.2.3 Factor Analysis Results

This section first presents the initial hypothesised model of MST’s overall perception of the PPSMI policy based on the clusters of items described in 4.3.2.1. This is followed by results from the exploratory factor analysis conducted on the survey responses. From these results, another model of MST perception of PPSMI is constructed.

#### 5.2.3.1 Initial Hypothesised Measurement Model

An initial measurement model (Loehlin, 2004) was hypothesised based on the categories that were presented in section 4.3.1. This is visually represented in Figure 17. The measured items themselves are represented by the rectangles and the hypothetical underlying variables are represented by the ovals. All the items in each category contribute to an overall perception of the PPSMI policy, shown in Figure 17 as PPSMI-O, the shaded, grey oval at the centre of the diagram.
Figure 17. Hypothesised Measurement Model: Pre-factor analysis
5.2.3.2 Sampling adequacy and Correlation among variables

Table 17 shows the results of the Kaiser-Meyer-Olkin (KMO) Measure and Bartlett’s Test of Sphericity.

Table 17 KMO and Bartlett’s Test results

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure</td>
<td>.920</td>
</tr>
<tr>
<td>Chi-square</td>
<td></td>
</tr>
<tr>
<td>Bartlett’s Test of Sphericity</td>
<td>9431.178</td>
</tr>
<tr>
<td>significance</td>
<td>.000</td>
</tr>
</tbody>
</table>

The high value of the KMO measure (.920) shows good sampling adequacy. Bartlett’s Test result is significant ($\chi^2 = 9431.178$, $p = .000$) indicating that the strength of the correlation among variables is strong and that the correlation matrix is not an identity matrix. Therefore, factor analysis is appropriate for this data set.

For the initial and extraction values for the communalities of each survey item see APPENDIX K.

5.2.3.3 Factors extracted

A Principal Components Analysis was run, followed by a Varimax rotation for factor extraction. The results of the factor extraction procedure are shown below. Table 18 gives us the eigenvalues of the factors along with the percentage of variance explained by these factors.
Table 18 *Eigenvalues and percentage of variance explained for each factor*

<table>
<thead>
<tr>
<th>Component</th>
<th>Initial Eigenvalues</th>
<th>Extraction sums of squared loadings</th>
<th>Rotation Sums of squared loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>3</td>
<td>2.214</td>
<td>7.380</td>
<td>52.965</td>
</tr>
<tr>
<td>4</td>
<td>1.514</td>
<td>5.048</td>
<td>58.013</td>
</tr>
<tr>
<td>6</td>
<td>1.006</td>
<td>1.006</td>
<td>65.814</td>
</tr>
</tbody>
</table>
Figure 18 is a screeplot for the eigenvalues reported in Table 18. This screeplot visually confirms what is presented in Table 18.

![Scree Plot](image)

**Figure 18.** Scree plot of eigenvalues for each factor

Table 18, along with Figure 18, show that there are six factors with an eigenvalue of 1.0 and above. The first factor accounts for 21.9% of the variance, while the second factor accounts for 13.7%. Factors 3 and 4 account for 11.3 and 7.2%, respectively, of the variance. Factor 5 takes up about 6.3% while Factor 6 only accounts for 5.3% of the variance. The total variance accounted for by these six factors is 65.8%.

### 5.2.3.3.1 Factor loadings

Table 19 shows how the various items load on the six factors. The pattern of how the items load on each factor give us an idea of what each of these six latent variables (the factors) may represent.
Table 19 *Factor loadings for the components*

<table>
<thead>
<tr>
<th>Component</th>
<th>Items and their loading on the components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S5</td>
</tr>
<tr>
<td>1</td>
<td>.760</td>
</tr>
<tr>
<td></td>
<td>S17</td>
</tr>
<tr>
<td>2</td>
<td>.777</td>
</tr>
<tr>
<td></td>
<td>S4</td>
</tr>
<tr>
<td>3</td>
<td>.768</td>
</tr>
<tr>
<td></td>
<td>S3</td>
</tr>
<tr>
<td>4</td>
<td>.694</td>
</tr>
<tr>
<td></td>
<td>S26</td>
</tr>
<tr>
<td>5</td>
<td>.882</td>
</tr>
<tr>
<td></td>
<td>S2</td>
</tr>
<tr>
<td>6</td>
<td>.477</td>
</tr>
</tbody>
</table>

For Factor 1, seven items have high factor loadings: S5 (.760), S7 (.760), S11 (.797), S18 (.788), S22 (.825), S29 (.800), S30 (.793). One other item has a fairly high loading as well, S28 (.679). From these items, we can see that this factor mainly concerns the
students’ linguistic abilities in English in connection with MST’s instruction in that language.

Five items load high on Factor 2. S17 (.777), S19 (.754), S21 (.797), S23 (.780), S25 (.757). S12 also loads quite highly (.644) on this factor. The loadings indicate that this factor has to do with the students’ linguistic capacities in BM relative to the classroom teaching of MST in the language.

Factor 3 has four items that load high on it: S4 (.768), S6 (.658), S16 (.778), S20 (.776). One other item, S15 loads fairly high (.580) on it as well. This factor is related to MST’s abilities to teach the subject matter in English.

In terms of Factor 4, three items load high to averagely high on it: S3 at .694, S8 at .567 and S10 at .660. The items all regard the kind of support available for MST to teach in English.

Factor 5 has only two items that both load very high. S26 (.882) and S27 (.857). These items indicate that Factor 5 has to do with MST’s efforts at preparing their students for the SPM exams.

Factor 6 does not really have very high loadings on any of the items. The three highest loadings are from S2 (.477), S9 (-.588) and S14 (-.521). This factor seems to indicate a certain resistance towards English as the language of instructions or perhaps preference for BM as the language of instruction.

From this analysis, six factors are retained.

5.2.3.4 Interpretation of Factor Analysis Results

The results from the EFA performed on the data found that six latent variables or factors underlie MST responses to the questionnaire items. These factors, and what they pertain to are briefly summarised below:

a) Factor 1 mainly concerns the students’ linguistic abilities in English

b) Factor 2 has to do with the students’ linguistic capacities in BM
c) Factor 3 is related to MST’s abilities to teach the subject matter in English.

d) Factor 4, regards the kind of support available for MST to teach in English.

e) Factor 5 has to do with MST’s efforts at preparing their students for the SPM exams.

f) Factor 6 indicates a preference for BM as the language of instruction.

The first two factors seem to have captured MST’s concerns with their students’ abilities to understand and respond to instruction in English and BM – the two languages in which their SPM exams are presented. This probably has to do with the fact that not all students are proficient in English – the results from interviews and observations conducted in SMK Kayu Manis and SMK Gaharu (see Chapter 6) illustrate that there are students who still need to be supported in their learning and exam preparation in English. Factor 3 and Factor 4 have more to do with MST’s worries about their own English proficiency and how this can be developed to a level sufficient for teaching comfortably in English. From questionnaire comments and observations in the two case study schools, this appears to be an ongoing concern for some MST although PPSMI is already in its fifth year of implementation. Factor 5 is fairly straightforward. In such an exam-oriented system, MST are, of course, preoccupied with how successful their efforts at preparing their students for the SPM are. Finally, Factor 6 indicates that there are MST who still view BM as a more suitable language of instruction for their students as compared to English.

5.2.3.4 Final Measurement Model: Post-factor Analysis

Based on these results, a corrected model for policy perception and exam perception is provided in Figure 19. This shows us how each of the items load on the factors and how each of these factors contribute to MST’s overall perception of the PPSMI policy.
Figure 19. Final Measurement model of MST perceptions of PPSMI in general: Post-factor analysis
5.2.3.5 Discrepancy between the Hypothesised Model and Final Model

What accounts for the discrepancy between the hypothesised model presented in Figure 17, and the Post-factor analysis model shown in Figure 19? This could be due to two main reasons.

The first of these reasons is related to the redistribution of the items initially linked to perceptions concerning policy (PolicyP), and support measures (Support). The descriptive results have indicated that MST broadly support the idea of PPSMI, as seen in their strong positive response to S1. This item does not load on any of the factors as the majority of teachers agree that teaching Mathematics and Science in English will speed up the transfer of Science and technology for future generations. The teachers’ disagreement, however, on how this can best be carried out within the educational system leads to the variance loading onto Factor 6. This split in opinions is especially evident between urban and out-of-town MST (For a more in-depth discussion of this issue, see section 7.2.1).

The second reason is linked to the fact that the SPM exams are in bilingual format. As such, in the initial model, MST proficiency in BM and English was hypothesised to be a factor that would influence MST’s responses. This was because I assumed that BM and English would be used to scaffold student learning according to “best-practice” recommendations in CBI literature. However, the items related to BM did not load onto Factor 3 concerning teachers’ linguistic competency (TL Comp-Eng) in the final model. Only items having to do with their content mastery and fluency in English formed the principal components of variance in this factor. This seems to indicate that, in general, teachers’ BM linguistic proficiency does not pose any concerns for MST relative to the teaching process. Their responses could be influenced by the MMOE’s emphasis on teaching and testing in English as well. It is also indicative of prevalent teaching practices which do not draw on students’ knowledge of their mother tongue or first language of instruction to build up their linguistic and knowledge schema in their L2. For more details on MST’s linguistic practices in their classrooms, see sections 6.2.3.1.1 to 6.2.3.2.5 that describe MST profiles in the case study schools.
5.3 Conclusion

In this chapter, the quantitative results from the analysis of the Likert-scale responses obtained from the questionnaire have been presented. The descriptive results show that there are still significant differences between urban and out-of-town MST’s perceptions of their own linguistic proficiency as well as the linguistic proficiency of their students. Although both groups of MST appreciate the support measures that the MMOE has provided, these measures seem to be more appreciated by the out-of-town MST. In terms of the bilingual format of the SPM, both groups of MST seem to think that the BM version may be helpful for their students. However, only urban MST are positive about the English version of the SPM. In fact, there is a significant effect of time on the MST’s responses. This can be seen, for example, in the drop in urban MST’s agreement with S11 concerning students’ satisfactory performance in English M & S exams.

MANCOVA results concur with the patterns observed in the descriptive statistics. The existence of urban and out-of-town differences is confirmed by the significance of the main effect of Area. The significant effect of Period once again confirms how MST responses evolve as the SPM exams approach at the end of the year. Further analysis of the MANCOVA results have illustrated how MST’s number of years of teaching experience can have an effect on their perception of the policy, especially relative to how useful they think support measures have been and also perception of their linguistic competency in English. The results also show that the linguistic environment of the school can impact how teachers perceive their own and their students’ linguistic proficiency.

Factor analysis results reaffirm descriptive and MANCOVA results: it highlights MST’s concerns about their students’ linguistic abilities but it picks up variance related to both BM and English, the two languages used for SPM M & S papers. It also illustrates teachers’ anxieties about their own linguistic abilities – here the factor analysis reiterates what the descriptive results have shown. MST are at very much at ease in BM, English is the language that causes them to worry. The factors also echo what was found in the MANCOVA – that there is significant variability in MST’s perception of the support measure provided, and perceptions about their exam preparation. The final factor, Factor
6, however, brings a dimension that was not in either the descriptive or MANCOVA results – that some MST may not regard English as suitable language of instruction for M& S and would prefer BM.

Having presented the quantitative results of the data analysis in this chapter, the next chapter turns to the presentation of qualitative results.
Chapter 6
Presentation of Qualitative Results

6.1 Introduction

This chapter presents the qualitative data obtained from the two case study schools. A portrait of each school in terms of the following dimensions is provided first: the case study’s history, physical environment, profile of its student population, teaching staff, school leadership and administration as well as its performance in national, standardised examinations. These are followed by the profiles of the MST who were interviewed and observed in each school. The data from classroom observations is grouped according to the school in which each MST teaches. Partial data from interviews with the principals and ESL teachers as well as data from observations of EMS training sessions will be incorporated into the presentation of data as needed. Data obtained from student interviews will not be presented in this chapter, but will be incorporated as needed into the discussion in Chapter Seven. The data from SMK Gaharu will be reported first, followed by results from SMK Kayu Manis.

6.2 Results for Case Study Sites: SMK Kayu Manis and SMK Gaharu

In the sections below, the results from observations, interviews and field notes concerning the two case study schools, SMK Kayu Manis (out-of-town school) and SMK Gaharu (urban school) are presented. A detailed description of each case study school – its history, physical environment, students, teaching staff, leadership and administrative structure – is first provided. This is followed by the profiles of selected MST who were interviewed and observed in class. Not all MST profiles are provided. Usually, the most complete profiles, and those that allow comparisons across subjects, data collection periods and student levels (Form Four/Form Five) were selected for presentation.
6.2.1 Portrait of SMK Kayu Manis

6.2.1.1 History

SMK Kayu Manis is a Grade A secondary school [enrolment of above 1000 students] situated in the district of Larut, Matang and Selama in the state of Perak. It is classified as a rural school by the state Department of Education. As far as schools go, it is not old, having been established only in 1983. At that time, it had only seven Remove Form\(^2\) and two Form One classes. The total enrolment was 321. Over the years, enrolment has increased considerably. In the late 1990s, it reached a peak of about three thousand students. Current student enrolment stands at 1447.

Due to the pressures of a growing school-age population and a directive from the MMOE that classes can only have a maximum of thirty students, two sessions are held every day. The morning session, which runs from approximately 7.15 am to 1.30 pm is for the upper secondary students and Lower and Upper Form Sixes. The afternoon session runs from 1.45 pm to approximately 6.00 pm. This session is for the lower secondary students. Upper and lower secondary students, therefore, share their classrooms, but use them at different times of the day.

6.2.1.2 Physical environment

SMK Kayu Manis is located just off a main road. There is a low outer wall with a gated entrance leading into the school. A guardhouse is situated just within the gates. All visitors report there and obtain a visitor’s pass from the guard on duty. A tarmac area with open parking space and roofed car shed for the administrators leads up to the buildings.

The buildings consist of four main blocks, A, B, C and D. Each block is 3 storeys high and houses Science Labs, classrooms, a library, a computer lab, counselling room, and

\(^2\) Remove Form classes consist of students from vernacular primary schools [medium of instruction either Chinese or Tamil] who enroll in national secondary schools [medium of instruction Bahasa Malaysia]. These students are placed into the remove classes for a year in order to permit them to become adapted to the new language of instruction.
resource room as well as the administrative offices and meeting rooms. There is also a separate, one storey structure with a few classrooms located at the end of Block A. An open quadrangle with flagpoles and a raised concrete platform is used for morning assembly, ceremonies and musical or theatrical presentations and competitions. The school is equipped with a public announcement system that allows notices about sport practices, schedule changes or any other important news to be heard by all teachers and students anywhere within the school compound. There is a large playing field for various sports and physical education activities adjoining the assembly area. The school canteen [cafeteria] is found in another separate, roofed structure. The kitchen and the dining room for teachers and staff is walled while the area where students eat is open on three sides. Long tables and benches where students can sit and eat are placed in rows here. Each of these structures is connected by covered corridors.

SMK Kayu Manis has a bright, clean and cheery outdoor environment. In the open areas between each block, and around the buildings, there are various types of gardens [Herbal Garden, Reflexology Garden and so forth] and landscaped nooks. These green areas sometimes have art installations in them. In fact, this school has won awards at both state and country–wide competitions for “most conducive school environment”.

The classrooms are open classrooms meaning that doors and windows are open to the outside environment even when classes were in session. All classrooms are usually equipped with a blackboard and teacher’s desk at the front. Fluorescent lamps light the class from the ceiling and, because of the hot, humid weather, there is usually a ceiling fan or two to cool the air. Student chairs and tables are placed two-by-two in rows separated by a narrow aisle in between so that teacher and students can circulate with ease in class. Although some equipment and furniture are rather worn, almost everything is still in good working order. The rather bare classrooms are brightened up by notice boards where students’ artwork and important announcements are posted.

Science laboratories are spacious, long rooms, almost two to three times the size of regular classrooms. They have high ceilings, and like the classrooms, are lighted by fluorescent lamps. The teacher’s table is located on a raised platform at the front of the room. Behind this table, there are four sliding blackboards which can be raised or lowered at will. A small side door in the wall either to the right or left of the platform
leads to a small room. This room is the storage and preparation area normally reserved for laboratory assistants who help Science teachers prepare the chemicals or lay out the equipment needed for class experiments. Teaching courseware, the more toxic chemicals and some lab equipment are also stored in this room. Sometimes, Science teachers also set up a mini workspace or office in this area. In general, all laboratories are stocked with the necessary lab equipment. The storage cabinets are clearly labelled with the English names of equipment that they contain such as beakers, test tubes and retort clamps.

Posters of various sorts, on safety rules in the Chemistry lab or on plant reproduction in the Biology lab, for example, decorate the walls of the labs. There are laptops, portable LCD projectors and pull down screens available in the labs, although during T1, one of the projectors was not in use due to technical problems.

6.2.1.3 Profile of student population

The students in SMK Kayu Manis come from surrounding fishing, farming and plantation areas. With few exceptions, the majority of students enrolled at this school are from low-income backgrounds. Most parents work as vegetable or fruit farmers, fishermen and hawkers, or are engaged in other types of manual work. Many of these are not highly educated, having finished only elementary school or lower secondary education. According to teachers and the senior assistant in charge of student welfare, some students also help their parents out after school. Some students mentioned that during school holidays, they would work as full-time waiters or dishwashers in local eateries, cashiers in supermarkets or as apprentices in various trades.

Due to their backgrounds, parental participation in school life is not active and parental expectations of academic success are not high. Consequently, students do not have a strong sense of identification or belonging in school nor do many of them have high hopes of academic success. The financial precariousness of their family also sometimes forces students to quit schooling altogether. One Form Three student, for example, was withdrawn from school by his father. This was because the latter, who was a fruit harvester, had injured himself and needed his son to take over as bread winner for
the family. Given this context, one teacher interviewed commented that, “Those students who succeed are fighters, real fighters.”

The student population is multi-racial and multi-lingual. Students come from the three main ethnic groups, namely Malay, Chinese and Indian. In the corridors and in classes, spontaneous conversations are carried on by students in Bahasa Malaysia, Mandarin, Hokkien, Cantonese [Chinese dialects], Tamil and the Northern Malay dialect. English can also be heard during certain classes. Despite this mix of languages, Bahasa Malaysia is the preferred lingua franca among students of different linguistic backgrounds. SMK Kayu Manis is a mixed school with boys and girls in all classes at every level from Form One to Upper Six. Students range in age from twelve plus [Form One] to about twenty or twenty-one [Upper Form Six].

6.2.1 A Profile of teaching staff

SMK Kayu Manis has a teaching staff of ninety – one teachers. Like the students, they are also drawn from multi-racial, multi-lingual backgrounds. In the staffroom, teachers can be heard conversing in Bahasa Melayu, English, Tamil, Mandarin and Hokkien. Some teachers are fluent speakers of multiple languages (at least three) and switch from one to another with ease.

The atmosphere in the staffroom is convivial and relaxed. The room is airy and well lit, and equipped with fans and air conditioning units. Each teacher is assigned a carrell or desk. Teachers from one end of the room can be seen traversing to the other end to ask about when paperwork is due or just to have a chat with their peers. Sometimes, teachers passing by other teachers’ desks will make funny comments or joke with each other. Teachers’ desks are usually piled high with reference books, textbooks, past year exam revision books and student notebooks waiting to be corrected or redistributed to students.

The quasi-totality of these teachers are degree holders. A few teachers have already completed their Masters degree and some are working on getting it. A teaching load of about 24 – 26 periods per week seems to be the norm for most. Each teacher is also responsible for at least one co-curricular activity such as a uniform unit (for example Police Cadets, Youth Cadets), sport (for example Athletics, Volleyball or Soccer) or
society (for example English Society, Life Skills Society). Several of them also have additional responsibilities such as coordinating internal tests/exams, being involved in committees set up by the District/State Education Department or participating in ad hoc committees for special events in school. Teachers can be, and often are, called up to attend professional development courses or information sessions planned by the MMOE, or the state or district education department. These courses can be one-day seminars and workshops held within the state or they can be longer courses or conferences held in other states. Those teachers who are active in sports can also be called upon to act as judges, referees, timekeepers, linesmen and so forth in sports meets at district, state or national level. Administrators and senior teachers, such as the principal and heads of the various subject panels, are often required to attend meetings called by the state or district education department as well.

6.2.1.5 Profile of school leadership and administration

SMK Kayu Manis, like most other secondary schools in Malaysia, is administered by a principal and a team of three senior assistants. After the principal, the first senior assistant is next in line in the administrative hierarchy followed by the senior assistant for student welfare and the senior assistant for co-curricular activities. These administrators are often experienced teachers who are promoted into position. They teach as well, although they usually are assigned only half or less of the regular teaching load due to their administrative duties. Each subject or group of subjects has its own panel, usually headed by an experienced teacher. Therefore, there is a Head of the Science panel, Head of the Mathematics Panel and so forth. These senior teachers supervise the teaching of their subject(s) to make sure the MMOE’s programmes are being implemented; conduct training if necessary, disseminate information concerning the syllabus and exams provided by the MMOE, JPD or PPD; coordinate the writing up of monthly test and exams for their subject(s) and the analysis of the results; and provide support to the teachers under their charge as needed.

During T1, when I first arrived in SMK Kayu Manis, its principal was already in the retirement process, and it was the first senior assistant who was in charge of the school
administration. The present principal, Encik Syafirul, arrived in July 2007 to take up his new position. Although he is new to the school as a principal, Encik Syafirul, had already taught in SMK Kayu Manis and served as its senior assistant for student welfare for five years, from 2000 to 2005. During that period of time, he and the other administrators tried to set up a “positive-thinking” culture in school. The former principal had also embarked on a school beautification programme, creating various types of gardens out of the empty spaces between school blocks. Encik Syafirul credits these efforts with a gradual transformation in the school’s culture. He feels that if students experience success, whatever form this may take, whether it be in sports, arts, extra-curricular activities or academics, they will be more inclined to like being in school and therefore, less likely to make mischief, absent themselves or quit school. This is how he puts it:

If they want to love the school, they must feel they are…they can contribute something. And then, I can make them feel, they can contribute and they themselves can, you know, get something, you know…If students always fail in their everyday activities, they, they make them a failure, you know.

He describes his own style of leadership as somewhat “eclectic” – for him, the decision-making process must fit the situation at hand. Moreover, since many teachers know him from the time he was senior assistant in the school, they are quite friendly with him and feel at ease approaching him to discuss problems or issues.

Encik Syafirul is a Physics teacher. Therefore, in terms of PPSMI implementation, he has experienced the transition of teaching in Bahasa Malaysia to teaching in English himself. His own primary and secondary education was in the English medium, so the process has not been very difficult. He is, in fact, quite enthusiastic about the idea of students becoming fluent in many different languages because he feels that it allows them to become “global citizens” who are free to travel wherever opportunity takes them. However, he is very aware of the fact that there are teachers in his school who are still struggling with this policy:

Because, mostly all the teachers, ah, basically, they speak in Malay, their education’s in Malay, and suddenly they want to teach in English. And I find my, my many of my teacher uh, got problems in communicating in English.
He also points out problems that specific groups of students are experiencing with learning in English. Chinese and Indian students who obtained their primary education in their mother tongues may in fact have problems with both official languages of instruction:

Because for example, the Chinese uh, before this they got problems in Bahasa Malaysia, you know. Now they got another problem, in Bahasa Inggeris. So now they got two problems. The Malay students, before this they got no problems in language, but now they got another problem, in English. Ah, but you know, I think we are stuck in a situation where, you need English.

Knowing that staff and students are having these difficulties with language, he has already planned for every Wednesday to be English Language Day in SMK Kayu Manis, a day in which everyone is encouraged to use the English language in school. He is also extremely supportive of any initiative on the part of his teachers to raise the standard of English among teachers and students – he tells them to just come up with the ideas and let him worry about finding the funds to run the activities.

In general, the teachers in SMK Kayu Manis find Encik Syafirul a principal who is supportive of their efforts in the academic arena and in other activities as well. They mention that he is easy to approach when they have problems and open to suggestions.

### 6.2.1.6 Performance in national, standardised examinations

Its first batch of students to sit for the Sijil Rendah Pelajaran (SRP) was in 1985. Out of 106 students, 57 passed (success rate of 54%). In 1991, SMK Kayu Manis’ students sat for the Sijil Pelajaran Menengah (SPM) for the first time and obtained a success rate of 48%. The Science Stream was introduced in 1992. Over the years, the teaching staff of this school has worked hard to increase the level of academic success in the standardised examinations.

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3 At secondary level, national examinations are administered at three different levels. The SRP [now called the PMR] is taken by students at the end of their Form Three studies. Students in Form Five sit for the SPM examination while those in the Upper Six Form sit for the STPM [Sijil Tinggi Pelajaran Malaysia]
national examinations. For example, in the 2005 SPM exam, the success rate reached a high of 82%.

6.2.2 Portrait of SMK Gaharu

6.2.2.1 History

SMK Gaharu is also a Grade A secondary school in the district of Larut, Matang and Selama. It is classified as an urban school by the state Department of Education, being located right within the town area. It was founded during the colonial period and is more than a century old. It is a school with a long history, distinctive “school spirit” and proud sporting traditions. Over the years, it has produced illustrious alumni who are or have been high-ranking government officials and wealthy, prominent public figures in Malaysian society. Its alumni association networks actively and continues to raise funds for infrastructure and activities for its alma mater. For example, the alumni association donated twenty desktops to SMK Gaharu in 2002 with proceeds from its fundraising activities. It is considered a premier school (for sports) and was one of the pioneer schools for the SMART (tech-ready) school project in 1999. When the researcher was there, SMK Gaharu was in the process of setting up a wireless network within the school for teaching and administrative purposes.

SMK Gaharu is essentially a boys’ school. All classes from Form One to Form Five are boys only. However, there are mixed classes of boys and girls for Lower Six and Upper Six forms. Student enrolment hovers at around 1500.

6.2.2.2 Physical environment

The road leading to SMK Gaharu is off a main road and lined with tall, stately old trees. The entrance is walled and gated, with a guardhouse just past the gates. As with SMK Kayu Manis, all visitors report to the guards on duty there and obtain a visitor’s pass before being allowed further onto the school grounds.
SMK Gaharu’s buildings are divided into six blocks: A, B, C, D, E and F. Blocks A, B and C are obviously of an older architecture. These gracious two-storey structures with high ceilings, thick pillars, wide balconies and arched corridors date from the colonial era. They house administrative offices, the teachers’ staffroom, classrooms, the library, the computer lab, two science labs and a conference room. Blocks D, E and F are more recent constructions. They are only one storey high and serve mainly as classrooms and science labs. An open quadrangle with a raised platform and flagpole faces the administrative offices located in block A. This quadrangle serves as an assembly place for students every morning when the weather is fair. During foul weather, the morning assembly is held in a cavernous, hangar-like hall. This hall also functions as an examination hall for major exams. Adjacent to the hall is a large playing field enclosed by wire fencing. The buildings are connected to each other by covered walkways. The open areas around SMK Gaharu are tended and landscaped by various student groups such as the St-John’s Ambulance Society and the Tamil language society. This makes for clean, neat and green outdoor spaces.

As for the classrooms, there is usually a blackboard or white board and teacher’s desk at the front of the classroom. Desks are placed in rows, two-by-two, with aisles in between rows. A notice board or two is usually located at the back or in front, beside the blackboard. Although the equipment and furniture looked somewhat worn, students make efforts to add decorative touches to their classrooms with things like posters and tablecloths for the teacher’s table.

The eight Science laboratories are spacious and well equipped. Equipment is neatly stored in cabinets. These are marked with the English names of the equipment stored inside. There are laptops, portable LCD projectors and pull down screens available in all eight labs. Being a SMART school, SMK Gaharu also has 2 computer labs with 3 servers and 80 desktops, 74 of which are networked. The network is available to teachers and students twenty-four hours a day, seven days a week. The school has also recently acquired wireless networking capacity. Teachers are able to store notes and activities on one of the servers. Students can access these materials easily using their passwords. Teachers are required to integrate ICT into their teaching in SMK Gaharu. Teachers have to send in reports about their frequency of ICT use, hours of use and so forth to school
administrators. At the time of data collection, the school was also working its way to obtaining International Standards Organisiation (ISO) certification. This involved a lot of work and coordination among office and teaching staff.

6.2.2.3 Profile of student population

A few students are from well to-do families, and many students in this school come from middle-class backgrounds, with parents who are civil servants, teachers, technicians or self-employed. However, according to school administrators, more than half of the students come from families with low socioeconomic backgrounds. Parents are not very involved in school life according to teachers and the principal. On the other hand, due to their professional backgrounds, some parents seem to be quite pro-active and aware of their rights as parents as well as the rights of their children. They are also very concerned about their children’s exam performance. For example, SMK Gaharu is now holding extra classes after regular school hours. This happened as a result of parents complaining to the District Department of Education, comparing SMK Gaharu unfavourably to other schools that provided this additional academic support.

The student population is predominantly Malay (about 70%) although there are also Chinese and Indian students as well. Therefore, when students chat among themselves in the corridors and in class, Bahasa Malaysia, the Northern Malay dialect, Mandarin, Hokkien, Cantonese and Tamil can be heard during these conversations. English is also used by students in certain classes. However, Bahasa Malaysia seems to be the preferred language when cross-ethnic conversations occur, even though English is sometimes used as well. Some students also occasionally use a mix of English and their own dialect in group conversations.

6.2.2.4 Profile of teaching staff

The teachers in SMK Gaharu are also of multi-racial, multi-lingual backgrounds. SMK Gaharu has a teaching staff of approximately a hundred teachers. Most teachers
speak two languages and a few are at ease in multiple languages, switching from one language to another without much difficulty.

The staffroom is located on the first floor of one of the older structures. Space is somewhat limited, but it is well-lit and equipped with fans. Each teacher is assigned their own carrell. Teachers seem to rarely have time to chat or conduct informal exchanges. This could be due to the number of extra programmes in which the school participates – these keep the teachers busy. Some Science subject teachers prefer to work in their labs and therefore do not appear often in the staffroom. On teachers’ desks, there are often piles of students’ exercise books that have to be corrected, textbooks, reference books, past year exam revision books, a copy of their teaching schedule and sometimes, circulars from the Education Department or Ministry. Almost all teachers are degree holders. Some teachers already have their Masters while others are enrolled in Masters programs. Most teachers teach between 24 – 26 periods per week. All teachers are also in charge of at least one co-curricular activity such as a uniform unit, sport or society. Some of them also have additional responsibilities such as being involved in organising the annual Sports Day, being a marker for the Examinations Board or participating in the training of teachers at school, district or state level.

6.2.2.5 Profile of school leadership and administration

The administrative structure in SMK Gaharu is the same as that found in SMK Kayu Manis. The principal and three senior assistants are generally responsible for various administrative duties related to the day-to-day running of the school. Here as well, there are panels for various subjects, headed by experienced, senior teachers.

The principal, Encik Shukri, has been in position since the end of 2004. He is an experienced teacher and was a principal in a school in a neighbouring state before being transferred to SMK Gaharu. In fact, this is not the first time he has been posted to this school. Encik Shukri was also first senior assistant in SMK Gaharu for five years before being promoted to the position of principal. As such, he is familiar with the particular culture present in this school due to its historical achievements and traditions. He mentions that like all principals, he tries to fulfill the mission and vision statements put
forth by the MMOE and JPN. However, in addition to these, he has the responsibility of seeing to it that his students are well-rounded individuals as the time-honoured mission of the school is encapsulated in the three words, “A scholar, a gentleman and a sportsman.”

There is pressure on the school from the better-educated parents in terms of academic performance as well as pressure from the alumni association to maintain their excellent performance in sports. He also points out that since SMK Gaharu is practically an all-boys school, they are often confronted with disciplinary problems. Therefore, teachers tend to maintain a strict level of discipline in school. In terms of leadership, he points out that I had already witnessed how teachers can come in to talk to him (twice during our interview, teachers knocked on his office door and came in to consult him on various matters). He is of the opinion that teachers can approach him easily because he has been in SMK Gaharu as a teacher and senior assistant before. He tries to keep the channels of communication open between the teachers and himself.

Encik Shukri himself was educated in the Malay medium. However, as the principal of a school such as SMK Gaharu, he sometimes has no choice but to speak English, especially when he represents the school at dinners, fundraisers and social events organised by the Old Boys’ Association. The alumni often converse in English among themselves. He understands the government’s rationale underlying the PPSMI policy. On the other hand, he finds that the initial move to put this policy into practice was so rushed that the school found itself unprepared:
In reference to the implementation of PPSMI, Encik Shukri tries to lead by example; he makes it a point to speak in English with teachers, just to show them that even if they do not speak English perfectly, they still should make the effort. On the other hand, there are also a number of MST who have demonstrated growing confidence in their abilities. Encik Shukri thinks the problems that teachers are experiencing will decrease in the long term. He draws a parallel between the former switch from English under the colonial government to BM after Independence and notes that in the beginning, the non-Malay teachers struggled too, but now all of them can teach in BM. Some of them asked for early retirement because they were in a panic or could not cope; there is a small group of Malay teachers who are doing the same under PPSMI as well.

The teachers spoken to in SMK Gaharu were of the opinion that Encik Shukri was someone they could go to with their problems. His caring attitude towards students and his support of their teaching endeavours was much appreciated by his teachers.

6.2.6 Performance in national, standardised examinations

In terms of exam performance, SMK Gaharu’s results would not be considered exceptional. Its pass rates for the PMR hover around 85% while the rates for the SPM exams are around 65%. The school has been trying to improve on its performance by trying to attract students with good UPSR results into its Form One classes.
6.2.3 MST profiles for SMK Kayu Manis and SMK Gaharu

The profiles for SMK Kayu Manis and SMK Gaharu are presented below. Each profile provides details about the MST’s years of experience, academic background, their role in the school’s “buddy system”, their perception of the PPSMI policy and their linguistic patterns when teaching their classes.

6.2.3.1 SMK Kayu Manis MST Profiles

6.2.3.1.1 Mr. Ang

Mr. Ang, a Chemistry teacher, was educated when English was still the language of instruction in Malaysian schools. He has an undergraduate degree in science education. He has more than 25 years of experience teaching Chemistry and is completely comfortable teaching it in English. Before the introduction of PPSMI, he had always taught in Malay. Mr. Ang has taught in several schools on the West Coast of Peninsular Malaysia. He has been awarded the title of “Excellent Teacher” (Guru Cemerlang). He takes on the role of “critical friend” in SMK Kayu Manis’ Buddy System.

He mentions that he welcomes this policy with open arms: “I think it’s good for the country, and it’s good for the children long term, long term, because we’re going to globalisation and English is one of the international language[s].” However, although he himself has no problems with the change in language of instruction, it is not the case for the students he teaches. He is confronted with a large continuum of English proficiency in his Chemistry classes. The classes he teaches are considered “good classes”, but there can be students who are proficient, average and not proficient at all in English within the same classroom. Therefore, he needs to take into account not only the students’ content knowledge but also their language proficiency when teaching. This, of course, involves extra planning and preparation in order to support their learning. He mentions that in terms of lesson planning, he might actually prepare Plan A, Plan B and Plan C in anticipation of the difficulties students might encounter. Throughout the year, he was implementing various techniques for getting students active and involved in the classroom, such as pair-share-report, ability grouping and a system he calls “traffic light” or “SOS”: his students can call out to him, “Teacher, I need help!” and he will go to
them. So, he has put in place strategies for giving more help or attention to those students who need it.

He was observed teaching 5 Science and Technology 1 (5ST1), also the best class in Form Five in this school. His teaching experience and ease in English (and also Malay) come through in the classroom. He is able to explain in simple and clear English to his students. During T1 and T2, Mr Ang taught almost exclusively in English. His students, on the other hand, did not appear very comfortable using English although they made efforts to do so during T1. In order to answer his questions, some students resorted to reading the textbook, line by line or would take a long time to formulate their answers. During T2, some of his students were actually using short English phrases to answer questions in class. During T3 teaching, however, Mr Ang handed out notes in BM. He also used BM terms and encouraged students to use Malay to express themselves if they were unable to do so in English; something he had never done in T1 or T2. He explains that weaker students did not perform well on the structure and essay questions during their mid-terms and Trial Exams:

…at this stage, I can’t help it. I have to let them know that, er, they, not to give up but to use a bit of rojak (mixed) English. Where there are some English terms but when they start to explain, they might use the Malay.

He also mentions directing some students to older reference books in the school library which are in BM only.

6.2.3.1.2 Puan Sarjit

Puan Sarjit is a Biology and Science teacher who has almost twenty years of teaching experience. She received her primary and secondary schooling in English but went to university in BM. She holds a bachelor degree in science education. She had always taught in Malay since starting her career until PPSMI came along. Puan Sarjit taught in urban areas before being posted to SMK Kayu Manis, where she has been teaching for fourteen years. She mentions that she enjoys teaching in English and says that even when she was teaching in BM in her previous urban area schools, she would sometimes use
English during her teaching. She has always been highly proficient in that language. In fact, English is the predominant home language for her family. In the Buddy System, Puan Sarjit plays the role of a Critical Friend. She was observed teaching 5 Vocational and Technology 2 (5VT2), classified as average to weak in this school. Although Puan Sarjit is very fluent in English, when she was observed teaching during T1 and T2 however, she spent almost equal amounts of time teaching in English and BM. Puan Sarjit often explains a point in English and then translates the same idea into BM. She also keeps the English terms when translating into BM, but more often than not, she explains to the students entirely in BM. Her pattern of teaching resembled that of the other teachers teaching Form Five: during T1, teaching students the syllabus content was the emphasis. T2 teaching began to incorporate more references to the SPM exam and the kinds of questions that would likely appear. Her students would often ask her questions or make comments in BM, but they would read out the questions or answers in English. Her T3 lesson was entirely focused on exam revision. At the beginning of class, she tells her students:

Sekarang saya tak kisah kalau kamu nak pilih untuk baca dalam Bahasa Inggeris atau Bahasa Melayu, tak apa. Saya nak jawapan yang betul
[translation: Right now, I don’t care if you choose to read in English or BM, it doesn’t matter. I want the correct answer.]

She explains to me in her T3 interview: “And at the end of the year, the students actually approached me to teach them in Malay. Although they had been exposed to all the terminology and all that in English, they were like, desperate, you know.” Like Mr. Ang above, Puan Sarjit is trying to ensure that students do not give up hope simply because they do not pass or do well in their English-only exams in school.

6.2.3.1.3 Mr. Ho

Mr. Ho is a Physics teacher with nineteen years of teaching experience. He underwent all of his education, from primary school to university, in Bahasa Melayu. He has a bachelor degree in science education and has taught in schools both on the East and West Coast of Peninsular Malaysia. Mr. Ho was assigned the role of buddy in the Buddy
System. Like Mr. Ang, he is also a strong supporter of this policy. On the other hand, unlike Mr. Ang, he has had to undergo a more arduous learning and adjustment process due to his lack of proficiency in English. In the initial stages of implementing PPSMI, Mr. Ho was intimidated and stressed at the idea of having to stand up in front of the class to teach in English because he felt that his English was not good enough. He describes how he relied on CD courseware provided by the Ministry of Education in the beginning because, “Otherwise, I dare not to stand in front and teach in English.” However, with help and mentoring from more proficient colleagues, he has worked at improving himself to the point where he only occasionally uses the CDs now. In fact, he is already preparing his own teaching materials in English. However, he still needs more time than before to prepare for classes. Indeed, since this is the first year where both the Form Four and Form Five Math and Science subjects are being taught in English, he prepares every night before classes. He was observed teaching 5ST1 during T1, T2 and T3.

During T1, T2 and T3 teaching, Mr Ho was speaking to his students almost exclusively in English. Apart from two brief incidents where he communicated with students in other languages (once in BM during T2, once in Mandarin during T3), all his teaching, questioning and notes were done in English. During T1 and T2, when he asked the students questions, they would respond by giving one- or two-word answers. By T3, most students were still giving one- or two-word responses but there were a few who were able to ask their questions in English. His teaching shifted slowly from teaching the content of topics in the first observation, to drawing students’ attention to the fact that the topic being taught has appeared in SPM exams in the past years in T2 to practising with exam papers throughout the entire class during T3. He does mention in his T3 interview, however, that he was shocked by how low students’ scores were during the Trial exams: “Through my years of teaching, I’d put it, this is the weakest batch. The weak, weakest batch.”

6.2.3.1.4 Encik Nasir

Encik Nasir is a Mathematics teacher. Like Mr. Ho, he has nineteen years of
experience teaching. He also holds a Bachelor in Mathematics Education. At present, he is working towards his Master’s degree in Science Education. He had spent the previous 18 years teaching in a school where both teachers and students were predominantly Malay. It is his first year being a teacher at SMK Kayu Manis. He also participates in the Buddy System as a buddy. He much prefers the former policy of teaching in Bahasa Malaysia. Encik Nasir feels that after nineteen years of teaching in Bahasa Malaysia, with the new policy he has to start from scratch, “Now I have to start from the beginning.”

This means putting much more time into lesson preparation in order to be ready for classes. However, in line with the policy, he has willingly worked on improving his own English by reading a lot of books and newspapers in English and also watching television. He also participates as a buddy in the EMS activities organised by the English teachers. Like the survey participants quoted above, he feels that the policy has a differential effect, depending on the student’s linguistic ability:

If they’re good in English it, so, there won’t be any problem about the question in English. But some of the students, if their English not very good, really affects, really affects. Their understanding to the question, first…

He mentions how, in order to compensate for his students’ weakness, he has taken on the role of translator in class.

For the class that are not very good, I have to speak English. Then I have to interpret in Malay, that for sure. Otherwise, they all don’t know what’s going on.

He was observed teaching Additional Maths to 4S1, the best class in Form 4. What is interesting, given his own reservations about his level of proficiency, is that when observed, he valiantly taught the entire lesson in English, using Malay only sporadically, despite hesitations, grammatical mistakes and difficulty in finding the right words. On the other hand, he did not seem particularly at ease teaching in the language. His students were attentive but unwilling to participate in English. Mr. Nasir often ended up answering his own questions. However, when whole class instruction was completed and students were working out the sums he assigned, he would walk around the class and provide explanations in Malay to those students who did not understand.
6.2.3.2 SMK Gaharu MST profiles

6.2.3.2.1 Mr. Wong

Mr. Wong is a very experienced, senior Science teacher. In total, he has taught for about 30 years. He was educated when English was still the language of instruction in schools in Malaysia, and went to university in the UK. He has an undergraduate degree in Chemistry and Mathematics from a British university and also holds a Diploma in Education from a local university. He actually began his career teaching in English before making the switch to Malay. He has taught in various schools along the West Coast of Peninsular Malaysia and is currently the Senior Science teacher in SMK Gaharu. Within the Buddy System, Mr. Wong plays the role of “critical friend”.

He is quite at ease with the PPSMI policy: “I find that the teaching of PPSMI is actually the best method...they have so many reference books to refer to... We didn’t have any reference books at all, except those by the Dewan Bahasa dan Pustaka” He is the Head of the Science Panel and a “master teacher” in SMK Gaharu. As the senior Science teacher at SMK 2 who is in charge of training other MST, he observes that some teachers are encountering difficulties with PPSMI:

“...when we train the teachers we need time, you know. You cannot just give them six months of training or four months, four months of training and then ask them to implement the thing. They, they find it very difficult. Their sentence construction and then, the pupils’ [...] achievement compared to the teacher achievement in English, the pupils tend to be higher, at a higher level than the teachers. So the teachers are reluctant to use the English language. So they feel a bit of inferiority there.” (emphasis added)

In his own teaching, he believes that learning should be meaningful to students and tries as much as possible to have student-centred activities in the classroom. In fact, he was the only teacher who employed a pre-test and post-test (during T1) to

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3 The Dewan Bahasa dan Pustaka is the equivalent of l’Académie Française in France. It is the organisation that statutes on linguistic issues related to BM, such as what constitutes correct usage of BM, new words, acceptable “borrowed” words and so on. It does much of the translation of literary and scientific works from other languages into BM and also produces what is often considered as “the” definitive BM dictionary, Kamus Dewan Bahasa dan Pustaka.
find out how much his students had learned from the lesson. In SMK Gaharu’s Buddy System, he functions as a Critical Friend. Mr. Wong was observed teaching 5 Science 1 (5S1), the best class in the whole form. His comfort level in both English and Malay is evident when he is teaching in class. Observed during T1 and T2, he conducted the lessons almost a hundred percent in English, but made one or two very brief translations when students requested clarification in Malay. His students also seemed comfortable with being taught in English. Most students used English when addressing him and responded to questions in English. During T1, the lesson focused more on teaching students content. Mr. Wong was observed scaffolding his students’ learning as he led them through the key steps of the scientific method – inference, hypothesis, investigation, variables and so on. However, during T2, Mr. Wong started pointing out to students that certain sub-topics would appear in the SPM exam. He also gave them pointers on how to get maximum points when answering SPM questions. Mr. Wong was not observed during T3 because his students were attending a revision programme [Progam Intervensi] prepared by the State Department of Education. However, he confirms in his T3 interview that without it, he would have gone over short concise notes with his students to recall important points and also looked at past year SPM questions as well as Trial Exam questions from other states, with a focus on exam answering techniques.

6.2.3.2.2 Encik Hamdan

Encik Hamdan is an Additional Mathematics and Mathematics teacher. He has a first degree in Mathematics. He has been teaching in SMK Gaharu for fifteen years. This is his first and only posting. He has a very positive opinion of PPSMI. He has no problems implementing it. This is his second year implementing PPSMI. He started teaching Form 4 in English last year and it is his first time teaching Form 5 in English. In his opinion, the main challenge for him is to improve on his grammar, which is not very good and to feel at ease in the language in terms of mathematical terms. Since he has been teaching
for fifteen years and the syllabus has not changed much, he does not feel that subject content poses any problem. He feels that this policy does not have much of an impact on his classes because Math is not so much about language. It is about numbers. He thinks that PPSMI would have a bigger impact on the Science subjects. In any case, even during T1, he states his teaching objective baldly:


[Translation: I teach Maths, and mainly, Add Maths. I focus more on answering the exam. That’s all. To answer the exam.]

Encik Hamdan was observed teaching 5 Science 1 (5S1), the best class, for all three periods of data collection. He was also observed in 5 Humanities and Literature 2 (5KS2), one of the weakest classes in the form, during T1 and T3. When observed in class, Encik Hamdan teaches much of the time in English in 5S1 lessons, about 80% of the time. However, his use of Bahasa Malaysia increases noticeably when he is in 5H2. Although he sometimes switch to Bahasa Malaysia while teaching in 5S1, he does so more often when students pose a question in Malay during whole class instruction or when they approach him individually. Typically when teaching in BM, he retains the English Mathematical terms. Occasionally, he provides the BM equivalent of the term. When teaching in 5H2, this switch happens more frequently, without prompting by students. His students in both classes preferred to address him in BM when they spoke to him.

Given his objective of teaching his students to answer SPM exam questions, it is not surprising that even during T1, he already mentions to 5S1 students that a certain sub-topic will appear in Paper 2 (long answer), how many points are normally allocated to such a question and what to do to avoid losing marks. He was not observed doing so with 5H2 during T1. His teaching during T2 with 5S1 remains similar to that of T1. During T3 for both 5S1 and 5H2, the entire lesson was centred on exam revision, i.e. doing past year exam questions. Either Encik Hamdan or his students would read out the question in English and proceed to work out the solution. He informs me that for 5S1, “out of seventeen topics maybe fifteen topics I, that I go through.” In contrast, for 5H2, “certain,
certain question only. Maybe four question, like that. And the four question is basically
on drawing, not much on calculation.”

6.2.3.2.3 Puan Salmiah

Puan Salmiah is a fairly new Chemistry teacher with six years of teaching experience.
She was educated entirely in Malay, from primary school to university level. She has a
bachelor in science (Food Technology) and a Diploma in Education. Puan Salmiah has
always taught at SMK Gaharu and is the head of the Chemistry panel in this school. She
participates as a “buddy” in the Buddy system. Having been educated entirely in Malay,
from primary to university level, Puan Salmiah finds that it has not been easy for her to
teach in English:

Yang paling sukar sekali bagi guru, bagi saya, secara personal, untuk
berkomunikasi dengan pelajar. Kita sebenarnya tidak boleh menggunakan
perkataan – perkataan yang canggih mengikut buku...kita kena gunakan
simple sentence. Jadi ini bermaksud guru kena belajar balik, pada asalnya,
pada peringkat awalnya, dalam Bahasa Inggeris, bagaimana untuk membina
ayat – ayat yang senang.
[translation: The hardest thing for the teacher, for me personally, is to
communicate with the students. We cannot really use sophisticated words like
those in books...We need to use simple sentences. So this means that the
teacher has to learn again, right from the start, from the early stages, how to
make simple sentences in English.]

However, she has taken the initiative to surf the Internet for English teaching materials in
order to improve her own teaching and also to become more comfortable with the
language.

She was observed teaching 4SE1, considered an average class in SMK Gaharu.
Classroom observations for Puan Salmiah only occurred during T1 and T3. Due to a
redistribution of teaching duties, Puan Salmiah was assigned to teach a lower Form Six
class during T2, and only came back to teaching 4SE1 sometime in the later half of the
year. When she was observed, she carried out the lesson mainly in English with an
occasional translation of important terms or explanations in Malay when students
requested it. For example, she switched to BM in order to make her instructions clear to
the students because they seemed uncertain about what to do during a titration experiment. Even though not all her students could speak English well (some of them responded to her questions in Malay), they generally understood her explanations and actively participated in class activities. She has learned as well that she needs to target her lessons at three different categories of pupils in order to successfully implement PPSMI: those who are fluent in English and have a good grasp of basic concepts, those who understand the concepts but who are not motivated to work on their linguistic skills and those who have neither an understanding of concepts nor a good command of English. For her, the challenge then is not only to master the English language but also to find ways to motivate the latter two categories of students.

6.2.3.2.4 Encik Yusri

Encik Yusri is a Mathematics teacher who has been teaching for thirteen years. Like Puan Salmiah, he received his primary, secondary and tertiary education in Malay. He holds a bachelor in mathematics education. He has also recently obtained a Masters degree in psychometrics from a local university. Also like Puan Salmiah above, SMK 2 is his first and only posting. In addition to his teaching duties, Encik Yusri is also in charge of coordinating the timetables at SMK 2. Like Puan Salmiah, he was also assigned the role of “buddy” and takes part in various activities such as EMS sessions to improve his English. Encik Yusri does not completely agree with the reasoning behind implementing PPSMI, but feels he has to do it simply because it is policy. He feels that if countries like Japan can succeed even if their students are instructed in mathematics and science in their mother tongue, Malaysia should be able to do it too. In terms of his own experience, he finds that he needs to do much more lesson preparation than before. When teaching in Malay, he mentions that “it’s all stored inside of my head”, so teaching preparation does not take up a lot of time. In contrast, when he teaches in English, he struggles because he finds himself not very fluent in English, “how to say, how to plan,…uh, how to find the simple words so my students easy to understand.” Therefore, for him, lesson preparations take more time now than in the past. He mentions how students, especially those in his
weaker classes, will request that he teach in Bahasa Malaysia instead of English because they cannot comprehend the explanations in English. So, in effect, he has to find a balance between teaching according to the PPSMI policy and making sure that his students understand the lesson. These statements were borne out during observation. When he was teaching the lesson, students would address him in Malay and request clarification.

Encik Yusri was observed teaching 4S2, the second best class in Form Four, during T1 and T2. However, during T3, his students were sitting for end of year exams and could not be observed. During both T1 and T2 observations, the pattern of Encik Yusri’s teaching focused on delivering the content, demonstrating how to work out sums on the topic and making students practise additional sums. When asked about his teaching during T3, he points out that the main thing for him is to finish teaching the syllabus.

6.2.3.2.5 Mrs. Chia

Mrs. Chia is a Mathematics teacher. Her basic education is in Mandarin. She started out teaching with a High School Certificate, but obtained her Bachelor of Education a few years ago. She has taught for almost twenty-two years. She explains that she is very comfortable teaching in English, despite her Mandarin education background. This is mainly due to the fact that her husband is not Mandarin-educated. Her children also do not go to Mandarin medium schools. Therefore, in her home, the language of communication with her husband and children is usually English or their Chinese dialect. Before coming to SMK Gaharu, Mrs. Chia had taught in other schools in Perak. In SMK Gaharu’s Buddy System, Mrs. Chia is a “critical friend”.

Mrs. Chia teaches Additional Mathematics (to 4S1 – a strong class) and Mathematics (to 4KS2 – a weak class) as well. She was observed teaching Additional Mathematics to 4S1, the best class in Form Four. In her teaching, she uses English almost exclusively with the students, both during whole class teaching and also in one-to-one or small group interactions with them. All through T1, T2 and T3 she focused on teaching the topics and sub-topics in the Form Four curriculum. When asked whether she does exam preparation with her class, she mentions that for term exams, she may spend
one class to help them revise key ideas or concepts. However, since this is not an “exam year” (non-SPM) class, she is more interested in making sure they have a good understanding of the topics and completing the curriculum.

When I pointed out that she and her students seemed very comfortable in English, she tells me that they are used to it. However, she also points out that she could not do the same with her 4KS2 class. In that class, when she teaches, she has to resort often to translation in order to get her students to understand what she is teaching.

In interviews with each and every one of these MST, they all expressed the concern that their students have to learn the “key words” because key words are important in the marking schema of SPM exam papers. As a result, these teachers will often put verbal stress on these words or repeat them in their sentences to draw students’ attention to them.

6.2.3.3 MST perceptions of school administration

The MST in both SMK Gaharu and SMK Kayu Manis consider their administration to be supportive of their work. The administrators themselves are accessible to teachers and open to suggestions; MST in both schools spoke of being able to see either their principal or senior assistants if they needed help or wanted to discuss specific issues. MST from these two schools mention as well that their administration is quite helpful with financial resources if they need to buy books or if they propose projects for teacher or student learning. When the researcher was in school, she would sometimes see the principal or the first senior assistant making their rounds in school, looking in on classrooms or chatting with teachers in the staffroom. During school assemblies, these administrators would often address the entire school, whether to comment on the beautification of the school, disciplinary problems or simply to give students pep talks as important exams approached. So it can be said that administrative leadership in SMK Gaharu and SMK Kayu Manis is both present and highly visible in the routine of teachers and students.
6.2.3.4 MST’s perceptions of school infrastructure, teaching workload and class size

It must be mentioned that despite their different locations, all the teachers are of the opinion that their schools are well equipped in terms of pedagogical resources and also the basic infrastructure, such as labs, library or computer lab, made available to them. Teachers in SMK Gaharu mentioned that certain teachers would take their classes to the computer labs for lessons. Individually, students would sometimes stay back after school to do research for courses in the computer lab. However, teachers in SMK Kayu Manis mentioned that their students did not or could not make full use of these facilities. Quite a number lived far from school and could not stay after school because they did not want to miss their bus.

Most MST had no complaints about their workload of about 24 to 26 teaching periods per week. MST also teach classes of a reasonable size, with about 20 – 30 students in each class. In both schools, the student population is composed of Malay, Chinese and Indian students, although not in the same proportions. MST often emphasised the importance of discipline in school and in the classroom in order to carry out effective teaching.

6.2.3.5 MST perception and use of teaching courseware and laptops

The teaching courseware that MST received specifically for PPSMI was also positively perceived although the pace of the lessons was thought to be a little slow, especially by the Mathematics teachers. None of the Math teachers was observed using teaching courseware in their classes. These teachers often said that it was more important to have the time to practise sums with their students after every topic and sub-topic, and to finish the curriculum. Science teachers, on the other hand, were often observed using the teaching courseware in their classrooms to supplement their own teaching materials. Mr. Ho, for example, mentioned that sometimes, the images presented in these CDs helped students visualise rather abstract concepts.
6.2.3.6 Perceptions concerning ETeMS programme

With respect to the ETeMS programme, the general opinion among these MST was that it was not really effective in terms of increasing their language proficiency even though they appreciated the ICT component of it. The main problem appears to be that it was designed as a short, one–time course that MST would take to improve their English skills. However, as one teacher, Encik Nasir, points out, “I think within two weeks you cannot, cannot improve your English.” One of the ESL teachers from SMK Gaharu, Mr. Yip, has been involved in this programme as a trainer for MST. In his opinion, some of the modules of the ETeMS are grammar taught in a “decontextualised” manner, so it was difficult for the participants to internalise the knowledge.

From the way I see it…some of the modules, it’s very, very grammar oriented and it’s grammar being taught in isolation sometimes. So, it’s not really contextualised. So, probably it’s quite difficult for people to internalise whatever you want them to learn.

6.2.3.7 MST perceptions concerning the Buddy System

As for the buddy system which was specifically set up in each school to provide an in-school support network, none of the MST seemed to rely much on this system to improve their learning. The senior teachers, for example, are required to play the role of “critical friend” and mentor to the younger teachers. The former mention that they are not often approached for help. The other participants, the buddies, on the other hand, find themselves simply too busy to set up meetings with their critical friends. This was confirmed by the buddy coordinators (two English teachers) who are in charge of organising meetings and activities for MST and their critical friends in SMK Kayu Manis and SMK Gaharu. When asked, they admitted that it was a headache trying to schedule formal meetings and activities. They point out that in addition to being teachers of specific subjects, all teachers are also in charge of at least one club and one society. Some of them sit on school or local Department of Education committees, and are often called to attend meetings or courses outside school. On top of that, although it is not mandatory,
many teachers often feel obliged to give “extra classes” (classes that take place after official school hours) in order to help poorer or weaker students who cannot afford private tuition.

6.2.3.8 Observation of English for Math and Science (EMS) sessions

In SMK Gaharu, EMS sessions for MST are organized by the English teachers. They are conducted in a very structured manner. The session I observed took place on Sunday and lasted about three hours. One of the Senior Assistants was present as an observer of the proceedings. All MST had been asked to prepare a lesson for the respective subjects they were teaching.

Three English teachers, members of the English Panel, were present to give feedback. Interestingly, during the opening of the session, these teachers emphasised the fact that they were language teachers – they were there to correct and provide feedback on the MST’s language use, not the content of their lessons.

SMK Kayu Manis’ EMS sessions were conducted more informally. The purpose of the planned activity also seemed more interactive and social in nature, rather than focused on M & S teaching. For the session I observed, which took place on a Wednesday, after school, MST were asked to simply come prepared to talk with their critical friend about a subject of their choice. During the session, which lasted for about two hours, MST paired up with their critical friend for a discussion.

6.2.3.9 Observation of EST course for 4S1 in SMK Gaharu

The EST course that I observed was a one-period lesson for 4S1 the best class in Form Four. In this lesson, the English teacher was trying to teach students how to use sequencing words such as “First”, “then”, “after that” and so on. These words are found frequently in texts regarding mathematical procedures or scientific experiments. The teacher chose to use a recipe for making a type of noodle soup instead. This may not
seem unusual given that recipes are often used to teach ELL sequencing words in language classrooms. However, EST is a course aimed specifically at teaching students English for Academic Purposes in the domain of Science and Technology. Sequencing words abound in scientific and mathematical procedures. What was surprising was that there was no attempt on the part of the teacher to link these words to a mathematics or science context.

As was described in Mrs. Chia’s profile, instruction for this class can be conducted entirely in English. In her class, students may address her in BM, but she systematically replies in English. Interestingly enough, the English teacher would code-switch into BM, even using the Northern dialect once or twice, without any prompting from the students.

6.3 Conclusion

This chapter has presented the qualitative results of the data collection conducted in the two case study schools. From the portraits of each case study school, we can see that the conditions mentioned in Chapter 3 concerning gaps between urban and non-urban schools can still be observed: these are more obvious in terms of historical differences, socioeconomic background of students, linguistic patterns and parental expectations of school success. However, there are also positive signs that these disparities are being reduced by the MMOE’s policies. This is especially evident in the area of pedagogical resources and physical infrastructure available to teachers and students.

In terms of the role of administrators and teachers, however, we can note the similarities in the school culture. Teachers and administrators have open and positive communications among themselves, but there is a hierarchy of leadership and organisation which is known and respected. Teachers in both schools play a central role in their students’ learning, as the classroom observations have illustrated. With few exceptions, lessons are teacher-centred. Furthermore, although teachers mention the passivity of students, the latter are rarely invited to play an active, participatory role in leading classroom activities. Teachers also respect their disciplinary boundaries – despite the fact that English teachers and M & S teachers participate in the EMS sessions and
Buddy system, their roles remain clearly defined by the boundaries of the subjects they teach. In both schools as well, we can see a continuum of MST’s linguistic abilities in terms of the new language of instruction, English. MST in both schools work hard to teach as much as they can in English. However, their linguistic abilities vary from highly proficient to still developing in terms of their ability to conduct instruction in English.

This section concludes the presentation of the qualitative results from the data analysis. In the next chapter, Chapter 7, the quantitative and qualitative results presented in Chapters 5 and 6 are discussed.
CHAPTER 7
Discussion of Results

7.1 Introduction

In this chapter, the results presented in Chapter 5 and 6 are discussed. This is done with regard to each of the research questions stated earlier in Chapter 4. The discussion is divided into six sections, each corresponding to one of the six research questions. Due to the mixed methods nature of this study, various data sources may be analysed in isolation and/or triangulated.

Questionnaire results are analysed in the clusters in which they were presented, although the analysis may cross cluster boundaries if necessary. The comments that MST wrote in the questionnaires is used to supplement the analysis and also to clarify the choices made by the MST. The results from profiles of each teacher are examined for patterns across time. The main points of interest are the MST’s attitudes towards PPSMI, their use of language in the classroom and also changes in content or format of the lessons observed in response to the SPM. Comparisons and contrast among MST are made as well. Data from interviews with Form Four and Five students as well as those with ESL teachers, administrators and coordinators are incorporated and provide different perspectives on various points.

At the end of the chapter, the findings resulting from the analyses and interpretation are stated.

7.2 Analysis of MST comments, interview and observation results

In this section, MST’s comments from the questionnaire as well as results from interviews and observations are analysed and interpreted. The quotes cited here are either originally in English or BM. Whenever the original quote is in BM, an English translation in square brackets follows.
7.2.1 Research question 1: How do MST perceive the change in language of instruction policy? What are these perceptions based on? Are there differences between urban and OOT MST?

When we look at the responses to S1: *Teaching Mathematics and Science in English speeds up the transfer of scientific and technological knowledge to younger generations of Malaysians*, we can see that after five years in effect, the policy still has the strong support of MST teachers from the urban areas. In answering this question as to how teachers perceive the PPSMI policy, it can be said that the majority of MST teaching in urban areas, agree or strongly agree that the policy is a step in the right direction. Their perception is based on the fact that Malaysians are living in an increasingly competitive world where knowledge of English is perceived as a must for economic survival. Given this context, they feel that it prepares their students to better face the challenges of globalization in the future. One urban MST comments: “Most scientific and technological knowledge whether through journals, internet or TV are in the English language.” Even so, some of these teachers express some reservations that their weaker students might struggle in their learning process: one teacher is of the opinion that, “Students with good English ability will gain more than the students whose are weak in English”. Another urban MST remarks:

There are pros & cons. [The] Positive [side] is students will be able to [be] exposed earlier to the scientific terms, but with [a] poor English background, students [who are] unable to understand well, sooner or later, they will not have any interest in science.

In contrast, many teachers from OOT areas are concerned that it generally disadvantages students from rural areas. According to one teacher who answered the Malay version of the questionnaire:

Polisi ini menyebabkan pelajar – pelajar dari luar bandar tidak mencapai kejayaan/keputusan yang cemerlang dalam subjek – subjek sains dan menutup peluang mereka untuk ke universiti.

[translation: This policy makes it so that students from rural areas don’t achieve success or excellent results in Science subjects and closes the door for their entry into university.]
Another OOT MST comments during T3 that, “Pencapaian sangat rendah kerana kompetensi BI sangat rendah” [translation: (The students’ level of) achievement is very low because (their) English competency is very low]. Mr. Chan, SMK Kayu Manis’ Head of the Math and Science Panel, confirms that this is true in his school as well:

At this moment, those students [in secondary school] using English to study Mathematics & Science are still within the transition period. I don’t think they will perform well. For certain students, I mean majority of students.

It would be expected that the pattern of responses for both groups of MST towards S2: **By learning Mathematics and Science in English, my students will be better prepared to face the increasingly globalised job market**, would be similar to that for S1. However, this is the case for urban MST but not for their out of town peers. If we consider the concerns expressed by these teachers we can see how perceptions can differ based on whether the policy is considered from a macro or a micro perspective. From a macro perspective – Malaysia and its future within a global society – this policy is a bold and visionary move to leapfrog Malaysia into the 21st century. This is the perspective that most urban MST seem to have adopted in responding to both these statements. However, while OOT MST understand the demands of this global reality, as evidenced by their support of S2, their response to S1 is influenced by their concerns at a micro level – the teaching and learning that goes on in actual classrooms across Malaysia. For them, the blanket implementation of this policy may be problematic because of local conditions which cause certain teachers and students to struggle more than others. OOT MST’s doubts as to the effectiveness of this policy stem from their own experiences with the hurdles their students face in the learning process, as was illustrated by T3 observations of Mr. Ang, Puan Sarjit and Mr. Ho’s classrooms. In certain rural or outlying regions of Malaysia, for example, English is more of a foreign language than a second language for the majority of students. Given this context, teaching Math and Science in English may hamper, rather than speed up, efforts to transfer scientific and technological knowledge. Also, despite various programmes introduced by the Malaysian government to reduce the difference, there is still a substantial gap between the income and educational level of urban and rural households. This means there is less likelihood of parents from outlying
areas being able to help their children in their learning or having the means to afford reference books and additional academic materials.

This split in level of perception comes through once again when we examine responses to S13: *English is the best language for teaching Mathematics and Science* and S14: *Bahasa Malaysia is the best language for teaching Mathematics and Science.* However, we can see that MST from urban areas and out of town hold opposing views when it comes to the appropriateness of the English language as the medium of instruction for Mathematics and Science. On this issue, urban teachers tend to favour English while out of town teachers prefer Bahasa Malaysia. This support for S13 is entirely comprehensible when the sociolinguistic context is taken into consideration. In urban areas, English can, and often does, function as a lingua franca between students of different ethnic or linguistic backgrounds. This is not the case in outlying or rural regions in Malaysia. One out of town MST comments:

R T1 Pen 104: Penerangan yang diberi sekiranya dalam Bahasa Inggeris kurang berkesan kerana tidak semua pelajar mahir dalam penggunaan Bahasa Inggeris dan perlu diterjemahkan di dalam Bahasa Malaysia.

[translation: Explanations given in English are less effective because not all students are fluent in the use of English. [The explanations] need to be translated into BM.]

When MST responses for S1 and S2 are compared to the pattern of responses for S13 and S14, both categories of MST seem to be contradicting themselves. This is especially true for S14. The fact that urban MST are evenly split on either pole of the Likert scale seems to belie their previous support for the first two statements discussed above. The contradiction is present among OOT MST if we consider their response to S2. The comments that some teachers have written to justify their choices provide some insight into this apparent incoherence. One urban MST pointed out that English is the best language of instruction, “For able students with a minimal command of BI. Not for the very weak who can’t understand even basic English.” An OOT MST puts a finger squarely on the problem:

Setuju demi cabaran masa depan tetapi perancangan yang teliti dan tidak tergesa –gesa. Lebih bagus diberi pilihan kepada pelajar,
On the other hand, regardless of their personal opinions on the subject, it can be seen from the observations of classroom teaching that MST are conducting their lessons in English. For certain groups of students, those less proficient in the language who are also struggling with the subject matter, learning takes place in bilingual classrooms. Although the aim of the MST is student comprehension, this approach also comes at a cost: it can take twice as long to teach the same amount of content. In a system where the SPM exit exams include all topics taught over the upper secondary cycle of Form Four and Form Five, this practice may limit the number of topics that teachers are able to complete. In fact, Encik Hamdan mentions that MST have the option of teaching their weaker students the Minimum Adequate Syllabus (MAS), which means teaching them the topics from the syllabus which are absolutely necessary for passing. Mr Chan concurs:

“[with] the very weak ones, we just help them, give them, within a Minimum Adequate Syllabus – we manage to teach them enough to pass, try to help them to pass the exam. At least they go through 5 years education in the school, they have learnt something.”

In consequence, this practice impacts the level of achievement of these academically weaker students during the SPM exams.

We could say that, although they understand how important it is for their students to master English, especially in scientific and technological domains, MST’s concerns about how their less linguistically proficient students fare under this policy give rise to conflicting views. For some, the speed at which this policy was implemented also seems to be cause for concern. It should be remembered that this policy was implemented barely a year after an official announcement was made by the MMOE. As a result, many MST have had to undergo their linguistic training in a hurry, via the short, compact ETeMS course. Even after five years of implementation, the linguistic capacities of a fair number of in-service MST are still being developed while pre-service or new MST who
were all educated in the Malay medium will need to go through this process. The only group of MST who do not seem too worried about their abilities in English are very experienced teachers like Mr. Wong or Mr. Ang who received all or part of their education in English. Mr Chan’s comments once again shed some light on the matter:

Some of the teachers, still quite weak in English. So, they have to brush up their, their English, especially those young, young teachers. For us, the old timers, the old teachers, no problem. (emphasis added)

Also, at the time that this survey was administered, MST were still under the impression that the SPM exams would be administered unilingually in English within that year itself or within the coming year. This placed additional pressure on them in terms of preparing their students for the SPM.

Their response to the PPSMI policy is shaped in several other ways. Support for implementation is one important aspect, and this includes training as well as teaching materials. From the responses of teachers to S3: The Ministry of Education’s ETeMS/EMS courses have prepared me sufficiently well to teach Mathematics and Science in English, we see that OOT MST tend to appreciate the language courses mandated by the MMOE more than their urban counterparts. This is partly due to the fact that MST in urban areas already have a certain level of proficiency in English. In fact, since ETeMS courses are designed to give MST basic English skills, some urban teachers express frustration at being asked to attend courses they do not need: “My command of English has been way sufficient before any training programme. MOE, please assess and cut down on unnecessary training.” (U T1 Pen 32). However, as mentioned in Chapter 3, the MMOE has recently taken steps to correct the indiscriminate testing and training of teachers by setting a threshold level above which MST are exempted from language testing and courses. OOT MST, on the other hand, find ETeMS courses helpful, but inadequate, given their linguistic backgrounds and the daunting task of having to teach subject content fully in English. The general opinion among these MST was that it was not really effective in terms of increasing their language proficiency even though they appreciated the confidence it gave them and the ICT component of it. This is mainly because the latter allowed them to access English materials online or taught them how to create digital teaching materials of their own. One OOT teacher points out: “Kursus 3
minggu yang diikuti adalah tidak mencukupi untuk menyediakan seorang guru mengajar dalam bahasa yang jarang diguna.” [translation: The three-week course I took is not sufficient to prepare a teacher to teach in a language which is rarely used.] The main problem appears to be that it was designed as a short, one – time course that MST would take to improve their English skills. As reported in Chapter 5, Encik Nasir, from SMK Kayu Manis, comments: “I think within two weeks you cannot, cannot improve your English.”

MST from both urban and OOT areas agree with S8: *The kinds of teaching material provided to me by the school for teaching Mathematics and/or Science in English are effective*. As Mr. Ho’s experience has shown, some MST may never have gotten started without the teaching CDs as an initial support. MST are particularly appreciative of the visual aspects of the CD as it is able to demonstrate certain abstract concepts to students, something that their verbal explanations alone cannot do. This helps students to understand these concepts. This aspect of the policy however, is not without its problems. In the T3 surveys, a few MST pointed out that using the CDs slowed down their teaching considerably. Sometimes the CDs they received were defective. Other MST mentioned that the CD courseware for Form 5 only arrived after they had finished teaching their syllabus.

Classroom observations however, showed an interesting pattern of difference between Mathematics teachers as compared to Science teachers. Mr. Wong, Puan Salmiah, Mr. Ang, Puan Sarjit and Mr. Ho were all observed using the teaching courseware in their science classes at some point during the year. Interestingly enough, none of the Math teachers, neither those teaching Form Four classes nor those teaching Form Five, was observed doing so. Two reasons seem to underlie this practice for the MST who were observed. The first has to do with being able to finish the syllabus: the Math teachers were of the opinion that the lessons presented on CD simply took up too much time. Encik Nasir, who teaches Additional Maths, when commenting on his use of technology in the classroom, says, “I don’t use the IT stuff very often because it’s going to make my lesson a little bit slower.” The second is related to their beliefs on the relationship between Mathematics and language. Encik Hamdan who teaches both Math and Additional Math states:
Sebab saya ajar Matematik, Matematiks tak da sangatlah PPSMI ni. Mungkin untuk Sains ke, Physics ke, Bio ke, sebab dia banyak sentence, kan? So Matematiks tu banyak number…Sebab, write sentence tu, buat apa – only numbers.

[Translation: Because I am teaching Mathematics, Mathematics doesn’t really have much of this PPSMI. Maybe for Science or Physics or Bio, because they [use] many sentences, right? So, Mathematics [uses] lots of numbers…because what’s the point of writing sentences - only numbers.]

Another Math teacher interviewed and observed in SMK Kayu Manis, Mr. Ramachandran, says that he doesn’t look at students’ language when correcting their work: “because Math has nothing to do with language.” A Math teacher comments during the T3 survey:

The Teaching and Learning of Mathematics do not require a good command of the language, as compared to Science. Math emphasises on the understanding of Mathematical concepts and logical reasoning. The evaluation is on the ability to present your work/solutions in mathematical form, rather than using words to explain. A student who excels in Math may not be proficient in the language. [U T3 PEN 27]

Therefore, they may feel it is unnecessary to provide additional linguistic input and support for their students by using the CDs, since this is somewhat superfluous to the task of truly mastering Mathematics. Moreover, this might prevent them from completing their syllabus in time for revision before the exams. There is also a strong belief among Math teachers that the best way to help students is to make them practise as many math problems as possible, especially the kinds found in the SPM exam.

The MST responses to S9: Teaching materials in Bahasa Malaysia are useful in preparing Mathematics and/or Science lessons in English, show us that OOT MST are still very much in transition in terms of their linguistic capacities because they still have a tendency to resort to BM teaching materials. Urban MST, on the other hand, are more likely to mention going to resources available on the internet, English materials produced by commercial publishers and even learning channels such as Discovery.

Even though the MST in both areas surveyed seem to agree with S10: My “critical friend” helps me improve in English, the observations of the Buddy system at work in
schools indicate that there are multiple constraints that limit the effectiveness of this system. Although the Buddy system was specifically set up in each school to provide an in-school support network, MST did not rely much on this system to improve their learning. One of the main reasons is the MST’s extremely busy schedules. The additional duties that teachers often take on, such as being in charge of societies or sports, make it difficult for the “critical friends” and “buddies” to find time to meet each other formally. However, due to the MMOE’s mandatory monitoring and auditing of the Buddy System and EMS activities, the buddy coordinators in SMK Kayu Manis and SMK Gaharu did plan and hold sessions for MST.

7.2.2 Research question 2: How do MST perceive the bilingual SPM exam? What are these perceptions based on? Are there differences between urban and OOT MST?

In terms of the English or BM version of exam questions as instruments for measuring their students’ abilities, MST from both urban and out of town areas, in general, tend to see both versions in a positive light. In fact, for many teachers, they are practically the same. An urban MST comments: “Questions are the same – Bahasa Malaysia version is translated into Bahasa Inggeris (English). Both exactly the same and student can answer in either language.” It should be noted however, that the positive perception of OOT MST concerning the English version is marginal during T1, only fifty-four percent, and actually drops to forty-seven percent during T3. The OOT teachers’ response to S24: *SPM Mathematics and/or Science exam questions in English are instruments that accurately measure my students’ skills and capacities in these subjects*, is quite understandable given the linguistic environment and parental background of many of their students. One teacher writes:

Murid –murid saya dari golongan luar bandar yang rata-ratanya anak petani dan peniaga pasar malam. Mereka membesar di persekitan yang berbahasa Melayu dan berdialek pekat.

[Translation: My students are all children of farmers and night market traders. They grow up in a Bahasa Melayu speaking environment, and speak in thick dialect].
Given this reality, English is more likely a foreign, not a second language, in these students’ social and familial contexts. The OOT teachers’ impression that the Bahasa Malaysia version is a better evaluation instrument, in this case, makes sense. It is interesting to note how their impression of the English version gets more negative as the SPM approaches. They are not very positive about the English version, even in T1. Mr. Chan, Head of the Math and Science panel in SMK Kayu Manis, talks about the Form Five cohort at the start of the school year (T1):

Yes, you see, now they have already go through F4 we can find out their answer is horrible. They totally cannot forward their ideas and their answer in proper English…so [from] the internal exams, [we] can see their result is very poor.

However, the teachers are more optimistic in T1 because they still have many months ahead of them to work on improving their students’ abilities. In contrast, during T3, the OOT MST are beginning to feel the exam pressure. The observations of Mr Ang and Puan Sarjit show that this drop in the approval of the English version can be due to the OOT MST’s realisation that students are still struggling to answer in English barely two months away from the SPM. They have seen their students’ results on the standardised, statewide Trial Exams held in late July. With the SPM exams just around the corner, they realise that it will be an uphill battle for their students to respond well in English.

…ramai pelajar tidak dapat menjawab soalan yang diberikan kerana tidak memahami soalan yang diberikan. Merenka mungkin berupaya menterjemah perkataan yang tidak diketahui dengan bantuan kamus tetapi kerap kali pelajar gagal untuk menginterpretasikan soalan tersebut. (R T1 Pen 102)
[translation: …many students cannot answer the questions given because they don’t understand the questions. They may be able to translate the words they don’t know with the help of a dictionary but often, the students fail to interpret (the meaning of) the question.]

The response patterns may also be influenced by the MMOE decision to postpone unilingual Science and Math exams to 2012 instead of implementing them that year.

However, while urban MST’s responses to S24 are consistent with the sociolinguistic conditions in urban schools, what accounts for the scores of urban MST on S25: *SPM*
Mathematics and/or Science exam questions in Bahasa Malaysia are instruments that accurately measure my students’ skills and capacities in these subjects? Once again, teacher comments provide some insight. The SPM exams, especially for the Sciences, consist of objective and also structure (short answer) and essay type questions. It would seem that even urban area students are struggling when answering the latter types of test items.

They can be trained to recognise the common words/questions etc. And can be trained to give suitable answers especially for objective questions. However, for the explanations, descriptions etc., they are lost.

Mr Wong, for example, explains that during an Exam Drill for Form Five students carried out by the MMOE in the early part of the school year, the students had some difficulties with the subtler aspects of questions:

Maybe they were not able to understand the question. Because when they (the exam questions) say, “state the meaning of this concept”, right? They (the students) went to state the concept, it’s not the meaning of the concept…So it’s like, a totally different answer.

It should also be kept in mind that these Secondary Four and Five students began their Mathematics and Science learning process in primary (elementary) school using Bahasa Malaysia. Apart from the Maths and Sciences, their other subjects are also taught in BM. Therefore, it is not surprising that for them, “…BM comes naturally. [For] e.g. [When formulating a] Hypothesis – Semakin luas permukaan semakin tinggi kadar…(translation: The larger the surface area, the higher the rate of…)” From interviews and observations in SMK Gaharu, we see as well that there are students, especially those who are academically weak, who are not yet fluent and comfortable in English despite five years of learning M & S in English.

The response of MST to the two statements, S26: The content of the SPM Mathematics and/or Science exams accurately reflects the topics that have been taught in Secondary Four and Five classrooms and S27: The format of the Mathematics and/or Science SPM exams accurately reflects the class/homework assignments and test/exam items that have been done in class, reveal how closely aligned classroom teaching, student assignments and in-school testing are to the SPM exams. From the very
high percentages of MST who agree or strongly agree with these two statements, we see here that there is a very strong washback effect at work. In terms of the content aspect, teachers do not really have a choice. The SPM exams assess what has been taught throughout the two-year, upper secondary cycle. The curricula and syllabi in all national and national-type schools are mandated by the MMOE and all teachers are required to teach what is laid out in these documents. In the regulations governing teachers’ code of conduct, one of the clauses (though rarely invoked), stipulates that teachers may face disciplinary action if they fail to complete teaching the mandatory syllabus within the specified school year. For S27, although teachers indicate through their responses that the format of their class/homework assignments and tests corresponds to that of the SPM exam, it is important to point out that teachers have a tendency to work principally on test items such as the objective or structure questions with students during regular class hours. They are less likely to do so with essay questions. Mr. Ho, for example, usually does structure and objective questions with students because during the early part of the year when the focus is just on completing the syllabus. As for essay questions, he mentions, “We have no time to do it in class”. [T3 pre-interview conversation] Mr. Ang, on the other hand, gives essay questions to those students whom he thinks can score A1 during T3 and asks them to hand in their responses for him to mark. This only happens as the SPM gets closer. This group is allowed to discuss among themselves but they have to write up their own answers. He feels it is more effective than giving an essay question to the whole class and having only one student doing the work (because the others will copy from him/her). [Mr. Ang, T3 interview]

In comparison, Puan Salmiah mentions giving extra classes to her students to address this weakness in writing, but attendance is not very satisfactory for these sessions:

Kalau kita buat kelas tambahan, contohnya ya, untuk membantu pelajar. Contohnya, lemah dalam bahagian esei. Kita perlu masa untuk menerangkan how to write the essay, how to write simple sentence, for example, we need certain time...Guru meluangkan masa, pelajar tidak hadir...
[translation: If we hold after-school classes, for example, to help students. For example, [those who are] weak in the essay section. We need time to explain how to write the essay, how to write simple sentence, for example, we need certain time...Teachers invest their time, [but] students don’t show up…]
While the reasons for this apparent lack of interest among students are not very clear, it is quite possible that, like MST themselves, students have constraints (such as problems with after-school transportation), co-curricular activities and other competing demands on their time.

Given the responses of MST to S26 and S27, it is no surprise that S28: *In terms of content, my students are going to be well-prepared to answer SPM Mathematics and/or Science exams in English*, also has very high percentages of agree and strongly agree responses. Note that the already high percentages of agreement for S26, S27 and S28 are even higher during T3 – this seems to indicate that the closer the SPM exams get, the stronger the washback effect is on MST and their classrooms in terms of content that is taught and the kinds of questions given to students for exam drill or practice.

However, this is not so in terms of the linguistic element in their classrooms represented by their responses to S29: *In terms of language skills, my students are going to be well-prepared for the SPM Mathematics and/or Science exams in English*. For the majority of these teachers, it seems to be an aspect which is somewhat beyond their control; even for the urban MST the figures in response to this statement do not change much from T1 to T3, indicating that they do not perceive a noticeable improvement in their students linguistic abilities. An urban MST observes: “Language skills will affect experiments, descriptions, and other essay questions but not the objective or short answers” [U T3 JOH 292: 2] For OOT MST, their perception of students’ language skills becomes more negative as the year progresses. One of these MST agrees that the students are well-prepared, but only, “kalau soalan pendek” [Translation: *if the question is short*]. [R T3 PEN 104: 3] This could point to the fact that more students in out of town schools experience difficulties comprehending longer questions which are more linguistically demanding. They also have problems producing longer, more complex texts.

The MST’s responses to S29 correspond strongly to their responses to S30: *My students’ chances of performing well on the SPM Mathematics and/or Sciences exam, if they are completely in English this year, are good*. Since OOT MST are aware of their students’ weak abilities in English, it is not surprising that they disagree or strongly disagree with S30. In urban schools, where students’ difficulties with English are not as extensive, being limited more to classes that are labelled as “weak classes”, urban MST are more
likely to agree or strongly agree with S30. The responses to S29 and S30 show that there may still exist large disparities between urban and OOT areas when it comes to students’ abilities in the English language.

However, the MMOE directive that all in-school tests and exams be solely in English, may cancel out the help or support that the bilingual format of SPM exam papers is supposed to provide to those students who are linguistically less proficient, whether in urban or rural areas. Before students sit for their Trial Exams (about two months before the SPM), they have not had any opportunity to answer questions in BM for their Science and Math subjects. Even though in their T3 interview, 5ST1 students in SMK Kayu Manis (out of town school) said they would refer to the BM version if necessary, one of them indicated that this may not be as straightforward as it seems:

I don’t think I can understand. The chemical terms, I not sure what natrium [sodium], kalsium [potassium] is. We learn this in English.

5S1 students in the urban school, SMK Gaharu, said the same thing but mentioned that for them it was just “biasa” [normal/habitual] to answer questions in English.

6.2.3 Research question 3: What changes (or perhaps, does not change) in MST’s classroom practices as the school year progresses and the students get closer to taking the SPM exam? Are there differences between urban and OOT MST?

This portion of the discussion will be based mainly on the qualitative data from interviews and especially from classroom observations. It bears repeating that despite their different locations, all MST found their schools well-equipped in terms of pedagogical resources and also basic infrastructure, such as science labs, library and computer labs. Teachers also have funds for purchasing a variety of textbooks and also exam revision books which are available in the market. In addition, since all MST have their own laptops, they are able to surf the net for pedagogical ideas and materials or create their own if they wish. Therefore, the availability or lack of teaching resources does not have an impact on teachers’ classroom practices.

When discussing patterns of change, it should be noted that, in terms of content and pace of teaching, there are two distinct patterns among the MST. One is specific to the
Form Four classes, who are in their non-exam year, and the other applies to the Form Five classes, who will sit for the SPM at the end of the school year. From the profiles of the MST who are teaching Form Four classes, Encik Yusri, Mrs. Chia and Puan Salmiah in SMK Gaharu and Encik Nasir in SMK Kayu Manis, it can be seen that the emphasis is placed on presenting the content of the various topics specified by the Form Four syllabus. The rhythm of this teaching is somewhat invariable – mid-term and end-of-year school exams do not seem to affect this pace. Some teachers such as Mrs Chia and Puan Salmiah even continue teaching after the final exams. They mention that for them, it is important not to rush through the topics. They want to make sure that the students understand what they are teaching. In fact, when Puan Salmiah was interviewed during T3, her students had already taken their end of year exams. However, she was still teaching the last topic and did not know if it would be finished by the end of the term.

Tapi mungkin kita akan bawa ke tahun hadapan...Tak da maknanya kalau saya cuba, tapi konsep asas itu perlu faham sekarang. [Translation: Maybe we will carry it over (for teaching) next year...There is no point if I try (to rush it), but the basic concept must be understood (by students) now.]

If these Form Four teachers do have some kind of exam preparation, the time taken for it is very brief. For Mrs Chia, it is only about a week before the finals that she goes through some past year exam questions with students:

One week only. Because I need to cover syllabus... I, but I, I inform them, after the exam, I'm going to continue teaching. Because I cannot cover the syllabus.

Puan Salmiah, in contrast, simply informs her students which topics will be tested in the exam and provides a little help in revision:

Saya cuma membantu bahagian – bahagian yang agak sukar. Contohnya, melihat kembali topik dalam point form. Itu sahaja. [Translation: I only help with parts that are quite difficult. For example, to review the topic in point form. That’s all.]

It could be said, therefore, that Form Four is seen by the MST as a foundational year for the students, but as yet the stress and pressure of the SPM exams is not really felt in
these classrooms. In fact, they often describe these students as being very playful and relaxed since they are in their “honeymoon year”. Students’ perspectives on their experience in Form Four are not quite the same. They feel that teachers have the wrong impression when they think that F4 students are enjoying themselves and taking it easy in their studies. They find that teachers just teach them the basics and expect them to be able to do their exercises and homework without realising that the transition to learning these new subjects is difficult. As mentioned in Chapter 3, students in Science streams go from one general science and one general mathematics course in Form Three to multiple specialised courses for M & S in Form Four, all of them in English. Siti Azlina, a 4ST1 student from SMK Kayu Mans, describes her feelings at the beginning of the year:

[Translation: Afraid, that’s it. Afraid. Because seven, seven, seven subjects. Seven subjects in English, in English, right? Afraid of not being able to master all of them.]

Her classmate, Nurhidayah, agrees.

“Mungkin dulu ramai orang yang cakap Form Four ni honeymoon year kan, tapi sebenarnya langsung tak betul pendapat tu. Memang kena work harder, Form Four, Form Five ni…Kita culture shocklah. Banyak matapelajaran baru yang diperkenalkan, kan?
[Translation: Maybe in the past, many people say Form Four is the honeymoon year, right? But actually, that opinion is totally wrong. We really have to work harder in Form Four, Form Five. We’re in culture shock. So many new subjects are being introduced, right?]}

The Form Four students in SMK Gaharu agree on this point. They think that their academic year is far from being a honeymoon; it is actually very tough. In terms of the SPM exams, by T2, the students in SMK Kayu Mans were already starting to worry about not having enough time for their revision.

[Translation: We don’t feel that the SPM is far away. We feel the SPM is getting closer even though it’s only next year (inaudible). But it already
feels like [we] won’t have enough time for revision. Like we already don’t have time.]

These 4ST1 students mentioned that they would be doing revision on their own during the end of year holidays. So it can be said that for these OOT students, unlike their teachers, the washback effect starts much earlier. This can be due to their awareness of their limited English proficiency, hence the need to take more time to prepare and revise for each subject.

For Form Five MST, on the other hand, the school year is almost divided into two parts, in terms of content and teaching pace. The first half of the year is quite similar to what Form Four MST do with their students: focusing on completing topics in the syllabus. However, as they near completion of the required syllabus, attention begins to shift to various aspects of exam preparation in the second half of the year. The observations of Mr. Wong, Mr. Ang, Puan Sarjit and Mr. Ho’s classrooms demonstrate this change as the year progresses. During T2, while continuing to teach the required content, these MST start pointing out to students that specific topics or sub-topics should be studied more intensively because they will appear on the SPM exams. Some MST also begin to focus students’ attention on how to answer exam questions. Puan Sarjit and Mr. Ho mention that they usually try to assign a few SPM questions at the end of topics or sub-topics, either as classwork or homework. During T3, topical revision and exam drill take over the classroom routine. Topical revision involves reviewing the various topics in brief, point-form with the students in class. It is designed to refresh students’ memories of what was learned through Form Four and Form Five. The exam drills are supposed to train students to recognise where and how the knowledge and various formulas they have learned should be applied when answering SPM questions. Since all SPM exam papers have to be completed within a limited time, familiarity with question patterns and ease with answering techniques (test-wiseness) give students an advantage in terms of speed and confidence when doing the exams. However, with certain teachers such as Encik Hamdan and Mr. Ramachandran, the preoccupation with the SPM exams is year round. In the sense that MST teach the required syllabus and the SPM exams test what is taught in the syllabus, there is therefore a powerful, positive washback effect in the system.
Like their Form Four counterparts, the Form Five students are very aware of the SPM exams. During the T2 interviews which took place just before their school holiday, the 5ST1 students in SMK Kayu Manis had already planned what they would do to prepare for the Trial exams during their vacations. The various exam preparation methods they had in mind included concept reviews, revision exercises, exam drills and “spotting” exam questions - the attempt to predict which topics will likely appear and what form the question will take in specific SPM papers. The SMK Gaharu 5S1 students interviewed seemed a little more relaxed. They mentioned that they wanted to sit for their Trial exams and obtain the results in order to know their weaknesses. Only then would they start serious exam preparation. However, the students from both schools realised that their essay writing was not up to par. These students found it difficult to express what they knew in writing. Surinderan from SMK Gaharu quotes one of his science teachers as saying: “I teach you how to do essay[s], but you always do [it] wrong, wrong, wrong!”

Puan Salmiah, who was interviewed after Form Four students had completed their end of year exams, noted that there had been improvement among students in her Chemistry classes, but they were still weak in the area of essay writing:

“Namun begitu, bila analisa dibuat daripada soalan objektif, struktur dan esei, mereka agak sukar untuk menjawab soalan dalam bentuk esei…Masih ada lagi pelajar yang hanya memberikan jawapan, apa yang kita berikan, dia beri dalam bentuk itu juga.”
[Translation: Despite (the improvements), when the analysis is done for the objective, structure and essay questions, they still have difficulties answering essay type questions…There are still students who provide as answers, what we have given them (as a question), they give it back in the same form.]

It can be said from the data of both students and teachers that the pressure from the SPM exam creates an effect not only in the classroom practices of MST. It also exerts an influence on Form Four and Form Five students well before it actually takes place. In fact, it changes the pattern of students’ academic activities in the upper secondary cycle outside the classroom and school.
7.2.4 Research question 4: Why do these changes in teaching happen? Are there specific factors which are determinant in the context examined? Are there differences between urban and OOT MST?

The SPM washback effect, in all probability, pre-existed the implementation of PPSMI. This policy started implementation only five years ago. Nationwide, standardised, high-stakes testing, on the other hand, has been part of the educational system since the colonial era. Mr. Ang, who has taught in several schools in Peninsular Malaysia, deems this is the exam culture within the Malaysian system:

I believe this is our culture. Our culture. More, they’re more exam orientated. In Form Four, I will go more on knowledge based, content based, because the Form Four students are considered, you know, as the honeymoon [year]…[In Form Five] after when nearing the half-year exam, they get worried because they know that SPM is coming near. So that, only that time only, I’ll start focusing on the exam. Because they’ll be more attentive, they’ll be more attentive.

The patterns observed in Form Four classrooms are due to having a very specific syllabus to teach and only a given amount of time to do it in. In Form Five classrooms, changes in classroom teaching happen as a result of a combination of factors. The first is the need to finish covering the Form Five syllabus by the month of July. The second is making sure that their students will be able to remember all the topics studied in their two-year cycle, hence the emphasis on topical revision. Finally, the MST are concerned about ensuring that their students are familiar with the language, format and demands of the SPM exam which leads to the intensive drilling of students on the various types of SPM exam questions that will appear in Paper 1, 2 and 3. Overall, however, we can see that the entire two-year cycle of teaching is mainly about getting students ready to take the high-stakes SPM exam even if this is not explicitly put at the forefront in Form Four.

However, what specifically are the washback effects due to the PPSMI policy? Since PPSMI is a change in language of instruction, this policy impacts, first and foremost, the linguistic aspect of teaching practices in the classroom. To answer the question as to why these changes happen in relation to PPSMI, these can be attributed mainly to the varying levels of English proficiency that exist in Malaysian schools. This is evident when we
examine MST’s responses regarding the linguistic abilities of their students in English and BM represented by Cluster 4.

For S5: *My students’ proficiency in English is sufficient to learn Mathematics and/or Science in that language*, the responses indicate that MST had become less confident of their students’ English abilities as the SPM exams drew nearer. The same pattern is observed for S7: *My students learn Mathematics and/or Science effectively in English* and S11: *My students’ Mathematics and/or Science test/exam performance when responding to test/exam questions in English is satisfactory*. Many comments from MST in both urban and OOT areas point out that these statements apply only to academically strong classes. As one OOT MST states:

Pelajar-pelajar daripada kelas yang lemah, 95% belum menguasai atau fasih BI [Translation: 95% of students from weaker classes have not yet mastered or are not fluent in English].

Another OOT MST who strongly disagrees with S5 points out:

…lebih 50% drp mereka gagal dalam BI in SPM Trial Exam” [Translation: More than 50% of them failed English in their SPM Trial exams.]

These responses are likely due to what Puan Sarjit mentioned in her own case – that the results from the bilingual Trial exams have finally given concrete proof that students are not doing as well as expected in their learning of M & S in English. While the problem may not be as severe in urban schools, teachers are still very aware that students in the weakest classes struggle to understand their lessons in English.

It is interesting to note that for S12: *My students’ Mathematics and/or Science test/exam performance when responding to test/exam questions in Bahasa Malaysia is satisfactory* although both urban and OOT MST tend to support this statement over the two survey periods, the percentage of those who agree or strongly agree falls quite significantly during T3. Once again, the results of the Trial exams may have caused this as well. MST see that the students who choose to answer in BM are not capable of formulating their answers properly in BM either. When asked about how they would answer bilingual exams in SPM, one of the 4S1 students interviewed in SMK Gaharu responded they would naturally opt for the English version:
Because we study in English. We study in English, so we cannot answer in Malay. Such as like, the words in Physics, we can’t change into Malay, we don’t know.

All the 5S1 students interviewed in this school also unanimously said they would opt for the English version as well. What is remarkable, however, is that the students who were interviewed from 5KS2, one of the weakest classes in SMK Gaharu, also provided similar responses:

Kalau sayalah, saya buat dalam versi BI-lah sebab memang dah biasa, kan?
Menuntut dalam BI semua. Jadi, so, buat dalam BI sajalah.
[Translation: For me, I’ll do it in English because we’re used to it, right?
Studying all of it in English. So, I’ll just do it in English.]

Although students interviewed in SMK Kayu Manis usually said that they would read the English version and try doing exam questions in English first, many said that they would also read the BM version to check that their understanding of the English question was correct. In that sense, they seemed less sure about their language skills in English. One 5ST1 students mentions how he finds it difficult to process longer and more complex texts; he is able to understand the initial part of the question but gets confused near the end:

I think Paper 2 because the language problem. Because they give long, long ah [questions], we read the first we understand, but until the last ah, we cannot understand what they talking about.

For S18: My students are able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in English clearly, while OOT MST indicate that they disagree with this statement during T1 and T3, urban MST marginally agree in T1 (54 percent) and then marginally disagree during T3 (54 percent). On the other hand, both groups of MST tend to agree with S19: My students are able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in Bahasa Malaysia clearly during T1 and T3. This pattern of response concerning their students’ verbal production is due in large part to the students’ pedagogical and sociolinguistic environments. In an urban school such as
SMK Gaharu, for example, students were mainly observed speaking English when responding to direct questions by their teacher. However, due to the nature of the questions, students could normally answer simply by giving one-word responses or short phrases. However, throughout the three periods of data collection, across all the classes, students were never observed providing extended verbal explanations or asking complex questions in English. The latter is true of SMK Kayu Manis as well. Students would even respond correctly to their teacher’s questions in English by providing responses in BM or a mixture of BM and English. This illustrates that students may have reached a certain level of verbal comprehension, but they are still not completely at ease with verbal production in English. Classroom environments are, as a rule, very teacher-centred as well. What this means in terms of verbal interaction is that much of the speech produced during teaching time is by the teacher and very little by the student. In the classrooms observed about 95% of the time was spent on teacher talk; students usually spoke up when they were directly questioned by teachers. If they did speak to the teachers on an individual basis, BM or another language (mother tongue dialect) was likely to be used.

The sociolinguistic environment of students may also be a contributing factor. In both schools observed, students tended to congregate with students who were of the same linguistic or ethnic background, in class and out of it. Speaking their mother tongue happened quite naturally, therefore, in these groups. In SMK Gaharu, either English or BM was used when verbal interactions took place across linguistic or ethnic boundaries. However, in SMK Kayu Manis, these cross-boundary interactions normally happened in BM. It should be remembered as well that these students underwent the first six years of their schooling entirely in BM and that teaching in all other subjects takes place in BM. Students who answer with longer phrases in English are sometimes teased by their classmates, with exclamations or phrases of mock awe or admiration, such as “Wah!” “Fu yo!”, even in urban classrooms. The same reaction was not observed when students chose to respond in BM. This seems to indicate that BM may still be regarded by many students as the “norm”, while English is still somewhat of a “curiosity” or “anomaly” in terms of everyday use. An OOT MST comments in the T3 survey:

Kebanyakan pelajar rasa malu untuk bercakap dalam BI & mereka lebih selesa menggunakan BM.
Most students are embarrassed to speak in English and they are more comfortable using BM.

This problem is compounded by the diffidence that students often show towards their teachers, especially in OOT schools; just the act of speaking up itself may be something quite difficult for these students. MST in SMK Kayu Manis often complained about the passivity and lack of self-motivation of their students. Although this attitude was often attributed to weaker classes, when the 5ST1 students interviewed were asked what happens in their classroom if students do not understand a lesson, they responded that, most of the time, they would just pretend they understood even if they actually did not. Very few students actually approach teachers after class for clarification. One of the students interviewed, Hong Teck, puts it this way:

Lepas cikgu keluar, ada pi tanya…Ada tanya. Sedikit, sedikit. Tapi cikgu terang lagi kita takut kita confuse lagi tapi sudah diam.

This is in contrast to what was seen in SMK Gaharu. SMK Gaharu’s MST did complain about the passiveness of their weaker students, but the students in the strong classes were quite comfortable posing questions and requesting clarification from their teachers. Mr. Wong’s students did not hesitate to ask him questions in English during their lab experiments. The excerpt below from Mrs. Chia’s 4S1 T1 observation gives an example of students’ assertiveness, and their comfort with using English in class, even if their productions are not always syntactically or grammatically correct. In this excerpt, Mrs Chia is teaching students how to solve logarithmic equations (Additional Math). She has just walked the class through the solution of part (a) of a math problem when students who had missed two weeks worth of classes (due to extra-curricular activities) indicate that they could not follow the steps taken to arrive at the solution:

Student 1 : Don’t understand, teacher.
Student 2 : Very hard, teacher.
Mrs Chia : Very hard?
Student 3 : Very hard, teacher.
Mrs Chia: So, the next question…[Mrs Chia gets ready to move on to the next part of the question]
Student 1: [with emphasis] Don’t understand.
Mrs Chia: You don’t understand? Because you were not here the last week…Not clear, ah…Which part you don’t understand? Which part?
Student 1: Aaah, all the part.
Student 3: All [gesturing at the board with his hand]
Mrs Chia: All the parts, huh? OK, again ahh…

The MST’s responses in terms of their students’ writing abilities in English closely parallel those that they express concerning the latter’s verbal abilities in English. Once again, the urban MST are somewhat divided over S22: *When my students respond to written assignments, they are able to write down ideas/explanations in English concerning the content of Mathematics and/or Science well*, while OOT MST simply disagree with this statement in T1 and T3. Once again as well, both groups of MST support S23: *When my students respond to written assignments, they are able to write down ideas/explanations in Bahasa Malaysia concerning the content of Mathematics and/or Science well* across the two periods. Their choice is logical if we consider that these students have received all of their instruction during their primary school years in Malay, and continue being taught in other subjects in Bahasa Malaysia, as mentioned above. Their comfort level in comprehending subject content and expressing themselves in this language is therefore much higher than it is for English. In all their interviews from T1 to T3, students who are from the strong classes in both schools pointed out that the most worrisome questions for them were the essay questions. Most students from weaker classes did not attempt essay questions at all and would hand in blank answer sheets when the school exams were entirely in English. The MST’s tendency to explain a scientific procedure in BM, while still employing the English terms within the explanation may be aggravating this problem for students. By emphasising only key words, they may be drawing their students’ attention to specific vocabulary items but obscuring the sentence structure of the English language. With the bilingual Trial exams, some MST found that their weaker students attempted to answer some essay questions in BM. However, though students may have written History or Malay literature essays, the writing of Science essays is a whole different genre (Christie, 1985; Halliday & Martin, 1993). If the students are having difficulties writing science essays in English, how can
they transfer skills they do not possess to BM, even if BM is the mother tongue or first language of instruction for many?

Given the responses and comments of MST about their students’ linguistic proficiency, it can be stated that the changes observed in classroom teaching which are directly linked to PPSMI implementation have come about as a combination of washback from the SPM bilingual exams and compensation strategies for the existing linguistic situations of their schools. We can see that for each and every teacher, the inclusion of some form of translation as part of their teaching methodology is obviously something which they did not do before PPSMI was mandated. MST have developed strategies to compensate for a lack of linguistic proficiency, whether on their own part or on the part of their students; more intensive lesson preparation, prior to stepping into the classroom has become part of the teaching routine of several of these teachers. Puan Salmiah surfs the internet for teaching materials, Encik Yusri works on improving his classroom delivery, finding words or explanations that will allow his students to understand easily, Mr. Ang does extra planning and preparation to accommodate students who are proficient, average and not proficient in English while Mr. Ho spends time developing teaching materials and preparing every night before classes.

From T1 and T2 observations, it would seem that the transition to teaching in English is going well – MST are teaching mainly in English and assigning work to students only in English. Students are also being tested only in English. What is striking in terms of change as the academic year progresses towards its close in November is the Form Five OOT MST’s about-face concerning their students use of English as observed in the classrooms of Mr. Ang and Puan Sarjit in SMK Kayu Manis. Below is what Puan Sarjit said to her students during T1 observation of her teaching:

“If I ask you a question English, try and answer in English. If you can’t, tak apa. Jawab dalam Bahasa Melayu. Sekurang – kurangnya saya tahu kamu faham apa yang saya kata.”
[Translation: If I ask you a question in English, try and answer in English. If you can’t, that’s alright. Answer in BM. At least I know you understand what I’m saying.]
This is in stark contrast to what she tells her students in T3 as she is doing exam drill with the class:

Sekarang saya tak kisah kalau kamu nak pilih untuk baca dalam Bahasa Inggeris atau Bahasa Melayu, tak apa. Saya nak jawapan yang betul
[Translation: Right now, I don’t care if you choose to read in English or BM, it doesn’t matter. I want the correct answer.]

The singular turnaround witnessed in Mr Ang and Puan Sarjit’s classroom is evidence of a direct washback effect due to the bilingual SPM exams. Why is this so? First of all, it should be remembered that the Trial exams are administered approximately two months before the actual SPM exams. They are also the first bilingual exam that their students sit for in the entire two-year upper secondary cycle; all other monthly tests and term exams they take prior to the Trial exams are solely in English. Puan Sarjit points out in her T3 interview: “But what happened was, in the Trial Exam, because the questions were bilingual, many of them actually answered in Malay. So that finally sort of gave me very concrete feedback that they weren’t comfortable answering in English.” However, as Mr Ang indicates, even if some students chose to answer in BM, they still did not perform well in the Trials. Given this situation, i.e., the lack of time and their students’ linguistic proficiency, these MST are constrained by the circumstances to giving out notes and doing revision and exam drill with their students in BM. Mr. Ang and Puan Sarjit also pointed out that students would probably not be penalised for using both languages in the same response. This practice had been accepted during this first cohort’s PMR exams and they had heard (and hoped) that it would continue.

The effect of the bilingual exam paper in an urban school such as SMK Gaharu differs. According to Mr Wong, who is also head of the Science Panel in SMK Gaharu: “Because when they set the Trial Exam, it’s in bilingual format also. And some of the uh, around two percent of the students, especially those weakest ones, they will answer in Bahasa [Malaysia]…Only around two percent in this group.” Here, he is referring to his 5S1. What is noticeable in the urban areas as well is that there is a strong correlation between academic ability and linguistic proficiency. It is usually the case that academically strong students are also linguistically able in both BM and English. Even
those who are not in the strongest classes in SMK Gaharu demonstrate a certain comfort with English. Encik Hamdan’s students in 5KS2, for example, sometimes made brief remarks in English and even joked with each other in a mix of BM and English. Encik Hamdan expressed surprise and disappointment when some of his 5KS2 students chose to use BM to answer some questions during the Trial exams.

There is one topic on Statement, … like logical, logical thinking. Is it true or false statement? They answered in Malay. And I didn’t teach them in Malay …I admit that I, sometimes, I talk in Malay to them because, to make them more understand. But, but like the, the, the words they should use,…the term…in English, yeah…Surprisingly, that one. Not one student. About four or five student answered in Malay for the…that topic is called Mathematical Reasoning.

When I asked whether that was a good sign, that even the weak students were taking their own initiatives to prepare for the exam, Encik Hamdan responded that it was an initiative on the bad side, because they did not do so in English. What this indicates is that some of the patterns of responses we have seen on the part of urban MST could be due to the linguistic environment in specific schools and higher expectations from these teachers regarding their students’ abilities to perform in English.

The correlation between academic ability and linguistic proficiency is not necessarily the case in OOT schools such as SMK Kayu Manis. Mr. Ang’s students, who are in 5S1, the best class in Form Five, were still experiencing difficulties responding to questions in English in T3, even though they seemed to have grown more comfortable using English. Puan Sarjit’s 5VT2 class also seemed to have gained some ease with using English, but her students, having seen the BM option in their Trial exams for the first time in T3, perhaps felt that they could provide better answers in BM. In Puan Sarjit’s case, we can see that her students’ panicked requests led to a change in teaching practices.

On the other hand, does the linguistic proficiency of MST have any impact on what they are doing in their classrooms? We turn to the statements in Cluster 3 to have a clearer idea of how MST perceive their own teaching abilities in English and BM. We can see from the responses of urban MST to S4: *My proficiency in English is sufficient to teach Mathematics and Science in that language*, that they are very
confident they have the requisite ability to teach in English. Their positive response to this statement is uniformly high both for T1 and T3. OOT MST, on the other hand, progress from being somewhat uncertain of their English abilities in T1, to demonstrating a greater confidence in their capacity to teach in English by T3 - only 50 percent agree or strongly agree to S4 during T1 while 64 percent do so in T3. Urban MST’s response to S6: *I teach Mathematics and/or Science effectively in English*, is similar to that for S4. OOT MST, however, do not feel they teach effectively in English because only 42 and 48 percent agree or strongly agree with this statement in T1 and T3 respectively. Interestingly enough, a majority of both urban and OOT MST are in accord with S16: *When I teach, I am able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in English clearly*. Why are OOT MST of the opinion that they can express ideas and explanations verbally in English clearly and yet feel that they neither have sufficient proficiency for teaching M & S in English nor do they teach effectively in this language? The answer probably lies in the fact that, for their oral presentations in class, MST usually have pre-written, structured, point-by-point notes for the specific topic or sub-topic they are teaching. This, in effect, functions as a “script” that allows these MST to deliver content clearly to their students. However, this appears to be the “upper limit” beyond which many of the less proficient teachers are unable to move. Unlike what they were able to do when teaching in BM, they are unable to provide more in-depth explanations or more varied ways of explaining the same content in English. An MST from a rural school spoken to during the course of administering the surveys mentions that when he was teaching in BM, he was able to quickly change the order of presentation or adjust his explanations if he saw that his students were having difficulty in understanding the topic; he feels frustrated because he is unable to do so in English. Many MST notice this difference in the quality of their teaching and the final comment below, from the T1 survey, illustrates how some of these MST feel:

My English not so good, so how am I going to teach my student...like “ketam mangajar anaknya berjalan” la... lagipun, saya lebih selesa & rasa lebih puas mengajar dlm BM kerana banyak perkara yang boleh saya CAKAP/ sampaikan semasa proses P & P. Kalau mengajar dalam BI percakapan saya tersangkut-sangkut/lambat sebab perlu
Of course, the MST from both areas highly agree with S17: *When I teach, I am able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in Bahasa Malaysia clearly.* This is not surprising because BM is the mother tongue of quite a number of the MST, and had been their language of learning when they were educated. It is also the language many of them have been teaching in for many years as well.

The same explanation for S16 applies to S20: *When I teach, I am able to write down ideas/explanations related to the content of Mathematics and/or Science courses in English well.* The majority of teachers, whether proficient or not in English, go into their classes with notes they have already prepared. These notes are usually summaries of the content in textbooks or an amalgam of points taken from various websites or exam revision books. These notes may have been reviewed by the MST’s buddies or may contain very few errors because they are taken from the sources mentioned. Therefore, writing out notes in English on the board for the students in class does not pose a problem for MST because they have time to prepare them in advance. The extremely high level of agreement among both categories of MST in response to S21: *When I teach, I am able to write down ideas/explanations related to the content of Mathematics and/or Science courses in Bahasa Malaysia well,* reflects the fact that Bahasa Malaysia has been the language of instruction in schools for the past few decades. As stated above, the majority of these MST were both educated in BM and started their teaching careers using this language as the medium of instruction. Hence, it comes as no surprise that they feel very comfortable teaching and writing in this language.

MST responses to S15: *I have a strong mastery of the content I teach in Mathematics and/or Science class,* indicate that teachers know the subject matter they
are teaching well. This is because, like their students, they have been streamed and specialised in specific domains since the secondary level. They also undergo an additional two to four years of teacher preparation to teach their particular subjects either at teacher training colleges or in universities. With this strong grounding in their subject areas and the years of experience that many of these MST have, it is normal to have such a high number of them agree or strongly agree with this statement.

7.2.5 Research question 5: If changes do occur, how do they happen? What is the learning process that these MST go through when they make the transition from their former teaching methods to the ones required by the new policy? Are there differences between urban and OOT MST?

The answer to this question is that the changes in classrooms and schools are slowly happening and that for quite a number of teachers and students, it is still a case of “learning in progress”. The responses from the surveys and the teacher profiles presented in the results section indicate that MST are indeed teaching their students Mathematics and Science in English as required by the PPSMI policy. However, the speed with which teachers can adapt and make changes in their classrooms varies. Classroom observations show that MST such as Mr. Wong, Mrs. Chia, Mr. Ang and Puan Sarjit have welcomed this policy and seem to have coped perfectly well right from the start of this policy. For Mr. Wong, Mrs. Chia, Mr. Ang and Puan Sarjit, academic, personal and professional factors play a role in determining their ease in transitioning to this policy. Mr. Wong, Mr. Ang and Puan Sarjit went to English medium institutions for all or a large part of their education. The fact of having been educated in English gives them much greater confidence that they can successfully negotiate this change in language of instruction. A few of these MST also mention that when they started teaching, many of their older colleagues were educated in the English medium as well, so it was quite common for them to communicate with each other in English.

Overall linguistic proficiency accounts only partly for this; after all, some MST report that they do not find having an English teacher as a critical friend very useful because the latter are not familiar with scientific texts and terms, even if they are good in English. It
should be noted that although English teachers are expected to help MST improve their English, none of the language teachers participate in planning or carrying out any M & S lessons; this is considered to be the sole responsibility of MST. However, English teachers may occasionally review or edit MST notes or classroom materials for linguistic correctness if asked.

A large part of the senior teachers’ proficiency could be due to the fact that they have been inducted, in the course of their education, into a community of English speakers who have learned how to “do science” and “talk science” (Lemke, 1990); a lot of the scientific, academic language they are using with their students had already been modeled for them by their own instructors. What is more, they were also among the group of pioneer MST who instructed the first cohort of Form Six students in 2003. When this study began, they had already been teaching in English, albeit not at the Form Five level, for four years. That learning and linguistic proficiency in the classroom need time to develop is evidenced by the following two comments. An urban MST, for example, mentions that there has been improvement in her comfort with teaching in English over time:

After 4 years of teaching Science in English, I find that I am more confident now. This is due to the courses/teaching aids supplied by the (M)MOE. Students have also shown lots of interest and enthusiasm now compared to 4 years ago. [U T1 Pen 8]

This can be contrasted to the distress voiced by another urban MST who is beginning her second year of teaching in English:

I learnt M & S in BM without any choice and now I have to teach Science in English. I am facing problems in expressing my thoughts and in transferring knowledge to my students. I try very hard to improve in my English. I speak English with other teachers. I need time to improve in the use of English to become as good as a English teacher…This is my second year in teaching Science in English. I hope that the MOE will give its full support to the M & S teachers to improve in our English. Please do not keep pressuring us.

Form Four and Form Five students’ comments in their interviews demonstrate that they too have had to go through a learning curve. It was a difficult
transition, especially for students from OOT schools. However, after four or five years of M & S instruction in English, they have become accustomed to being taught in that language. When asked if it was easier to learn in BM or in English, Farid from SMK Kayu Manis 5ST1 responds: “Mula-mula memang susah untuk adapt diri kita dengan BI, tapi sekarang dah OKlah” [Translation: At first, it was really hard to adapt ourselves to English but now, it’s OK.]

In contrast to the more proficient MST, the other MST who were observed, Encik Hamdan, Puan Salmiah, Encik Yusri, Encik Nasir and Mr. Ho, have had to work harder to implement PPSMI. All of them were educated entirely in BM, and have put in much personal effort to improve their capacity for teaching in English. Encik Hamdan, Puan Salmiah and Mr. Ho have progressed to a certain level of comfort with teaching in English. As for Encik Yusri and Encik Nasir, they appear to be the ones who are struggling most with the policy. Although they have also worked on ameliorating their English, whether on their own or through the Buddy System, Encik Yusri and Encik Nasir both indicate that making the transition is difficult because of their lack of fluency in English. Encik Amiruddin, the Buddy System coordinator and head of the English panel in SMK Gaharu remarks upon how some teachers are still at the stage that Mr. Ho had traversed in the development of English proficiency, that of using technology to palliate their lack of linguistic capacity:

I can observe this every time I pass by classes, and then, even though just for a minute or so, from passing by you would know, know that they’re, they’re really having a tough time delivering their lessons, yeah…The only salvation is that they’re using technology to help them. So we’ll have like, you know, they will have softwares that, that uses the English language. But it’s not them teaching. It’s the technology teaching the students, you know. So when it comes to their part, then again they, come back [to] the same problem…

The students themselves notice that some of their teachers are struggling with language in the classroom. Hong Teck, a 5S1 student from SMK Kayu Manis says,

I think the teacher also got problem because they are want to transfer in English. Difficult to them because they also studied in Malay. Want to transfer to BI [English] also difficult sometimes.
For Mrs. Chia, the home environment plays a role in it as well. Although she was educated in the Chinese medium, her husband and daughters all speak mainly English at home. This is also true for Puan Sarjit, whose home language is English. Encik Amiruddin emphasises that this factor is probably a good predictor for students’ linguistic proficiency in English:

You see, most affluent, students from affluent background, gravitate towards certain schools. And perhaps these schools are better off…You know, because when you have more affluent background of the students, they, they are generally more attuned to the English language, you know, bearing in mind that their parents are bilingual or trilingual, you know, and more educated perhaps.

Classroom observations and interviews with MST demonstrate as well that the kinds of modifications that teachers undertake vary. These modifications happen as part of the teachers’ learning process. To a large extent, however, modifications that happen are a factor of the MST’s linguistic ability and pedagogical knowledge, and students’ academic and linguistic abilities. There is a noticeable interaction effect between teacher ability and student ability, and what happens in the classroom. Linguistically weaker MST are usually more concerned about their content delivery and whether they are getting the basic message across to their students. As pointed out previously a reliance on multimedia technology to teach in the classroom is often one of the first steps taken by MST who are less than confident of their English language skills. Quite a number of teachers, therefore, have been obliged to become “tech savvy” in order to deal with multimedia equipment in class, to create their own powerpoint presentations and also to surf on the net for additional teaching materials. More intensive lesson preparation prior to stepping into the classroom has also become part of the teaching routine of several of these teachers. Encik Yusri and Encik Nasir work on finding simple words or explanations that will allow their students to understand easily while Mr. Ho spends time developing teaching materials in English and preparing every night before classes.

With MST who are confident of their abilities in English, modifications to their classroom teaching can focus more on innovative ways of teaching and class management to promote students’ use of English for M & S. By doing so, they increase students’ ease and familiarity with English, thereby slowly improving students’
mathematical and scientific knowledge and English proficiency. Mr. Ang, for example, used techniques such as pair-share-report where students worked in pairs to respond to a question and presented their results to their peers in class. He also implemented ability grouping where students of specific ability levels are grouped together so that he could tailor instruction to the appropriate level. Moreover, to make sure students ask for help when they need it, he introduced a system he calls “traffic light” or SOS, so that students who require extra help can feel free signal their need to him. Because he put in place strategies for giving more help or attention to those students who needed it, and actively encouraged students to participate even if they made mistakes, these OOT students gradually became increasingly comfortable using English and speaking up in class. Another example comes from Mr. Wong’s class. Mr. Wong used a pre-test and post-test procedure to respectively engage his students’ prior knowledge and to reinforce what was learned in the lesson. He also involved his students in small group and whole class discussions of scientific methods, carefully modelling language and procedures for his students. Of course, the two teachers described here are both “master teachers”. They also have the advantage of teaching the best Form Five classes in their school. However, it is doubtful that they would be able to implement the same procedures if they themselves experienced linguistic problems.

The inclusion of some form of translation as part of their teaching methodology is also obviously something which MST, both more and less linguistically proficient ones, have had to learn to do in most classrooms, as observations of classroom teaching have shown. However, teachers are aware that this is not an ideal solution and would rather not have to resort to it because it cuts into their instructional time: “I teach in English, then I have to translate in BM, so waste a lot of time”.

Finally, the linguistic abilities of their students are crucial in deciding to what extent teachers can use English in their classrooms. All the MST who were interviewed spoke about their main concern when teaching in English – making sure that students could understand the lesson. It is almost a reflexive action among MST that as soon as their students look lost or seem unable to comprehend, they resort to translating the terms or specific portions of that lesson. Therefore, in classes where the majority of students are academically able and linguistically proficient, so-called “strong classes”, MST will teach
their lessons entirely in English. However, with weaker classes, these teachers will use much more Malay in class, by way of translation. As a result, instead of teaching Mathematics and Science in English, many teachers end up teaching these subjects in English and Malay. (It must be stressed here that “strong” and “weak” are relative terms. In classes that were categorised as “weak” by the teachers in SMK Gaharu, many students were still able to address the teacher in English and call out responses in English. In SMK Kayu Manis, this was not observed, even with students in so-called “strong” classes).

This pedagogical response has much to do with the pressure that teachers feel about “covering the syllabus” within specific timelines so that students will be ready for school exams and standardised public exams. These exams take place at set times during the school year. This being the case, on-the-spot translation offers them the fastest route to achieving their goal of increasing students’ comprehension. The result of these practices is the creation of a two-track system, even within the same school. Mrs Chia, for example, teaches the 4S1 and also a much weaker Form 4 class. The observations of her teaching 4S1 show that she uses English almost exclusively with that class. Even when students ask her questions in BM, she responds in English. However, when asked if she did the same for her weaker class, Mrs Chia mentions in her T3 interview that it is not possible to use only English with that class: “I have to use bilingual. But I, I still teach in English. So, where the terms which they, they don’t understand, I just put a note there in Malay.” Similarly, Mr. Ang, who teaches 5S1 and 5S2, had to make a pedagogical choice in terms of language usage with the latter class during T2:

But for the weaker students, that is, in 5S2, that is really a uphill battle for me. So, in view of their exams, in view of their exams, so I already sort of decided, I’m using more of Bahasa Melayu when I teach them, mixed with English so the process will become slower in the sense that I’ll use, have to use dual language to teach them.

Observations of Encik Hamdan’s language use with his two classes illustrate the same pattern, that is, that academically stronger classes are less likely to be taught using a bilingual approach compared to academically weaker classes.
The linguistic environment in school and consequently, the peer support available in terms of linguistic mentoring, can also be determinant in terms of the way and the speed at which teachers learn how to use English in their teaching. This is apparent if we compare the profiles of Encik Nasir and Mr. Ho. Both these teachers have comparable educational backgrounds (Malay medium) and years of teaching experience (19 years each), in their subject domain. It could be said of them then that since neither subject content knowledge nor classroom teaching methods would be a hindrance in terms of implementing PPSMI, their focus in learning is more specifically the linguistic component. In this aspect, we see how their learning paths have differed. With help and mentoring from his more proficient colleagues, Mr. Ho has developed in linguistic proficiency and in self-confidence in terms of implementing PPSMI. From someone who absolutely needed to use the teaching courseware provided by the Ministry, he has become a teacher who can choose when and where he uses them, and even then, only as teaching aids. Mr. Nasir, on the other hand, did not mention receiving any help from teachers in his former school and had been working largely on his own to improve his command of English. His progress seems to be less rapid, compared to that of Mr. Ho, because he still struggles somewhat with English even after several years of implementing PPSMI.

While many MST are in the process of upgrading their own abilities in English, they are, incredibly, also transforming themselves into teachers of English for Academic Purposes (EAP) for their students as well.

Tugas akan jadi mudah sekiranya pelajar sudah mahir menulis dan bertutur dalam BI. Tapi malangnya, tidak. Kami bukan setakat ajar Sains tetapi terpaksa mengajar cara nak mengeja, maksud perkataan dan bagaimana nak buat ayat. U T3 PER 210
[Translation: Our task would be easier if students were already skilled at writing and speaking in English. Unfortunately, that’s not the case. We not only have to teach Science but must also teach [students] how to spell, the meaning of words and how to construct sentences.]

In many ways, MST do not necessarily have any choice in the matter. Since the education system is very much exam-driven, at the end of the two-year upper secondary cycle, students must perform well enough to at least pass their SPM exams. Given that each
subject consists not only of multiple choice questions (Paper 1) but also structure and essay questions (Paper 2 and Paper 3), MST have to prepare their students to, at the very minimum, write out short phrases in their responses. The excepts below, from the T2 observation of Mr. Ang’s 5ST1 and Puan Sarjit’s 5VT2, are examples of how teachers carry out this new role while teaching their subjects:

Excerpt 1 – Mr. Ang is teaching a topic on the reactivity of metals. He and his students have just seen some slides showing the reduction of copper oxide, by hydrogen, to copper. Mr. Ang asks his students why they have to keep hydrogen flowing through the apparatus while the copper is cooling. [Incorrect English usage by student and correction by teacher in italics.]

Kar Wai: When the air from surrounding, ah…[turns to classmate for help, but classmate doesn’t respond] flow, flow back into the copper tube [here, the student means the test tube containing the copper], then, because of the copper is still heat, then the…

Mr Ang: Still hot, still hot
Kar Wai: Ah, still hot, then it will react become copper oxide…
Mr Ang: Again, yes.
[Class applauds loudly after Kar Wai’s effort]

Excerpt 2: Puan Sarjit is discussing a question on Bernoulli’s principle [Bernoulli’s principle states: As the velocity of a fluid increases, its pressure decreases]. One of her students, Fuad, is reading out his answer to a question written out on the board.

Fuad: (continues reading) this cause the water level in tube X to be the, (Another student, Fikri, calls out, ‘Higher’) to be the highest.

Puan Sarjit: Yes.

Fuad: And the water in tube Z to be the low.

Puan Sarjit: (with emphasis) low-est. High-est. Because you’re comparing between three, right? So I’ll repeat the answers. Thank you.

In the first instance, we see Mr. Ang correcting the choice of vocabulary made by the student by substituting the right word. In the second, Puan Sarjit not only corrects her student, but provides the grammatical rule as the rationale for why she is doing so. However, it should be kept in mind that both Mr. Ang and Puan Sarjit are experienced
teachers who are highly proficient in English: this specific focus on language was actually very rarely observed in M & S classrooms.

Indeed, not all MST are happy to be playing this dual role. MST see themselves principally as responsible for the content learning of students; many think it should be the work of English teachers to improve the English abilities of their students. The two comments below, from the T1 and T3 survey respectively, illustrate their point of view:

“Kajian perlu dijalankan bagaimana untuk meningkatkan BI pelajar. Kaedah pengajaran BI yang sedia ada perlu di AMELIORATED, jika tidak pelajar – pelajar kita tidak akan dapat menguasai S & M. Masalah yang saya hadapi ialah bukan saja saya perlu menjelaskan pengetahuan sains kepada mereka tetapi perlu juga memperbaiki BI pelajar.” R T1 Pen 107

[Translation: Studies need to be conducted on how to improve students’ English. The existing methods of teaching English need to be AMELIORATED, otherwise our students won’t be able to master Science and Maths. The problem I’m facing right now is, not only do I have to explain scientific knowledge to them but I also need to work on improving my students’ English.]

Another OOT teacher echoes similar views:

Pengajaran dalam BI perlu diberi lebih penekanan. Pada masa sekarang, saya rasa bebanan saya bertambah, bukan sahaja terpaksa mengajar matapelajaran S tetapi terpaksa juga mengajar BI terutama yang berkaitan dengan articles, tenses dan singular/plural form. Lebih baik saya mengajar BI sahaja… Tambah lagi satu matapelajaran yang saya perlu ajar pada student iaitu – “translation” (R T3 PER 120)

[Translation: The teaching of English needs to be emphasised. Right now, I feel that my burden has increased. Not only do [I] have to teach the Science subject, but I also have to teach English especially concerning articles, tenses and singular/plural form. I might as well just teach English…In addition, there’s another subject that I need to teach my students – “translation”].

However, while translation in one form or another seemed to be the preferred method among MST, some of them were concerned that they would lose students’ interest because of the lengthy explanations required to get every point across.

It can be said that change in linguistic behaviour and attitude is slowly happening in classrooms as a result of this policy. For example, due to the atmosphere of trust and
collaboration that Mr. Ang created in his classroom, his 5ST1 students became more at ease using English:

So I noticed that ah, the 5S1, the 5S1 classes, now they have become more responsive, and they are, they are, sort of have more confidence in trying to answer in English. They don’t, they won’t, they don’t feel shy if they make any mistakes. And their friends are very supportive of them.

However, these shifts are not localised to classrooms only. In certain instances, a change in culture due to this policy has happened within the entire school environment as well. For example, I was surprised to have students greeting me with, “Good morning” on my visits to some OOT schools for the purpose of distributing the survey. In the morning assemblies held at both SMK Gaharu and SMK Kayu Manis, I saw teachers and students making announcements in English – something that did not occur before the implementation of this policy. In SMK Gaharu, Puan Salmiah notes that there are subtle differences in the students’ attitudes:

Penggunaan pelajar lebih relaks, lebih bersahaja menggunakan BI, walaupun kadang – kadang tidak menepati tapi kita memahami. Maka perubahan itu ada. Nampak perubahan ketara…Kadang – kadang ada pelajar yg menjadi lebih yakin bila hari-hari kita bertanya dlm BI, mereka cuba jawab dlm BI.

[Translation: Student are more relaxed, more nonchalant about using English, even if it’s not accurate but we understand. So there is change. We can see obvious change…Sometimes, there are students who become more confident because we ask them every day in English, [so] they try to answer in English.]

In SMK Kayu Manis, the principal, Encik Syafirul, spoke of making every Wednesday “English Language Day” to promote the use of English among all students, teachers and staff in school. Puan Sarjit comments on how students’ attitudes toward speaking English has changed:

“But the students seem to be more comfortable using English. Like, if they were to pass a teacher in the corridor, they greet the teacher in English…which wasn’t something that the other students would do, who were not exposed to PPSMI. So there are, there are changes, in the, in the children, you know, the students themselves…in their attitudes. And they definitely use more English, although not that
much, they definitely use more English, better English than the students before…”

Puan Salwa, the Buddy System coordinator and ESL teacher has noticed that the second cohort of students who started learning M & S in English are more confident:

The second year I do notice. From the students, who are from the lower secondary forms, when they reach the upper forms, like the Form Four, they manage to speak English with me, they manage to converse in English with me, and they do have the confidence.

Asked if students would speak English among themselves, she responds: “They won’t converse in English among themselves. They’ll only converse with teachers.”

A small group of this same cohort from 4S1 actually approached me outside the staffroom one day during T1 data collection and struck up a conversation because they were curious about who I was and what I was doing in their school. Although they did not speak in perfectly correct English, they did manage to ask me questions about myself, my work and about Canada. They had no difficulty understanding my responses. This made me curious as to why they were absolutely silent in Encik Nasir’s class when he asked them questions in English in the classroom [see Encik Nasir’s profile]. When asked why they did not interact with the teacher in class using English, they admitted to being afraid of making mistakes when formulating questions or being laughed at. These students spoke about how they are regarded as “sombong” [proud] or “berlagak” [show off] if they speak in English.

These comments are very similar to remarks made by the group of students I interviewed during T2: they are very sensitive to the fact that when they are among friends, if someone chooses to use English, they get “pandang semacam” [disapproving looks] by the others. So, although a part of the linguistic behaviour of these students is due to their language skills, another contributing factor may be the social cost of using English. This type of “in-group” and “out-group” behaviour is true of students of other ethnicities as well as can be seen from the way students tend to speak in their mother tongues when among themselves in both SMK Kayu Manis and SMK Gaharu.
7.2.6 Research question 6: How do MST change their teaching practices to accommodate the requirements (content and format) of the new exam? Are there differences between urban and OOT MST?

The analysis for question 6 will draw on many of the elements already mentioned in analysing the five previous questions. In general, teachers consider that the content of the subjects they are teaching has not changed much. This is because the M & S curriculum content has undergone only minor adjustments. This is reflected in what appears in the SPM exams. Since this is the case, many MST tend to think that what is required of them in implementing PPSMI is more a change in linguistic practices rather than teaching methods. For them, the major change in the SPM has been the bilingual format: with the implementation of PPSMI in 2003, it was the first time that teachers and students in the educational system had experienced a bilingual exam format.

It should be mentioned that, in terms of reaction to exam requirements, MST are actually pulled in opposite directions because of the differing demands of internal and external exam policy. The internal exam policy stipulates that tests and exams in school be held only in English. This is the ultimate goal of PPSMI, and English-only seems to be the default format that all MST are supposed to aim for. There is pressure from the MMOE, the JPN and the PPD to move in this direction. However, the SPM exams themselves are held in bilingual format. These competing aims and formats produce a rather unusual effect on the teaching practices of OOT MST.

From the profiles of MST for both SMK Kayu Manis and SMK Gaharu during T1 and T2, teachers in both schools are not preparing their students to answer exam questions in BM at all; they are working to prepare their students to answer exam questions in English. Therefore, throughout almost the entire two-year upper secondary cycle, it is the English version of the bilingual format that is driving washback in both urban and OOT classrooms. As was mentioned in response to questions 3, 4 and 5, there are different patterns in terms of how MST prepare their students for the English exams: those MST who are highly proficient in English, teaching students who are also proficient in English, conduct lessons and practice questions entirely in English – students are expected to respond in English. However, MST who teach students who are less proficient may resort to BM to make the questions and their explanations clear to
students, but they still expect students to respond in English. MST may focus on key words, simplify sentences, translate or code-switch occasionally from English to BM, but the principal objective is to get students ready to answer the SPM exam in English.

It is only during T3 that we see a difference between MST classroom practices in the OOT school, SMK Kayu Manis and in the urban school, SMK Gaharu. MST in SMK Gaharu maintain what they are doing, that is, preparing students to answer their exams in English. This seems to be the case for other urban schools as well. An urban MST commented in the T3 survey that the bilingual format might not make much difference for her students:

> Although BM is my students’ mother tongue I strongly believe that writing down answers for M & S in Malay especially my subject would be a problem to my students as they have learned the subject in English for the past 2 years. (U T3 JOH 248)

Another urban MST puts it even more strongly: U T3 PEN 9 writes, “Students will confuse and waste time if the exam questions were prepared in BI & BM. Some of the terms they couldn’t understand in BM.”

MST in SMK Kayu Manis, on the other hand, have to deal with evidence that their students have performed poorly on their Trial Exams, and with panicked requests from students who, having seen BM exam versions for the first time, feel they can do better in BM. This means that the bilingual format exerts a washback effect only as the SPM gets very near – it is the fallback format for students who are not performing well with the English version. Comments from OOT MST during the T3 survey concur that these MST think the bilingual version could aid their students. One of them writes, “I’m teaching at rural area where students can’t understand English very well. So, answering in (M)alay can sho(w) student skills & capacities.” (R T3 JOH 308)

Given that MST have so little time to prepare their students for answering questions in BM, how helpful it will actually be in enhancing students’ exam performance is somewhat questionable. Puan Sarjit’s apprehensive remarks about how her students will perform in the SPM even with bilingual support underscore this concern:

> Mmm, for the weaker students, I guess they still have to fall back on the use of Bahasa. But at the same time, if they’re being taught the Sciences and
Maths in English, the terminology is all in English, how are they going to understand the questions when the terms are Malay terms?

7.3 Summary of salient points from the analyses and interpretations: Questions 1-6

The salient points arising from the analyses and interpretations of Questions 1 through 6 are briefly summarised below. MST changes in teaching practices and response to the bilingual exam format are dependent on the factors listed below, and how these interact in the teaching environment:

1) MST’s linguistic capacities – the first is, of course, whether they themselves have the necessary English proficiency. Since all teachers are already proficient in BM, it is their proficiency in English which is determinant. In the two case study schools, MST’s BM proficiency is never brought up – it is a basic assumption of their teaching abilities. This is the case in both urban and OOT schools. It accounts for the fact that none of the items relating to MST’s BM capacities loaded on any of the factors extracted through factor analysis.

2) Students’ linguistic capacities – as the previous discussions have demonstrated, students’ linguistic abilities determine how teachers choose to teach in their classrooms, in terms of language of instruction. These capacities may vary according to the school’s geographic location (urban or OOT), the students’ socio-economic backgrounds and the linguistic climate present in school.

3) Students’ academic abilities – from the questionnaire responses, interviews and observations, academically weaker students are the ones struggling most under this policy. With this category of students, MST tend to make adjustments in both language and content of instruction as well. The main objective for MST, in this case, is for students to secure at least a pass in their SPM exams.

4) MST’s perception/beliefs about their subject area (Math or Science) and the role of language in that domain – the pedagogical choices and statements made by Math teachers clearly indicate that for them, language is not an important part of the teaching, learning and evaluation process. Therefore, pedagogical issues related to language are not given priority in these classrooms. Science teachers, on the other hand, introduce different measures which they feel might help students improve their linguistic skills such as having students listen to courseware CDs or pairing students up to discuss and then report to their classmates.

5) Requirements of different question formats within the SPM exam – As pointed out in Chapter 2 and mentioned by Encik Hamdan, there are no essays required
for SPM Math exams. On the other hand, short answers and essays are required in all the SPM science exams. This plays a role in determining whether and how MST include various elements in their classrooms to help students understand and answer exam questions. Science teachers, for example, were observed carefully modelling procedural language and correcting students’ English mistakes; this was not seen with Math teachers.

6) Scoring or grading of student responses for SPM exams – The Malaysian Examination Syndicate seems to be allowing examiners to accept responses that are not strictly in either BM or English because it is still a transition period for this policy. As the SPM approaches, MST are responding to this leeway by encouraging their weaker students to write in a mix of the two languages if they are unable to express themselves uniquely in one language.

7) MST’s capacity to make pedagogical adaptations – From the different MST profiles, we can see that not all MST transition at the same speed or with the same ease into teaching according to this policy. At one extreme, we have those who completely quit the profession because they feel unable to make the required changes. At the other, there are those who have transitioned with ease and are making additional efforts to change teacher-student dynamics in the classroom.

8) MST’s pedagogical expertise - In terms of teaching methodology, many of the classrooms observed have retained the teacher-centred approach towards teaching and learning. In class, the teacher is the one who lectures or demonstrates in order to deliver knowledge to students. In whole-class teacher-student interactions, the pattern of question and response is typical of many traditional classrooms. The teacher initiates the interaction by asking a question, and a student is selected to give a response which the teacher then evaluates as being right or wrong. However, some teachers, such as Mr. Wong and Mr. Ang have been able to step away occasionally from this pattern. Mrs. Chia as well has created a classroom environment where students feel comfortable participating in English and speaking up when they do not understand. However, as pointed out by both Mr. Wong and Mr. Ang, the student-centred types of activities take much more time than whole-class lectures. This makes student-centred learning activities difficult to incorporate into their teaching schedules because they have specific content to teach within a limited amount of time. This factor is discussed below.

9) Time available to complete syllabus – Time constraints also influence MST’s pedagogical decisions. Given that teachers are required to teach multiple topics and sub-topics, all of which are liable to be tested during the high-stakes SPM exam at the end of the two-year, upper secondary cycle, many MST tend to resort to translating as the quickest way to make students understand.
7.4 Findings

The analysis of different strands of quantitative data (descriptive statistics, MANCOVA and factor analysis) and qualitative data (comments, interviews and observations) demonstrate a strong pattern of convergence.

However, the data from the case studies added finer details that were not captured by questionnaire items. For example, even though quantitative analyses did not find any difference between teachers of Math and Science subjects in terms of their perception of the policy, support factors and so on, observations and interviews demonstrate that there is a difference in terms of the importance they give to the linguistic aspect in their classrooms. It also showed how MST’s perception of the intensity of washback for the SPM on students differ from what students themselves are experiencing. For MST, serious preparation only starts in Form Five – the Form Four students are “on honeymoon”. Form Four students from both SMK Gaharu and SMK Kayu Manis vigorously deny this. It also demonstrated that while MST are working for washback of the English version, the students’ knowledge that a BM version is available as well may be creating a washback effect counter to these official aims.

The results of the analyses show:

1) There are indeed differences in urban and out of town regarding multiple aspects of the implementation of PPSMI; however, there are also many similarities.

2) The teacher factor is an important element in determining response to policy change and the kind of washback that happens in the classroom. Teacher proficiency, expertise and beliefs about language, as well as their evaluation of student abilities, shape MST’s classroom practices in response to mandated change.

3) Even though PPSMI is a policy that involves both language and subject learning, MST and language teachers’ responsibilities remain separate: English teachers play a supporting role, but MST have the primary role of effecting change in the M & S classroom.

4) The student factor is a crucial aspect of educational change: students’ home environment, linguistic proficiency and academic abilities, have an impact on their capacity to meet the requirements of this policy. Certain groups of students are paying a price in terms of the quantity and quality of their learning under this policy.
5) Multiple aspects of the school environment contribute to shaping MST and student responses.

6) Time is needed for educational change to take place, and change may happen at varying speeds for different individuals.

7) The importance of carefully considering the ensemble of these contextual factors and how they may interact – as the results have demonstrated, it is not only teacher proficiency or only student proficiency that determines to what extent MST can teach in English.

8) The importance of aligning internal and external assessment policies – otherwise, these do not work together to promote better teaching and better student learning.

This chapter discussed the results from Chapter 5 and 6, and presented the findings of this study. The next chapter, Chapter 8, examines these findings in light of the literature presented in Chapter 2.
CHAPTER 8

Discussion of results in relation to previous literature and conclusion

8.1 Introduction

This chapter discusses the findings of the study in Chapter 6 with regard to the three different strands of literature presented in Chapter 2. Therefore Chapter 8 is divided into three sections. The first section discusses the findings in relation to CBI, the second with regard to assessment and washback, and the final section focuses on educational change.

This chapter concludes the study by talking about the study’s implications, strengths and limitations. It also indicates direction for future research and specifies the contributions made by the study.

8.2 PPSMI implementation and CBI

The results and findings of this study share similarities with other CBI and EAP for ELL classrooms discussed in the literature. They also support the findings of previous studies based on Cummins’ Theoretical Framework (1981, 1986, 2000) concerning the impact of L2 proficiency on their academic learning as well as those arguing for the use of the L1 in supporting ELL’s academic and L2 learning.

In the Malaysian context, PPSMI is producing different results depending on the student’s academic level, as well as their linguistic background and environment. It is working well for some students. These are often students whose home backgrounds have allowed them to develop BICS and CALPS to function effectively in the school context. Since they have no problems with speaking, listening, reading or writing in English, and generally receive adequate support in the content area, this is reflected in their excellent performance when they are tested.

However, five years into implementation, we also see that there is another group that is just starting to develop some receptive academic English skills (listening and reading).
This is evident from their ability to take notes based on the teacher’s lectures or from reading their textbooks. On the other hand, they are not as comfortable with their productive skills, since these students often have great difficulty responding to questions in English verbally or in written form. On their assignments and exams, this group of students can perform well on specific types of tasks that require minimal or no production such as multiple choice or short answer questions. There are also students for whom all aspects of English are problematic – as MST have indicated, these students have given up on performing well academically. Clearly, for the latter group, providing them with meaningful contexts and comprehensible input only are not enough.

This concurs with what has been stressed by researchers and educators in the field of CBI (Crandall, 1987; Echevarria & Graves, Cummins, 1981, 2000; Wesche, 2002) - there is a link between academic achievement and language proficiency for ELLs. Therefore, when the cognitive demands of the content area are high, the ELLs assigned to these courses must have an appropriate level of proficiency in the target language. Otherwise, they may not be able to follow teaching in the subjects concerned, and are not able to develop their language abilities either. What is specific to the Malaysian context, however, is that, due to sociocultural and historical factors mentioned in Chapter 3, the geographic location of students is a factor that limits their access to the English language. This needs to be taken into consideration when considering CBI and the types of support that need to be provided to the learners.

As pointed out above, certain students have only developed their receptive skills to a certain extent after five years of being in the PPSMI programme. These students are also able to interact socially as evidenced by their conversations with me and with their ESL teachers. While this may reflect the MST’s emphasis on understanding content, it also provides support for Cummins (1979, 1981, 2000) hypothesis that BICS develops at a faster pace than CALPS: the latter may take up to nine years to develop.

We see that, like other classrooms mentioned in immersion, CBI literature and EAP for ELL literature, there is a tendency to focus mainly on content (Allen et al, 1990; Swain, 1996; Swain & Carroll, 1987; Arkoudis, 2006). When student proficiency is not optimal, MST try to get content across to their students in various ways. These means are immediately useful in the classroom, but also pose their own problems. The most
commonly used method is translation – the mention of this technique in interviews and questionnaires is ubiquitous. While the MST observed did not fall into this category, the Head of the ESL panel in SMK Gaharu makes an interesting point about the quality of English being used in some classrooms:

I observe some of the teachers, they, they use translation. How they would speak in Malay, they would speak in English. And translation can be a problem because the Malay structure is different from the English structure.

Students who are consistently exposed to this kind of English over long periods of time may end up learning a non-standard variety of English with persistent types of errors (fossilisation) introduced by the teachers themselves.

Another way of addressing linguistic difficulties is via simplification. MST often mention using simple words or simple sentences in order to help students understand. On the other hand, simplification entails the loss of technical complexity or depth of the concepts being taught. MST are aware that it curtails what students actually grasp of complex scientific or mathematical ideas; Mr. Ang, who teaches Chemistry admits:

“...I will try to use simple English. Instead of ‘effervescence’, I will try to use ‘bubbles’, but when you try to use simple Chemistry, simple English terms, the idea is not so clear anymore sometimes...He might only be able to understand 60%.”

Moreover, students who do not have other kinds of input in their linguistic environment may become accustomed to processing only these simple structures. As some students themselves have indicated, they have difficulty understanding longer, more complex sentences.

MST also focus on key words in attempts to skirt the language issue in their classrooms. One Form Four student very perceptively points out that students may memorise these words but they need more than that if they are to truly understand the content they are learning:

Syimah: “Dia, sama ada kita faham ke tidak benda tu. Kita tak boleh ingat ah, macam terms tu dalam English tapi hakikatnya kita tak faham apa yang kita tulis tu, kan.”
Moschkovich (2007, p.92) states: “Instruction focusing on low-level linguistic skills, such as vocabulary, neglects the more complex language skills necessary for learning and doing mathematics” This strategy may, in fact, backfire on the MST. Mr. Wong’s example of how students stated a concept, instead of explaining the meaning of the concept as required by the question, illustrates how teaching students to pay attention only to key words limits their capacity to interact with text at a more advanced level, and may lead them to misunderstand or misinterpret texts.

Classroom observations have shown that MST attempts at correcting students’ linguistic errors are rare and not done in any systematic manner. Apart from the strategies mentioned here, MST did not have any consistent approach to language teaching. This is similar to what has been noted by Barwell (2005a) and Creese (2005) about subject teachers in mainstreamed ELL classrooms. The limitations of MST’s teaching strategies in this situation are illustrated by what Malik, a 5KS2 student from SMK Gaharu says:

Boringlah, sebab dia asyik explain yang ni saja dalam Bahasa Inggeris. Lepas tu, kita tak, kita tak paham dia ulang balik, ulang balik dalam…yang sama saja…Tanpa mengubah cara, kaedah dia untuk bagi lebih menarik. Asyik-asyik ulang, macam tu, macam tu aje, dengan proses sama jugak.

[Translation: It’s boring, because he just explains the same thing in English. After that, when we don’t, we don’t understand, he repeats, repeats in…the same thing… Without changing the way, his method to make it more interesting. Just repeating, just that, just like that, using the same process]

Indeed, Stryker and Leaver (1997) have noted that in order to teach effectively in CBI classrooms, teachers have to be aware of using strategies such as “using context effectively, recycling or spiraling information, exploiting students’ background knowledge and schemata, using peer work, and teaching coping strategies.” (p. 8) They contend that second language teachers are more likely to possess these types of expertise than subject-matter specialists. This leads us to the next point: collaboration (or rather, the lack of it) between content and language teachers in M & S classrooms.

Although PPSMI is a policy that touches on both content and language, MST and language teachers are not required to work together to plan lessons for M & S classes.
The reaction of subject and language teachers along the lines drawn by their respective disciplines is similar to those observed in other mainstreaming and EAP contexts (Arkoudis, 2003, 2005; Leung & Franson, 2001). Language teachers are quite willing to help MST improve their English proficiency – this falls very much within the domain they are comfortable with as language experts. However, as observations of the EMS sessions have shown, they draw the line at having to engage with the content of M & S subjects, something which they are not experts in and which they were not trained to do. In regular English classes, they teach students grammar, how to read and respond to literature/poetry and essay writing, not calculations, formulas and so forth. Vice versa, some MST have indicated that they see themselves as subject teachers and, given a choice, would rather not have to shoulder the responsibility of teaching students English. However, literature on CBI and second language classrooms have demonstrated how learners benefit when attention to language and linguistic structures is planned and incorporated into teaching. (Snow, Met and Genesee, 1989; Echevarria and Graves, 1998; Lyster, 2007). Moreover, as Fillmore and Snow (2002) have argued, all teachers of ELL are language teachers.

The use of students’ L1 or first language of instruction, BM, was observed often in the form of translation as mentioned above. However, this practice is actually not officially encouraged by policy makers. MST are advised to use it sparingly to aid comprehension or if their students request it. Therefore, MST use of L1 is not systematic. It only depends on whether or not MST think students have understood their explanations. There is no focus on making links between BM and English or drawing on their students’ knowledge schema in the L1. This leads to missed opportunities for supporting the language growth of their students: research in bilingual education has demonstrated, on the contrary, that ELLs may be able to use their knowledge about their L1 to form hypotheses about the L2 (Edelsky, 1982; Ballinger, Lyster & Collins, 2009) and that direct instruction concerning the differences and similarities in the functions and structures between L1 and L2 enhances the development of the target language (Jimenez, Garcia & Pearson, 1996; Nguyen & Shin, 2001; Riches & Genesee, 2006).

It could be said that MST view the connections between language and their content area through an older paradigm where content and language exist separately (Barwell,
language is not seen as a tool for meaning making or creating
knowledge. Rather, teaching is the act of getting content into students and getting them
ready for exams - language is simply the conduit for doing so. Due to these beliefs, the
lack of time because they are obliged to complete a fairly extensive syllabus, and their
view of themselves as subject matter teachers, most MST in the study had not yet
explored the types of teaching or classroom activities recommended in more recent
literature on EAP for ELLs in M & S classrooms (Huang & Normandia, 2008; Valdez
and Svedkau skaite, 2002, Richardson Bruna & Gomez, 2009; Scherer et al., 2009).

8.3 PPSMI implementation and the washback effect of the bilingual PPSMI exams

Since the bilingual SPM M & S exams are inextricably linked to the implementation
of the PPSMI policy, the same elements which influence policy implementation impact
the washback of the bilingual exams as well. Drawing on the results presented in Chapter
5 and the findings in Chapter 6, this second part turns now to the washback literature. We
begin by reconsidering the Washback Hypotheses put forward by Alderson and Wall
(1993):

1) A test will influence teaching
2) A test will influence learning
3) A test will influence what teachers teach
4) A test will influence how teachers teach
5) A test will influence what learners learn
6) A test will influence how learners learn
7) A test will influence the rate and sequence of teaching
8) A test will influence the rate and sequence of learning
9) A test will influence the degree and depth of teaching
10) A test will influence the degree and depth of learning

It can be said for the bilingual SPM exams that they confirm the first 10 hypotheses that
were put forward. What has to be pointed out, on the other hand is that, to what degree
each of these hypotheses holds true depends not only on the characteristics of teachers
and learners, but also on how these characteristics interact. Almost all MST have
indicated that they modify how they teach linguistically in function of their students’
language and academic abilities. Mr Chan’s and Encik Hamdan’s comments about the
Minimum Adequate Syllabus (MAS) demonstrate that MST actually modify what they teach in hopes of helping their students pass the exam. This modification in content affects the rate, sequence, degree and depth of MST’s teaching. Consequently, the rate, sequence, degree and depth of student learning is affected.

11) A test will influence attitudes to the content, method, etc. of teaching and learning

The findings show that it is not only the test, but also what else is in place to support transition and implementation from the former to the new which influence these attitudes. For example, a teacher such as Mr. Ho, who was apprehensive about teaching in English in the beginning, became much more comfortable because of the mentoring and linguistic support available in his school environment, and the technical support provided by the MMOE (laptops, CDs).

12) Tests that have important consequences will have washback
13) Tests that do not have important consequences will have no washback

What emerged from the data and analyses is that even important tests may have limited washback if policy and other support measures run counter to it. Although both the English and the BM version have important consequences, given that they appear on the SPM exams, the MMOE’s policies on in-school English-only testing and its encouragement of English-only linguistic practices in the classroom actually blocked the washback effect of the BM version. Students resorted to preparing for it on their own, as in the case of Encik Hamdan’s students, or asked for help in exam preparation in extremis two weeks before the SPM like Puan Sarjit’s students. This demonstrates that tests and the misalignment of policies accompanying them can have unintended effects.

This lack of washback could also be due in part to certain beliefs or assumptions on the part of MST concerning BM. Firstly, MST assume that since students are able to understand better in BM, they will be able to express their understanding in this language when placed in exams situations. The second is that students do not need much preparation for answering questions in BM – they can do it on their own because it was
their first language of instruction and it is the first language for many students. Student views on this matter contradict these beliefs.

14) Tests will have washback on **all** learners and teachers
15) Tests will have washback effects for some learners and some teachers, but not for others

It can be said that the English version of the SPM exams has had an effect on all learners and teachers. From a baseline of zero (no official teaching, learning or assessment of M & S in English) prior to PPSMI, this exam has become the primary driver of washback within the system. The BM version, on the other hand, has had an effect only on students who are academically weaker and/or less confident of their ability to respond to exam questions in English. However, the intensity of washback, in the sense of how much changes and how rapidly, as well as the different patterns of washback do depend on individual differences and contextual differences.

The findings in this study extend what has already been found in the literature. By looking at the mid-life of the implementation cycle, it was found that with time, support but also constant monitoring and pressure from the MMOE, MST have made the transition or are in the process of making the transition, of teaching in English and preparing their students for the English version of the bilingual SPM exam.

These findings provide additional evidence for the centrality of the teacher’s role in washback – their linguistic abilities, their pedagogical practices but also their beliefs and perceptions about their students, about language and learning, determine how teaching is aligned to support student learning within the requirements of a new assessment. The teacher factor is especially important in contexts where students have little linguistic or academic support outside school.

As for the student factor, the findings show that it is crucial in determining the extent to which washback occurs in the classroom. This is because, as the study has shown, the abilities and needs of students greatly influence what teachers decide to implement in their classrooms.
In terms of the elements proposed by Henrichsen (1989) in his model, it can be seen that the antecedents of the system, the user and traditional pedagogical practices influence the rate of adoption of the PPSMI policy. The consequence that this policy has on students' SPM results is, of course, a major consideration for MST. As for the process of implementation itself, the MMOE has succeeded in conveying its message to MST concerning the importance of learning M & S in English, as demonstrated by MST comments acknowledging the validity of the MMOE’s goals. On the other hand, there are still factors within the school contexts themselves that may hinder change. Inter-elemental factors, such as the English proficiency of individual teachers reacting with the academic ability and language proficiency of students can either facilitate or hinder the process of change in classroom practices. However, in terms of consequences, because MST believe that they must submit to MMOE directives, no overt rejection of the policy was observed. Instead, the levels of adoption of English as the language of instruction varied: this could range from teaching entirely in English in certain classrooms to relying extensively on translation to BM during instruction in other classrooms.

Based on these findings and the categories specified in Henrichsen’s (1989) model, I would like to propose a model of the washback effect in M & S classroom due to the bilingual SPM exam format introduced by the PPSMI policy.

8.3.1 A washback model in the Malaysian context of PPSMI implementation

In Figure 20, SPM test factors are represented by the white rectangle with an oval inside: teacher and students have no choice but to be attentive to the SPM demands and specifications since the exam is mandatory for all Secondary Five students. The factors represented in the shaded grey rectangles on the left of the page represent factors which have an effect on the MST English proficiency, while those in white rectangles represent factors which influence students’ English proficiency. These can be antecedent or current factors. The white ovals show students’ linguistic and academic abilities, and the shaded grey ovals indicate MST proficiency and their perception of students’ linguistic and academic abilities. The elements in these white and grey ovals interact to influence the
Figure 20. Proposed model of washback effect from bilingual SPM format
pedagogical options that MST may select, represented by the large white arrow in the middle of the diagram. These options, moreover are filtered through the lenses of teachers’ beliefs about their subject domain and their understanding of the content and linguistic demands of the bilingual SPM exams, as indicated by the grey rectangles in the middle of the diagram. Once the selection of language(s) and content have been made, how these are enacted in the classroom is also a function of MST’s pedagogical knowledge (teaching methods/strategies, classroom interaction, classroom management and so forth) – these two elements are represented by the large, white rectangles following the arrow in the middle of Figure 20. The deployment of specific approaches, to teach the content via the language(s) (as represented by the diamond on the left of the diagram) then has an impact on students’ linguistic ability and academic ability. These need time to develop (as represented by the small grey and white rectangles above and below the diamond) and are influenced by the students academic motivation and future aspirations. Similarly, MST also go through a learning process – their English proficiency and pedagogical abilities may be enhanced by the process of teaching, and the various training and support measures that are put in place as policy implementation unfolds. These also take time to evolve. This broader aspect of time relative to the various stages of policy implementation is represented by the long arrow found right at the bottom of the diagram. This teaching and learning cycle represent the washback effect that the bilingual SPM exam implemented within the PPSMI policy context is having in M & S classrooms in Malaysia.

8.3.1.1 How the model expands on and contributes to previous washback models and washback literature

This model builds upon and extends what previous washback models demonstrated. In comparison to Bailey (1996) and Cheng (2002) model, which lays out factors that contribute to washback along three specific categories(participants, process, product), this model demonstrates not only that participant, process and product factors contribute to washback – the sub-elements within each factor may interact among themselves or across factors to create a washback effect.
Moreover, the results have also provided evidence that the same factors, in different micro-contexts, may not produce the same washback effect.

It corroborates what Shih (2007, p.137) has mentioned: that “any given test needs research tailor-made to examine its washback”. It also expands upon the model proposed by Shih (2007), which examined how multiple factors may variably impinge on washback of student learning only. In contrast, this model shows very distinctly how very specific factors, and combinations of factors drive the washback effect on both teaching and student learning: what teachers decide to implement in their classrooms relative to a high-stakes exam inevitably impacts how students respond to it, meaning that the two are inextricably linked. The results of this study suggest that in educational systems such as the one present in Malaysia, looking at only one or the other presents an incomplete profile of the washback effect of any given high-stakes test or exam.

It also adds a dimension that was missing in the previous washback models suggested by Bailey (1996), Cheng (2002) and Shih (2007) – the dimension of time. Although Shih’s (2007) model includes time as a factor, the author admits that this was not empirically substantiated as the study took place over only one semester. The model that I am proposing is grounded in empirical evidence showing the effect of time on washback at two levels. On the broader, more general level of exam policy implementation, the model suggests that examining the washback effect at different periods of implementation (initial, mid-term or fully established) will show a different washback profile in terms of teaching and learning. On a narrower, more micro level, the model points to the fact that the washback effect observed in classrooms differs according to the proximity of the high-stakes exam. In both these cases, as Shohamy, Donitsa-Schmidt and Ferman (1996) have pointed out, washback evolves with the passage of time.

This model also bear outs Wall’s (1996, 2000) suggestion for looking at models and frameworks that include antecedent, process and consequence factors such as the one proposed by Henrichsen (1989) when considering washback models; these elements, along with an ethnographic, triangulative approach to data collection, permit a more comprehensive inclusion and understanding of factors at work within any given washback context.
8.4 PPSMI implementation and the literature on educational change

The implementation process of the PPSMI policy is an interesting demonstration of how change is effected in a highly centralised, bureaucratic system (Weber, 1978; Kliebard, 1988; Wenger 1998). It is evident from what has been described in this study that top-down change can work, but only up to a certain extent. The MMOE has invested considerable resources in terms of equipment, training, support measures, monitoring and regular assessment of student progress and financial incentives for MST. It has also managed to communicate to MST the rationale and the need for a policy such as PPSMI, as evidenced by MST comments. What the transition process of these MST demonstrates is that teachers can change and are willing to do so – if they understand and support the aims of the policy, and also if they are provided with adequate resources and support to accomplish the change. This is in line with what has been found in the literature on educational change (Petrie, 1990; Fullan, 1991, 2001; Hargreaves et al., 1998).

The MMOE has also made great efforts to level the gap between urban and non-urban areas in terms of infrastructure and other types of pedagogical resources. This is evident from the well-equipped labs and computer labs in out-of-town schools. However, the Ministry of Education is asking teachers for whom English is a second or foreign language to simultaneously acquire new language skills and make pedagogical adjustments rapidly. Even though MST may be willing, the results show that they, just like their students, need time to develop EAP to a level which is sufficient for teaching their subjects.

What has not been considered by the MMOE are the local factors specific to each context. The finding show historical antecedents and sociolinguistic conditions prevalent in urban and out-of-town areas may mean that the students start off at different levels of linguistic proficiency. Therefore out-of-town students may need more time to develop their skills to the desired level. The MST teaching these students may need more as well in terms of linguistic and pedagogical development and support. The results show as well that regardless of location, there are MST who are at various points along the English proficiency continuum. Therefore, the amount of time given to each teacher to reach appropriate proficiency levels may need to be adjusted based on their language development.
The evidence also points to a gap in terms of the learning experiences by students in academically advanced and those in less advanced classes. Time and again, MST have said, that this policy works, *but only for good students* – this refers to the way the policy is implemented as is. At present, much of the focus in terms of support for MST has been on technological and linguistic development. What they may need as well could be pedagogical development in terms of knowing what teaching in a CBI classroom entails. Given that support structures have now been set up for MST, a more specific approach may also be necessary to support some students’ capacity to learn in PPSMI classrooms. The two points just discussed highlight what has already been mentioned in this body of literature, that local contexts and the specific work conditions of teachers need to be considered when planning change (Wise, 1988; Sarason, 1992, 2003; Hargreaves & Fullan, 1992).

The findings show that the extremely centralized fashion in which the MMOE is implementing and making changes to policy may also mean that the MMOE is losing out on valuable input from the grassroots level (i.e., schools and classrooms) on what can help improve the process of PPSMI implementation. For example, even though MST do not know exactly how to do it, suggestions from MST stating that teaching of English should be improved so that students can learn better do make sense – this is supported by literature from CBI research. Comments from students have also demonstrated as well that these young people are perceptive and conscious of their own learning processes and needs. By listening to these stakeholders and being aware of what is happening at the micro level, the MMOE may also increase MST and students’ sense of investment in the implementation process.

8.5 Conclusion

8.5.1 Implications

This section discusses the implications of PPSMI policy implementation in light of the findings and the discussion in the previous sections of this chapter.
First of all, it can be said that for PPSMI implementation, one size does not fit all. Although the MMOE has been careful and organised in its distribution of resources and provision of support, it still needs to consider local, micro factors which significantly impact the quality of teaching and learning happening in M & S classrooms at this stage of the implementation.

Secondly, although the MMOE has considered the comprehension aspects of students’ learning process, they have not taken into account what linguistic support students need in terms of production. This is true of English, where the focus of both MST and English teachers (in EST courses) is on ensuring student comprehension – students are rarely expected to speak or to write. However, this is true of BM as well. The unproblematic assumptions that student comprehension in BM will automatically transfer into performance in the exam context contradicts what students themselves say they can do. Students are aware of this, and comments from MST responding to the survey and in interviews indicate that teachers are conscious of this shortcoming too.

Finally, we see as well that what had been put in place as a support measure, that is, the BM version within a bilingual SPM exam format, is not accomplishing its role. The misalignment between internal and public exam policies means that the effect of this version is not in line with good teaching and testing practices as advocated by language testing experts (Bachman & Palmer, 1996; Bachman, 2000). These emphasise that educators must assess what is taught. However, students who opt for this version do not receive adequate pedagogical support for the BM version – some are given help close to the SPM while others have to study for it on their own. Also, because of the varied linguistic practices of MST and especially the difference between language of testing in school and languages of testing in the SPM exams, there may be some questions as to the validity of what the bilingual exams are measuring exactly (Abedi, 2002; Ockey, 2007). Therefore, there needs to be a reconsideration of how MST linguistic practices in class, in-school testing practices and the SPM exams can be aligned to provide optimal support for those students who are less proficient in English so that the bilingual SPM exams can actually claim to be mainly testing students’ content knowledge.
What the results of this study have shown may indicate the need to re-consider certain measures related to the implementation of PPSMI. Recommendations to improve policy implementation are given below.

8.5.2 Recommendations

The recommendations in this section are based on the findings with respect to the literature:

- Consideration needs to be given to how MST, who are only trained in subject teaching, may also be prepared to help their students in ways other than the direct translation and simplification methods that are commonly used at present.

- For pre-service MST, teacher training needs to increase their awareness of the role of language in creating meaning. This means knowing how to use language as a tool for learning, not simply as a conduit for transferring facts and formulas.

- Teacher training for language teachers, especially at the secondary level, must include basic knowledge of M & S, and knowledge of how to support the learning of EAP in M & S classrooms.

- Collaboration between MST and language teachers should be increased. The types of collaborative activities could include team-teaching, sheltered/adjunct courses as described in Brinton, Snow and Wescbe (2004), or planning sequences of M & S and language courses where activities in content and language classes scaffold each other (Davison, 2006). The MMOE may also consider implementing a framework of Counterbalanced Instruction, such as the one proposed by Lyster (2007), where language activities focusing on form and content-based activities can be integrated or complement each other across the curriculum.

- Greater emphasis should be put on teaching students literacy skills, especially in the academic writing domain, and not just discrete grammar points in their language and/or academic courses.

- The English courses that are already available to students should be designed to help students not only with comprehension, but with production of the language in the EAP context. This includes both speaking and writing in the academic domain.

- Differential support needs to be planned for students who are weaker academically or linguistically. In the same way that MST are screened to see who needs training and support, pre-assessment measures should be implemented before students begin their M & S courses.
• Although the bilingual version is seen to be transitional, support for students who opt for the BM version needs to form part of the regular teaching and learning process in M & S classrooms. Otherwise, those students who choose to respond in BM during the SPM are disadvantaged.

• Choices may be provided to students to learn M & S in either English or BM, so that they may learn in their strongest language.

8.5.3 Strengths of the study

One of the main strengths of this study is its research design. The study uses a mixed methods approach to both data collection and analysis. This research design allowed the triangulation of multiple sources of quantitative and qualitative data, creating data patterns that would otherwise not have emerged using quantitative or qualitative approaches alone. The result was greater breadth and depth, not only in terms of the data collected but also in terms of the interpretations that could be made based on the results of quantitative and qualitative analyses.

Another of the study’s strengths is that it is longitudinal in nature, encompassing one school year. This was particularly useful in terms of accounting for the change process happening in classrooms: it allowed me to see not only what was happening at specific moments in the school year, but to place classroom activities into a pattern of change within the year. This is especially important in terms of washback because, by comparing MST practices at different periods of time, the effect of approaching exams can more clearly be observed.

Finally, it gathered data from participants at various levels within the same group. For example, Form Four MST and Form Five MST or a strong Form Five class, an average class and a weak Form Five class. Data from these different levels permitted a rich variety of comparisons and contrasts. This led to a more complex understanding of the interplay of various factors involved in classroom choices and policy implementation. It also permitted unique perspectives as well. Having Form Four and Form Five students from T1 meant that comparisons and contrast could be made using two baselines: Form Four as the baseline year in the two – year cycle, T1 in Form Five as the baseline for the SPM exam preparation year. Having these two perspectives
made it easier to note whether washback occurred throughout the entire upper secondary or only at one specific level.

8.5.4 Limitations of the study

The first limitation of this study is that it was conducted in only three of the eleven states in Peninsular Malaysia. Although they were chosen to represent specific zones (north, mid and south) the inclusion of more states, on the East Coast for example, might have made the findings even more representative.

Secondly, given the rapidly expanding pace of development in Malaysia, it would probably have been interesting to have three categories for schools – urban, suburban and rural – to have a finer grained portrait which captures this new reality. The study also did not obtain information on the students’ socio-economic backgrounds for each school. This information would have helped make even clearer distinctions in the patterns of responses within a specific area (urban or OOT).

Finally, I observed single lessons for each MST per period, and not the complete teaching of a whole unit (topic) as I had originally planned. Observing entire teaching units would have provided much deeper and more detailed understanding of MST classroom practices, and how these relate to the PPSMI policy.

8.5.5 Future directions

It will be interesting to conduct a follow-up study that focuses more specifically on the students perceptions and their learning processes. PPSMI is often described as being in the transitional stage by MST. This is because the students who have been taught M & S in English since Primary One have just reached Form One level at the time of writing. Conducting a study with this cohort of students would build on what has been found in this research and allow me to see if the effects of implementation observed here remain even past the transition phase. This
could take the form of a multi-phase longitudinal study to track the development of students from Form One to Form Five to observe the growth of their content and language capacities.

Studies of educational change and washback in other ESL/EFL contexts are also directions for future research. I would particularly like to explore how links between curriculum, teaching and learning, and evaluation can take form during educational change processes. These comparative studies would provide additional information on how teacher factors and student factors impact the implementation of educational change to create specific washback effects.

Further studies on how CBI is implemented with ELL in other linguistic contexts are additional paths for future research. The practices in these contexts may have similarities and differences with the Malaysian context, and could furnish other kinds of evidence concerning classroom practices that support the language learning of ELL in content classrooms.

8.5.6 Contributions

The study contributes to the literature on educational change, especially in the domain of language of instruction policy. It demonstrates the complexity involved in such a change and the multitude of factors that need to be taken into account in order to achieve the intended objectives. The findings indicate the importance of considering local factors in planning and implementing such large-scale change, as these may hinder the attainment of equitable benefits for all students.

The study also contributes to advancing knowledge about contexts and practices related to CBI. The findings from classrooms in Malaysia, a CBI context which has not been much studied, provide support for previous claims about linguistic interdependence and a threshold level necessary for success in CBI classrooms with cognitively demanding content. The findings also suggest the need to re-examine how content and language teachers may improve their methods of collaboration to ensure that students do indeed learn both content and language through these courses.
With respect to the literature on washback, the inter-disciplinary, mixed methods approach used in this study, which includes an ethnographic component, responds to calls from previous research conducted in this domain. It demonstrates that, indeed, such an approach may provide an interesting avenue for teasing apart the complex interactions and effects involved in washback. The findings about M & S classrooms in Malaysia also contribute to knowledge about an as yet unexplored context in the washback literature. They speak to the importance of the teacher factor in determining washback effect, but point to the influence the student factor has on this effect as well. Finally, it demonstrates the uniqueness of interactions between factors within each educational context in creating specific washback effects: the model of washback proposed may inform research designs on washback in novel contexts.

In conclusion, the findings of this study have demonstrated the complexity of the process that take place during a system-wide educational change involving both content and language learning. It shows the necessity of giving equal emphasis to these two parts if the twin objectives of language and content learning are to be achieved. The findings also signal the necessity of considering contextual factors related to teachers and students when planning curriculum, teaching and learning as well as assessment. Failure to align these components with the reality of teachers and students may result in reduced learning and academic achievement on the part of students.
References


Davison, C. (2006). Collaboration between ESL and content teachers: How do we know when we are doing we are doing it right? The International Journal of Bilingual Education and Bilingualism, 9(4), 454 – 475.


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Turner, C.E. (2005, April). Professionalism and high-stakes tests: Teacher perspectives when dealing with educational change introduced through provincial exams. TESL Canada Journal, 23(2), 54 - 76


PART I: YOUR BACKGROUND INFORMATION

Please circle/tick the appropriate response. Write additional comments in the space provided if necessary.

A] Gender:  ○ Male  ○ Female

B] In which program were you registered at university? [For example: Dip. Ed, B.Sc (Eng), B.Ed and so on.]

_______________________________________________________________________

C] Which subject(s) do you teach in school now?:

○ Mathematics (Additional Mathematics and/or Mathematics)
○ Science
○ Biology
○ Chemistry
○ Physics
○ Other (please specify):

D] Mother tongue:  ○ Malay  ○ Chinese  ○ Tamil
○ Other (please specify): ________________________________________________

E] What was your medium of instruction at each of these levels?

<table>
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<tr>
<th>PRIMARY</th>
<th>SECONDARY</th>
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<tr>
<td>English</td>
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<td>English</td>
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</table>

F] How many years have you been teaching?
○ 1-5 years  ○ 6 – 10 years  ○ 11 – 15 years  ○ More than 15 years

G] How long have you been teaching Form Four and Form Five Mathematics or Science?
○ 1-5 years  ○ 6 – 10 years  ○ 11 – 15 years  ○ More than 15 years
H] What was your first unofficial source of information about the new language of instruction policy for Mathematics and Science?

- Newspapers
- Other teachers in my school
- TV/radio
- Other sources (please specify)

Comments: ____________________________________________________________

I] Was your reaction to official sources of information similar to your reaction to the unofficial source(s) concerning this policy?

Comments: ____________________________________________________________

J] Before the new policy, did you ever use English when teaching in class?

- Never
- Rarely
- Sometimes
- Often

Comments: ____________________________________________________________

K] Before the new policy, did you ever use English with students outside class, in the school environment?

- Never
- Rarely
- Sometimes
- Often

Comments: ____________________________________________________________

L] Before the new policy, did you ever use English with other teachers or the principal outside class, in the school environment?

- Never
- Rarely
- Sometimes
- Often
APPENDIX A – T1 English questionnaire

Comments: ______________________________________________________________
_______________________________________________________________________

M] How commonly is English used by students in daily interactions in class?

○ Never ○ Rarely ○ Sometimes ○ Often

Comments: ______________________________________________________________
_______________________________________________________________________

N] How commonly is English used by students in daily interactions outside class, in the school environment?

○ Never ○ Rarely ○ Sometimes ○ Often

Comments: ______________________________________________________________
_______________________________________________________________________

PART II: QUESTIONNAIRE

INSTRUCTIONS:

Responses to the items below reflect perceptions of your experience and involvement in the policy of teaching Mathematics and Sciences in English (PPSMI) at this point in time.

PLEASE INDICATE WHETHER YOU AGREE OR DISAGREE WITH THE STATEMENTS BELOW BY CIRCLING/TICKING A NUMBER FROM 1 TO 4

On this scale, 1 = STRONGLY DISAGREE while 4 = STRONGLY AGREE

① Strongly disagree  ② Disagree  ③ Agree  ④ Strongly agree
QUESTIONS

1) Teaching Mathematics and Science in English speeds up the transfer of scientific and technological knowledge to younger generations of Malaysians.

① ② ③ ④

Comments: _____________________________________________________________
________________________________________________________________________

2) By learning Mathematics and Science in English, my students will be better prepared to face the increasingly globalised job market.

① ② ③ ④

Comments: _____________________________________________________________
________________________________________________________________________

3) The Ministry of Education’s ETeMS/EMS courses have prepared me sufficiently well to teach Mathematics and Science in English.

① ② ③ ④

Comments: _____________________________________________________________
________________________________________________________________________

4) My proficiency in English is sufficient to teach Mathematics and Science in that language.

① ② ③ ④

Comments: _____________________________________________________________
________________________________________________________________________

5) My students’ proficiency in English is sufficient to learn Mathematics and/or Science
APPENDIX A – T1 English questionnaire

in that language.

1) 2) 3) 4) 5)

Comments: ________________________________________________________________
_______________________________________________________________________

6) I teach Mathematics and/or Science effectively in English.

1) 2) 3) 4)

Comments: ________________________________________________________________
_______________________________________________________________________

7) My students learn Mathematics and/or Science effectively in English.

1) 2) 3) 4)

Comments: ________________________________________________________________
_______________________________________________________________________

8) The kinds of teaching material provided to me by the school for teaching Mathematics and/or Science in English are effective.

1) 2) 3) 4)

Comments: ________________________________________________________________
_______________________________________________________________________

9) Teaching materials in Bahasa Malaysia are useful in preparing Mathematics and/or Science lessons in English.

1) 2) 3) 4)

Comments: ________________________________________________________________
10) My “critical friend” helps me improve in English.

① ② ③ ④

Comments: _____________________________________________________________

11) My students’ Mathematics and/or Science test/exam performance when responding to test/exam questions in English is satisfactory.

① ② ③ ④

Comments: _____________________________________________________________

12) My students’ Mathematics and/or Science test/exam performance when responding to test/exam questions in Bahasa Malaysia is satisfactory.

① ② ③ ④

Comments: _____________________________________________________________

13) English is the best language for teaching Mathematics and Science.

① ② ③ ④

Comments: _____________________________________________________________

14) Bahasa Malaysia is the best language for teaching Mathematics and Science.

① ② ③ ④
15) I have a strong mastery of the content I teach in Mathematics and/or Science class.

   1  2  3  4

Comments: _____________________________________________________________
_______________________________________________________________________

16) When I teach, I am able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in English clearly.

   1  2  3  4

Comments: _____________________________________________________________
_______________________________________________________________________

17) When I teach, I am able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in Bahasa Malaysia clearly.

   1  2  3  4

Comments: _____________________________________________________________
_______________________________________________________________________

18) My students are able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in English clearly.

   1  2  3  4

Comments: _____________________________________________________________
_______________________________________________________________________
19) My students are able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in Bahasa Malaysia clearly.

1  2  3  4

Comments: _____________________________________________________________
_______________________________________________________________________

20) When I teach, I am able to write down ideas/explanations related to the content of Mathematics and/or Science courses in English well.

1  2  3  5

Comments: _____________________________________________________________
_______________________________________________________________________

21) When I teach, I am able to write down ideas/explanations related to the content of Mathematics and/or Science courses in Bahasa Malaysia well.

1  2  3  4

Comments: _____________________________________________________________
_______________________________________________________________________

22) When my students respond to written assignments, they are able to write down ideas/explanations in English concerning the content of Mathematics and/or Science well.

1  2  3  5

Comments: _____________________________________________________________

23) When my students respond to written assignments, they are able to write down ideas/explanations in Bahasa Malaysia concerning the content of Mathematics and/or Science well.
24) SPM Mathematics and/or Science exam questions in **English** are instruments that accurately measure my students’ skills and capacities in these subjects.

1) 2) 3) 4)  

Comments: ____________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

25) SPM Mathematics and/or Science exam questions in **Bahasa Malaysia** are instruments that accurately measure my students’ skills and capacities in these subjects.

1) 2) 3) 4)  

Comments: ____________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

26) The content of the SPM Mathematics and/or Science exams accurately reflects the topics that have been taught in Secondary Four and Five classrooms.

1) 2) 3) 4)  

Comments: ____________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

27) The format of the Mathematics and/or Science SPM exams accurately reflects the class/homework assignments and test/exam items that have been done in class.

1) 2) 3) 4)
28) In terms of content, my students are going to be well-prepared to answer SPM Mathematics and/or Science exams in English.

   1   2   3   4

Comments: 

_____________________________________________________________________

29) In terms of language skills, my students are going to be well-prepared for the SPM Mathematics and/or Science exams in English.

   1   2   3   4

Comments: 

_____________________________________________________________________

30) My students’ chances of performing well on the SPM Mathematics and/or Sciences exam, if they are completely in English this year, are good.

   1   2   3   4

Comments: 

_____________________________________________________________________

31) I feel comfortable with the idea of sitting for the English test for Mathematics and Science teachers required by the Ministry of Education this year.

   1   2   3   4

Comments: 

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________
PLEASE FEEL FREE TO WRITE DOWN YOUR OWN COMMENTS REGARDING ANYTHING ELSE RELATED TO THE POLICY OF TEACHING MATHEMATICS AND SCIENCE IN ENGLISH IN THE SPACE PROVIDED BELOW.
BAHAGIAN I : MAKLUMAT MENGENAI LATARBELAKANG GURU DAN PERSEKITARAN LINGUISTIK DI SEKOLAH

Sila bulatkan/tandakan jawapan yang paling sesuai. Jika perlu, sila tulis komen tambahan dalam ruang yang telah disediakan.

A] Jantina:  ○ Lelaki   ○ Perempuan

B] Apakah program yang anda ikuti di peringkat kolej/universiti? [Contoh: Diploma Pendidikan, Sarjana Muda (Sains), Sarjana Muda Sains dalam Pendidikan]
______________________________________________________________________

C] Mata pelajaran yang anda ajar di sekolah sekarang:
○ Matematik (Matematik Tambahan dan/atau Matematik)
○ Sains
○ Biologi
○ Kimia
○ Fizik
○ Lain-lain (sila nyatakan mata pelajaran yang berkenaan):

D] Bahasa ibunda:  ○ Bahasa Melayu   ○ Bahasa Cina   ○ Bahasa Tamil
○ Lain (sila nyatakan bahasa yang berkenaan):

E] Semasa anda bersekolah di peringkat-peringkat berikut, bahasa apakah yang digunakan sebagai bahasa pengantar?

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</tbody>
</table>

F] Berapa lamakah telah anda mengajar?
○ 1–5 tahun ○ 6–10 tahun ○ 11–15 tahun ○ Lebih dari 15 tahun

G] Berapa lamakah telah anda mengajar mata pelajaran Matematik atau Sains di peringkat Tingkatan Empat dan Tingkatan Lima?
APPENDIX B – T1 BM questionnaire

○ 1-5 tahun ○ 6–10 tahun ○ 11–15 tahun ○ Lebih daripada 15 tahun

H] Apakah sumber pertama yang **tidak rasmi** yang anda memperolehi mengenai polisi pengajaran Matematik dan Sains dalam Bahasa Inggeris?

○ Suratkhabar ○ TV/radio
○ Guru-guru lain di sekolah ○ Sumber lain (sila nyatakan)

Komen: _________________________________________________________________

I] Adakah reaksi anda sama terhadap sumber **rasmi** dan sumber **tidak rasmi** mengenai polisi mengajar Matematik dan Sains dalam Bahasa Inggeris?

○ Ya ○ Tidak

Komen: _________________________________________________________________

J] Sebelum polisi ini diperkenalkan, pernahkah anda menggunakan Bahasa Inggeris semasa mengajar di dalam kelas?

○ Tidak pernah ○ Jarang sekali ○ Kadangkala ○ Selalu

Komen: _________________________________________________________________

K] Sebelum polisi baru ini, pernahkah anda berbual dengan murid-murid anda di luar kelas dalam Bahasa Inggeris, dalam persekitaran sekolah?

○ Tidak pernah ○ Jarang sekali ○ Kadangkala ○ Selalu

Komen: _________________________________________________________________

L] Sebelum polisi baru ini, pernahkah anda berbual dengan guru-guru lain atau pengetua
APPENDIX B – T1 BM questionnaire

dalam Bahasa Inggeris, dalam persekitaran sekolah?

☐ Tidak pernah ☐ Jarang sekali ☐ Kadangkala ☐ Selalu  
Komen: ______________________________________________________

.................................................................

M] Adakah murid-murid anda menggunakan Bahasa Inggeris untuk berinteraksi di dalam kelas?

☐ Tidak pernah ☐ Jarang sekali ☐ Kadangkala ☐ Selalu  
Komen: ______________________________________________________

.................................................................

N] Adakah murid-murid anda menggunakan Bahasa Inggeris untuk berinteraksi di luar kelas di persekitaran sekolah?

☐ Tidak pernah ☐ Jarang sekali ☐ Kadang kala ☐ Selalu  
Komen: ______________________________________________________

.................................................................

#########################################

BAHAGIAN II: Soal selidik

ARAHAN:
Jawapan kepada soalan-soalan berikut menggambarkan persepsi pengalaman dan penglibatan anda dalam polisi pengajaran Matematik dan Sains dalam Bahasa Inggeris (PPSMI) pada masa ini.

SILA BULATKAN/TANDAKAN SATU NOMBOR DARI 1 HINGGA 4 UNTUK MENUNJUKKAN SAMA ADA ANDA BERSETUJU ATAU TIDAK BERSETUJU DENGAN PERNYATAAN-PERNYATAAN DI BAWAH
APPENDIX B – T1 BM questionnaire

Untuk skala ini, 1 = SANGAT TIDAK Bersetuju manakala 4 = SANGAT Bersetuju

1 2 3 4
Sangat tidak bersetuju Tidak bersetuju Bersetuju Sangat bersetuju

SOALAN - SOALAN

1) Mengajar Matematik dan Sains dalam Bahasa Inggeris mempercepatkan pengetahuan saintifik dan teknologi kepada generasi muda di Malaysia.

1 2 3 4
Komen: _____________________________________________________________

____________________________________________________________________

2) Murid – murid saya lebih bersedia menghadapi pasaran pekerjaan yang semakin global kerana mereka mempelajari Matematik dan Sains dalam Bahasa Inggeris.

1 2 3 4
Komen: _____________________________________________________________

____________________________________________________________________

4) Kursus – kursus ETeMS/EMS yang dikendalikan oleh Kementerian Pelajaran telah menyediakan saya untuk mengajar Matematik dan/atau Sains dalam Bahasa Inggeris dengan baik.

1 2 3 4
Komen: _____________________________________________________________

____________________________________________________________________

5) Saya cukup fasih dalam Bahasa Inggeris untuk mengajar Matematik dan/atau Sains dalam bahasa tersebut.

1 2 3 4
6) Murid-murid saya cukup fasih dalam Bahasa Inggeris untuk belajar Matematik dan Sains dalam bahasa tersebut.

   1  2  3  4

   Komen: ____________________________________________________________
   ________________________________________________________________

7) Saya mengajar Matematik dan/atau Sains secara berkesan dalam Bahasa Inggeris.

   1  2  3  4

   Komen: ____________________________________________________________
   ________________________________________________________________

8) Murid-murid saya belajar Matematik dan Sains secara berkesan dalam Bahasa Inggeris.

   1  2  3  4

   Komen: ____________________________________________________________
   ________________________________________________________________

9) Bahan-bahan pengajaran yang telah dibekalkan oleh sekolah untuk saya mengajar Matematik dan/atau Sains dalam Bahasa Inggeris adalah berkesan.

   1  2  3  4

   Komen: ____________________________________________________________
   ________________________________________________________________
10) Bahan-bahan pengajaran dalam Bahasa Malaysia adalah berguna semasa saya menyediakan pengajaran dalam Bahasa Inggeris.

Komen: _____________________________________________________________

10) “Critical friend” di sekolah membantu mempertingkatkan prestasi Bahasa Inggeris saya.

Komen: _____________________________________________________________

11) Prestasi murid-murid saya semasa menjawab soalan peperiksaan/ujian Matematik dan/atau Sains dalam Bahasa Inggeris adalah memuaskan.

Komen: _____________________________________________________________

12) Prestasi murid-murid saya semasa menjawab soalan peperiksaan/ujian Matematik dan/atau Sains dalam Bahasa Malaysia adalah memuaskan.

Komen: _____________________________________________________________

13) Bahasa Inggeris adalah bahasa yang paling sesuai untuk pengajaran mata pelajaran Matematik dan Sains.
APPENDIX B – T1 BM questionnaire

14) Bahasa Malaysia adalah bahasa yang paling sesuai untuk pengajaran mata pelajaran Matematik dan Sains.

Komen: _____________________________________________________________
________________________________

15) Saya mempunyai penguasaan yang kukuh mengenai kandungan mata pelajaran Matematik atau Sains yang saya ajar.

Komen: _____________________________________________________________
________________________________

16) Semasa saya mengajar, saya boleh melafazkan idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Inggeris dengan jelas.

Komen: _____________________________________________________________
________________________________

17) Semasa saya mengajar, saya boleh melafazkan idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Malaysia dengan jelas.

Komen: _____________________________________________________________
18) Murid-murid saya boleh melafazkan idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Inggeris dengan jelas.

   ①  ②  ③  ④

Komen:____________________________________________________________

19) Murid-murid saya boleh melafazkan idea/peneranan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Malaysia dengan jelas.

   ①  ②  ③  ④

Komen:____________________________________________________________

20) Semasa saya mengajar, saya boleh menulis idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Inggeris dengan jelas.

   ①  ②  ③  ④

Komen:____________________________________________________________

21) Semasa saya mengajar, saya boleh menulis idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Malaysia dengan jelas.

   ①  ②  ③  ④

Komen:____________________________________________________________

22) Murid-murid saya berupaya memberi respons yang baik kepada tugas bertulis
APPENDIX B – T1 BM questionnaire

mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Inggeris.

① ② ③ ④

Komen: _____________________________________________________________
____________________________________________________________________

23) Murid-murid saya berupaya memberi respons yang baik kepada tugas bertulis mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Malaysia.

① ② ③ ④

Komen: _____________________________________________________________
____________________________________________________________________

24) Soalan-soalan peperiksaan Matematik dan/atau Sains SPM dalam Bahasa Inggeris menilai kemahiran dan keupayaan murid-murid saya dalam mata pelajaran ini dengan jitu.

① ② ③ ④

Komen: _____________________________________________________________
____________________________________________________________________

25) Soalan-soalan peperiksaan Matematik dan/atau Sains SPM dalam Bahasa Malaysia menilai kemahiran dan keupayaan murid-murid saya dalam mata pelajaran ini dengan jitu.

① ② ③ ④

Komen: _____________________________________________________________
____________________________________________________________________

26) Kandungan kertas peperiksaan Matematik dan/atau Sains SPM memberi gambaran yang tepat mengenai topik-topik yang telah diajar kepada murid-murid Tingkatan
APPENDIX B – T1 BM questionnaire

Empat dan Tingkatan Lima.

\[ \begin{array}{cccc}
1 & 2 & 3 & 4 \\
\end{array} \]

Komen: _____________________________________________________________

____________________________________________________________________

27) Format soalan peperiksaan Matematik dan/atau Sains SPM memberi gambaran yang tepat mengenai tugas kelas dan kerja rumah yang diberi serta soalan ujian/peperiksaan yang dibuat di sekolah.

\[ \begin{array}{cccc}
1 & 2 & 3 & 4 \\
\end{array} \]

Komen: _____________________________________________________________

____________________________________________________________________

28) Dari segi kandungan mata pelajaran, murid-murid saya akan cukup bersedia untuk menghadapi peperiksaan SPM Matematik dan/atau Sains dalam Bahasa Inggeris.

\[ \begin{array}{cccc}
1 & 2 & 3 & 4 \\
\end{array} \]

Komen: _____________________________________________________________

____________________________________________________________________

29) Dari segi kemahiran bahasa, murid-murid saya akan cukup bersedia untuk menghadapi peperiksaan SPM mata pelajaran Matematik dan/atau Sains dalam Bahasa Inggeris.

\[ \begin{array}{cccc}
1 & 2 & 3 & 4 \\
\end{array} \]

Komen: _____________________________________________________________

____________________________________________________________________

30) Kebarangkalian murid-murid saya memperolehi prestasi yang baik dalam mata pelajaran Matematik dan/atau Sains untuk peperiksaan SPM, sekiranya ia dilaksanakan sepenuhnya dalam Bahasa Inggeris tahun ini, adalah bagus.
APPENDIX B – T1 BM questionnaire

1) 2) 3) 4) 
Komen: __________________________________________________________
__________________________________________________________________

31) Saya berasa selesa untuk mengambil ujian Bahasa Inggeris yang telah diarahkan oleh Kementerian Pendidikan untuk guru-guru Matematik dan Sains tahun ini.

1) 2) 3) 4) 
Komen: __________________________________________________________
__________________________________________________________________

SILA TULIS SEBARANG KOMEN LAIN MENGENAI POLISI PENGAJARAN MATEMATIK DAN SAINS DALAM BAHASA INGGERIS DALAM RUANG YANG DISEDIAKAN DI BAWAH.
Dear Teachers,

First and foremost, thank you for your participation in answering my first questionnaire early this year. This second time around, my questionnaire would like to determine whether your opinions and perceptions on the same issues have changed over the course of the year.

This survey is directed exclusively at Form Four and Form Five Mathematics [Additional Mathematics and Mathematics] and/or Science [Physics, Biology, Chemistry, Science] teachers. The data collected will be used in a PhD thesis.

Thank you for taking the time out of your busy day to answer this survey. Your help is truly appreciated.

Should you have any queries, please do not hesitate to contact me at may.tan@mail.mcgill.ca

Guru – guru yang dihormati,

Terdahulu sekali, ingin saya ucapkan ribuan terima kasih atas kesudian anda untuk menjawab soal selidik yang pertama awal tahun ini. Kali ini, soal selidik ini ingin mengenalpasti sama ada pendapat dan persepsi anda tentang isu – isu yang sama telah berubah dengan masa.


Terima kasih kerana sudi mengambil masa untuk menjawab soal selidik ini. Bantuan anda amat dihargai.

Sekiranya anda ada apa – apa pertanyaan, sila hubungi saya di may.tan@mail.mcgill.ca
PART I: YOUR BACKGROUND INFORMATION

Please circle/tick the appropriate response. Write additional comments in the space provided if necessary.

A] Gender: ○ Male ○ Female

B] In which program were you registered at university? [For example: Dip. Ed, B.Sc (Eng), B.Ed and so on.]
_______________________________________________________________________

C] Which subject(s) do you teach in school now?:
○ Mathematics (Additional Mathematics and/or Mathematics)
○ Science
○ Biology
○ Chemistry
○ Physics
○ Other (please specify):

D] Mother tongue: ○ Malay ○ Chinese ○ Tamil
○ Other (please specify): _____________________________________________

E] What was your medium of instruction at each of these levels?

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<td>Chinese</td>
</tr>
<tr>
<td>Tamil</td>
<td>Tamil</td>
<td>Tamil</td>
<td>Tamil</td>
</tr>
<tr>
<td>English</td>
<td>English</td>
<td>English</td>
<td>English</td>
</tr>
</tbody>
</table>

F] How many years have you been teaching?
○ 1-5 years ○ 6 – 10 years ○ 11 – 15 years ○ More than 15 years

G] How long have you been teaching Form Four and Form Five Mathematics or Science?
○ 1-5 years ○ 6 – 10 years ○ 11 – 15 years ○ More than 15 years
H] What was your first **unofficial** source of information about the new language of instruction policy for Mathematics and Science?

- Newspapers
- Other teachers in my school
- TV/radio
- Other sources (please specify)

Comments: ________________________________________________________________

__________________________________________________________________________

I] Was your reaction to **official** sources of information similar to your reaction to the **unofficial** source(s) concerning this policy?

Comments: ________________________________________________________________

__________________________________________________________________________

J] Before the new policy, did you ever use English when teaching in class?

- Never
- Rarely
- Sometimes
- Often

Comments: ________________________________________________________________

__________________________________________________________________________

K] Before the new policy, did you ever use English with students outside class, in the school environment?

- Never
- Rarely
- Sometimes
- Often

Comments: ________________________________________________________________

__________________________________________________________________________

L] Before the new policy, did you ever use English with other teachers or the principal outside class, in the school environment?

- Never
- Rarely
- Sometimes
- Often
M] How commonly is English used by students in daily interactions in class?
   ○ Never   ○ Rarely   ○ Sometimes   ○ Often
Comments: _____________________________________________________________
   ________________________________________________________________

N] How commonly is English used by students in daily interactions outside class, in the school environment?
   ○ Never   ○ Rarely   ○ Sometimes   ○ Often
Comments: _____________________________________________________________
   ________________________________________________________________

PART II: QUESTIONNAIRE

INSTRUCTIONS:

Responses to the items below reflect perceptions of your experience and involvement in the policy of teaching Mathematics and Sciences in English (PPSMI) at this point in time.

PLEASE INDICATE WHETHER YOU AGREE OR DISAGREE WITH THE STATEMENTS BELOW BY CIRCLING/TICKING A NUMBER FROM 1 TO 4

On this scale, 1 = STRONGLY DISAGREE while 4 = STRONGLY AGREE

  1  2  3  4
Strongly disagree  Disagree  Agree  Strongly agree
QUESTIONS

2) Teaching Mathematics and Science in English speeds up the transfer of scientific and technological knowledge to younger generations of Malaysians.

   1  2  3  4

Comments: _____________________________________________________________
_______________________________________________________________________

2) By learning Mathematics and Science in English, my students will be better prepared to face the increasingly globalised job market.

   1  2  3  4

Comments: _____________________________________________________________
_______________________________________________________________________

11) The Ministry of Education’s ETeMS/EMS courses have prepared me sufficiently well to teach Mathematics and Science in English.

   1  2  3  4

Comments: _____________________________________________________________
_______________________________________________________________________

4) My proficiency in English is sufficient to teach Mathematics and Science in that language.

   1  2  3  4

Comments: _____________________________________________________________
_______________________________________________________________________

5) My students’ proficiency in English is sufficient to learn Mathematics and/or Science
APPENDIX C – T3 English questionnaire

6) I teach Mathematics and/or Science effectively in English.

   1  2  3  4

   Comments: _____________________________________________________________
   _______________________________________________________________________

7) My students learn Mathematics and/or Science effectively in English.

   1  2  3  4

   Comments: _____________________________________________________________
   _______________________________________________________________________

8) The kinds of teaching material provided to me by the school for teaching Mathematics and/or Science in English are effective.

   1  2  3  4

   Comments: _____________________________________________________________
   _______________________________________________________________________

9) Teaching materials in Bahasa Malaysia are useful in preparing Mathematics and/or Science lessons in English.

   1  2  3  4

   Comments: _____________________________________________________________
10) My “critical friend” helps me improve in English.
   ① ② ③ ④
   Comments: _____________________________________________________________

11) My students’ Mathematics and/or Science test/exam performance when responding to test/exam questions in **English** is satisfactory.
   ① ② ③ ④
   Comments: _____________________________________________________________

12) My students’ Mathematics and/or Science test/exam performance when responding to test/exam questions in **Bahasa Malaysia** is satisfactory.
   ① ② ③ ④
   Comments: _____________________________________________________________

13) **English** is the best language for teaching Mathematics and Science.
   ① ② ③ ④
   Comments: _____________________________________________________________

14) **Bahasa Malaysia** is the best language for teaching Mathematics and Science.
   ① ② ③ ④
15) I have a strong mastery of the content I teach in Mathematics and/or Science class.
   ① ② ③ ④
   Comments: _____________________________________________________________

16) When I teach, I am able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in **English** clearly.
   ① ② ③ ④
   Comments: _____________________________________________________________

17) When I teach, I am able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in **Bahasa Malaysia** clearly.
   ① ② ③ ④
   Comments: _____________________________________________________________

18) My students are able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in **English** clearly.
   ① ② ③ ④
   Comments: _____________________________________________________________
19) My students are able to verbally formulate and express ideas/explanations related to the content of Mathematics and/or Science courses in Bahasa Malaysia clearly.

Comments: _____________________________________________________________

20) When I teach, I am able to write down ideas/explanations related to the content of Mathematics and/or Science courses in English well.

Comments: _____________________________________________________________

21) When I teach, I am able to write down ideas/explanations related to the content of Mathematics and/or Science courses in Bahasa Malaysia well.

Comments: _____________________________________________________________

22) When my students respond to written assignments, they are able to write down ideas/explanations in English concerning the content of Mathematics and/or Science well.

Comments: _____________________________________________________________

23) When my students respond to written assignments, they are able to write down ideas/explanations in Bahasa Malaysia concerning the content of Mathematics and/or Science well.
24) SPM Mathematics and/or Science exam questions in **English** are instruments that accurately measure my students’ skills and capacities in these subjects.

① ② ③ ④

Comments: _____________________________________________________________
_______________________________________________________________________

25) SPM Mathematics and/or Science exam questions in **Bahasa Malaysia** are instruments that accurately measure my students’ skills and capacities in these subjects.

① ② ③ ④

Comments: _____________________________________________________________
_______________________________________________________________________

26) The content of the SPM Mathematics and/or Science exams accurately reflects the topics that have been taught in Secondary Four and Five classrooms.

① ② ③ ④

Comments: _____________________________________________________________
_______________________________________________________________________

27) The format of the Mathematics and/or Science SPM exams accurately reflects the class/homework assignments and test/exam items that have been done in class.

① ② ③ ④
28) In terms of content, my students are going to be well-prepared to answer SPM Mathematics and/or Science exams in English.

□ □ □ □

Comments: _____________________________________________________________
_______________________________________________________________________

29) In terms of language skills, my students are going to be well-prepared for the SPM Mathematics and/or Science exams in English.

□ □ □ □

Comments: _____________________________________________________________
_______________________________________________________________________

30) My students’ chances of performing well on the SPM Mathematics and/or Sciences exam, if they are completely in English this year, are good.

□ □ □ □

Comments: _____________________________________________________________
_______________________________________________________________________

31) The Gerak Gempur and trial exams for Mathematics and/or Sciences have helped my students prepare for the actual SPM exams.

□ □ □ □

Comments: _____________________________________________________________
_______________________________________________________________________
PLEASE FEEL FREE TO WRITE DOWN YOUR OWN COMMENTS REGARDING ANYTHING ELSE RELATED TO THE POLICY OF TEACHING MATHEMATICS AND SCIENCE IN ENGLISH IN THE SPACE PROVIDED BELOW.
Guru – guru yang dihormati,

Terdahulu sekali, ingin saya ucapkan ribuan terima kasih atas kesudian anda untuk menjawab soal selidik yang pertama awal tahun ini. Kali ini, soal selidik ini ingin mengenalpasti sama ada pendapat dan persepsi anda tentang isu – isu yang sama telah berubah dengan masa.


Terima kasih kerana sudi mengambil masa untuk menjawab soal selidik ini. Bantuan anda amat dihargai.

Sekiranya anda ada apa – apa pertanyaan, sila hubungi saya di may.tan@mail.mcgill.ca

Dear Teachers,

First and foremost, thank you for your participation in answering my first questionnaire early this year. This second time around, my questionnaire would like to determine whether your opinions and perceptions on the same issues have changed over the course of the year.

This survey is directed exclusively at Form Four and Form Five Mathematics [Additional Mathematics and Mathematics] and/or Science [Physics, Biology, Chemistry, Science] teachers. The data collected will be used in a PhD thesis.

Thank you for taking the time out of your busy day to answer this survey. Your help is truly appreciated.

Should you have any queries, please do not hesitate to contact me at may.tan@mail.mcgill.ca
Sila bulatkan/tandakan jawapan yang paling sesuai. Jika perlu, sila tulis komen tambahan dalam ruang yang telah disediakan.

A) Jantina: ○ Lelaki ○ Perempuan

B) Apakah program yang anda ikuti di peringkat kolej/universiti? [Contoh: Diploma Pendidikan, Sarjana Muda (Sains), Sarjana Muda Sains dalam Pendidikan]

C) Mata pelajaran yang anda ajar di sekolah sekarang:
○ Matematik (Matematik Tambahan dan/atau Matematik)
○ Sains
○ Biologi
○ Kimia
○ Fizik
○ Lain-lain (sila nyatakan mata pelajaran yang berkenaan):

D) Bahasa ibunda: ○ Bahasa Melayu ○ Bahasa Cina ○ Bahasa Tamil ○ Lain (sila nyatakan bahasa yang berkenaan):

E) Semasa anda bersekolah di peringkat-peringkat berikut, bahasa apakah yang digunakan sebagai bahasa pengantar?

<table>
<thead>
<tr>
<th>SEKOLAH RENDAH</th>
<th>SEKOLAH MENENGAH</th>
<th>KOLEJ</th>
<th>UNIVERSITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melayu</td>
<td>Melayu</td>
<td>Melayu</td>
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</tr>
<tr>
<td>Cina</td>
<td>Cina</td>
<td>Cina</td>
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</tr>
<tr>
<td>Tamil</td>
<td>Tamil</td>
<td>Tamil</td>
<td>Tamil</td>
</tr>
<tr>
<td>Inggeris</td>
<td>Inggeris</td>
<td>Inggeris</td>
<td>Inggeris</td>
</tr>
</tbody>
</table>

F) Berapakah lamakah telah anda mengajar?
○ 1-5 tahun ○ 6 –10 tahun ○ 11–15 tahun ○ Lebih dari 15 tahun

G) Berapakah lamakah telah anda mengajar mata pelajaran Matematik atau Sains di peringkat Tingkatan Empat dan Tingkatan Lima?
○ 1-5 tahun ○ 6 –10 tahun ○ 11–15 tahun ○ Lebih daripada 15 tahun
H] Apakah sumber pertama yang tidak rasmi yang anda memperolehi mengenai polisi pengajaran Matematik dan Sains dalam Bahasa Inggeris?

- Suratkhabar
- Guru-guru lain di sekolah
- TV/radio
- Sumber lain (sila nyatakan)

Komen: ________________________________________________________

_______________________________________________________________________

I] Adakah reaksi anda sama terhadap sumber rasmi dan sumber tidak rasmi mengenai polisi mengajar Matematik dan Sains dalam Bahasa Inggeris?

- Ya
- Tidak

Komen: ________________________________________________________

_______________________________________________________________________

J] Sebelum polisi ini diperkenalkan, pernahkah anda menggunakan Bahasa Inggeris semasa mengajar di dalam kelas?

- Tidak pernah
- Jarang sekali
- Kadangkala
- Selalu

Komen: ________________________________________________________

_______________________________________________________________________

K] Sebelum polisi baru ini, pernahkah anda berbual dengan murid-murid anda di luar kelas dalam Bahasa Inggeris, dalam persekitaran sekolah?

- Tidak pernah
- Jarang sekali
- Kadangkala
- Selalu

Komen: ________________________________________________________

_______________________________________________________________________

L] Sebelum polisi baru ini, pernahkah anda berbual dengan guru-guru lain atau pengetua dalam Bahasa Inggeris, dalam persekitaran sekolah?

- Tidak pernah
- Jarang sekali
- Kadangkala
- Selalu
APPENDIX D – T3 BM questionnaire

Komen: _____________________________________________________________

M] Adakah murid-murid anda menggunakan Bahasa Inggeris untuk berinteraksi
di dalam kelas?

☐ Tidak pernah ☐ Jarang sekali ☐ Kadangkala ☐ Selalu

Komen: _____________________________________________________________

N] Adakah murid-murid anda menggunakan Bahasa Inggeris untuk berinteraksi di luar kelas di
persekitaran sekolah?

☐ Tidak pernah ☐ Jarang sekali ☐ Kadang kala ☐ Selalu

Komen: _____________________________________________________________

#

BAHAGIAN II: Soal selidik

ARAHAN:
Jawapan kepada soalan-soalan berikut menggambarkan persepsi pengalaman dan
penglibatan anda dalam polisi pengajaran Matematik dan Sains dalam Bahasa Inggeris
(PPSMI) pada masa ini.

SILA BULATKAN/TANDAKAN SATU NOMBOR DARI 1 HINGGA 4 UNTUK
MENUNJUKKAN SAMA ADA ANDA BERSETUJU ATAU TIDAK BERSETUJU
DENGAN PERNYATAAN-PERNYATAAN DI BAWAH
Untuk skala ini, 1 = SANGAT TIDAK BERSETUJU manakala 4 = SANGAT
BERSETUJU

1 2 3 4
Sangat tidak besetuju Tidak besetuju Bersetuju Sangat besetuju
SOALAN - SOALAN

1) Mengajar Matematik dan Sains dalam Bahasa Inggeris mempercepatkan pemindahan pengetahuan saintifik dan teknologi kepada generasi muda di Malaysia.

1 2 3 4

Komen: _____________________________________________________________
______________________________________________________________

3) Murid – murid saya lebih bersedia menghadapi pasaran pekerjaan yang semakin global kerana mereka mempelajari Matematik dan Sains dalam Bahasa Inggeris.

1 2 3 4

Komen: _____________________________________________________________
______________________________________________________________

12) Kursus – kursus ETeMS/EMS yang dikendalikan oleh Kementerian Pelajaran telah menyediakan saya untuk mengajar Matematik dan/atau Sains dalam Bahasa Inggeris dengan baik.

1 2 3 4

Komen: _____________________________________________________________
______________________________________________________________

13) Saya cukup fasih dalam Bahasa Inggeris untuk mengajar Matematik dan/atau Sains dalam bahasa tersebut.

1 2 3 4

Komen: _____________________________________________________________
______________________________________________________________
14) Murid-murid saya cukup fasih dalam Bahasa Inggeris untuk belajar Matematik dan Sains dalam bahasa tersebut.

1.  
2.  
3.  
4.  

Komen: ____________________________________________________________
____________________________________________________________________

15) Saya mengajar Matematik dan/atau Sains secara berkesan dalam Bahasa Inggeris.

1.  
2.  
3.  
4.  

Komen: ____________________________________________________________
____________________________________________________________________

16) Murid-murid saya belajar Matematik dan Sains secara berkesan dalam Bahasa Inggeris.

1.  
2.  
3.  
4.  

Komen: ____________________________________________________________
____________________________________________________________________

17) Bahan-bahan pengajaran yang telah dibekalkan oleh sekolah untuk saya mengajar Matematik dan/atau Sains dalam Bahasa Inggeris adalah berkesan.

1.  
2.  
3.  
4.  

Komen: ____________________________________________________________
____________________________________________________________________

18) Bahan-bahan pengajaran dalam Bahasa Malaysia adalah berguna semasa saya menyediakan pengajaran dalam Bahasa Inggeris.

1.  
2.  
3.  
4.  

10) “Critical friend” di sekolah membantu mempertingkatkan prestasi Bahasa Inggeris saya.

   ①  ②  ③  ④

Komen: ________________________________________________

11) Prestasi murid-murid saya semasa menjawab soalan peperiksaan/ujian Matematik dan/atau Sains dalam **Bahasa Inggeris** adalah memuaskan.

   ①  ②  ③  ④

Komen: ________________________________________________

12) Prestasi murid-murid saya semasa menjawab soalan peperiksaan/ujian Matematik dan/atau Sains dalam **Bahasa Malaysia** adalah memuaskan.

   ①  ②  ③  ④

Komen: ________________________________________________

13) **Bahasa Inggeris** adalah bahasa yang paling sesuai untuk pengajaran mata pelajaran Matematik dan Sains.

   ①  ②  ③  ④

Komen: ________________________________________________
14) **Bahasa Malaysia** adalah bahasa yang paling sesuai untuk pengajaran mata pelajaran Matematik dan Sains.

1 2 3 4

Komen: _______________________________________________________________

____________________________________________________________________

15) Saya mempunyai penguasaan yang kukuh mengenai kandungan mata pelajaran Matematik atau Sains yang saya ajar.

1 2 3 4

Komen: _______________________________________________________________

____________________________________________________________________

16) Semasa saya mengajar, saya boleh melafazkan idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam **Bahasa Inggeris** dengan jelas.

1 2 3 4

Komen: _______________________________________________________________

____________________________________________________________________

17) Semasa saya mengajar, saya boleh melafazkan idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam **Bahasa Malaysia** dengan jelas.

1 2 3 4

Komen: _______________________________________________________________

____________________________________________________________________

18) Murid-murid saya boleh melafazkan idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam **Bahasa Inggeris** dengan jelas.
19) Murid-murid saya boleh melafazkan idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Malaysia dengan jelas.

   ①  ②  ③  ④

Komen: ________________________________________________________________

   ________________________________________________________________

20) Semasa saya mengajar, saya boleh menulis idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Inggeris dengan jelas.

   ①  ②  ③  ④

Komen: ________________________________________________________________

   ________________________________________________________________

21) Semasa saya mengajar, saya boleh menulis idea/penerangan mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Malaysia dengan jelas.

   ①  ②  ③  ④

Komen: ________________________________________________________________

   ________________________________________________________________

22) Murid-murid saya berupaya memberi respons yang baik kepada tugasan bertulis mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Inggeris.

   ①  ②  ③  ④
23) Murid-murid saya berupaya memberi respons yang baik kepada tugas bertulis mengenai kandungan mata pelajaran Matematik dan/atau Sains dalam Bahasa Malaysia.
   ①  ②  ③  ④

24) Soalan – soalan peperiksaan Matematik dan/atau Sains SPM dalam Bahasa Inggeris menilai kemahiran dan keupayaan murid-murid saya dalam mata pelajaran ini dengan jitu.
   ①  ②  ③  ④

25) Soalan – soalan peperiksaan Matematik dan/atau Sains SPM dalam Bahasa Malaysia menilai kemahiran dan keupayaan murid-murid saya dalam mata pelajaran ini dengan jitu.
   ①  ②  ③  ④

26) Kandungan kertas peperiksaan Matematik dan/atau Sains SPM memberi gambaran yang tepat mengenai topik-topik yang telah diajar kepada murid- murid Tingkatan Empat dan Tingkatan Lima.
   ①  ②  ③  ④
27) Format soalan peperiksaan Matematik dan/atau Sains SPM memberi gambaran yang tepat mengenai tugasan kelas dan kerja rumah yang diberi serta soalan ujian/peperiksaan yang dibuat di sekolah.

Komen: _____________________________________________________________

____________________________________________________________________

28) Dari segi kandungan mata pelajaran, murid-murid saya akan cukup bersedia untuk menghadapi peperiksaan SPM Matematik dan/atau Sains dalam Bahasa Inggeris.

Komen: _____________________________________________________________

____________________________________________________________________

29) Dari segi kemahiran bahasa, murid-murid saya akan cukup bersedia untuk menghadapi peperiksaan SPM mata pelajaran Matematik dan/atau Sains dalam Bahasa Inggeris.

Komen: _____________________________________________________________

____________________________________________________________________

30) Kebarangkalian murid-murid saya memperolehi prestasi yang baik dalam mata pelajaran Matematik dan/atau Sains untuk peperiksaan SPM, sekiranya ia dilaksanakan sepenuhnya dalam Bahasa Inggeris tahun ini, adalah bagus.

Komen: _____________________________________________________________
31) Gerak Gempur dan peperiksaan percubaan untuk matapelajaran Matematik dan/atau Sains membantu murid – murid saya menghadapi peperiksaan SPM yang sebenar.

① ② ③ ④ ⑤

Komen: _____________________________________________________________
____________________________________________________________________

SILA TULIS SEBARANG KOMEN LAIN MENGENAI POLISI PENGAJARAN MATEMATIK DAN SAINS DALAM BAHASA INGGERIS DALAM RUANG YANG DISEDIAKAN DI BAWAH.
**APPENDIX E – Observation grid**

Observation period: **Baseline / Period 1 / Period 2 / Period 3**

Teacher: _______________________________________

School: _______________________________________

Subject: _______________________________________

Time: _________________________________________

Unit: _________________________________________

Lesson #: _____________________________________

<table>
<thead>
<tr>
<th>Lesson Description: Introduction / Presentation of concepts / derivation of formulae / labwork / class discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of specific teaching techniques/supports</td>
</tr>
<tr>
<td><strong>Advanced organizers</strong></td>
</tr>
<tr>
<td>i) draw on prior knowledge</td>
</tr>
<tr>
<td>ii) outline of lesson</td>
</tr>
<tr>
<td>iii) draw attention to headings, subtitles in text/readsings</td>
</tr>
<tr>
<td>iv) list of key words</td>
</tr>
</tbody>
</table>
### APPENDIX E – Observation grid

**Observation period:** Baseline / Period 1 / Period 2 / Period 3

<table>
<thead>
<tr>
<th>Use of specific teaching techniques</th>
<th>✓ if observed</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Linguistic support (verbal)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) code switching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii) translating words, phrases or sentences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii) simplifying language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv) bilingual instruction</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Linguistic support (non-verbal or textual)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) summary of lesson content</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii) prepared notes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii) translated texts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv) bilingual texts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v) simplified texts</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E – Observation grid
Observation period: Baseline / Period 1 / Period 2 / Period 3

<table>
<thead>
<tr>
<th>Use of specific teaching techniques</th>
<th>✓ if observed</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>VISUAL SUPPORT (diagrams, charts, tables)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) drawn on blackboard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii) posters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii) e-media (digital projector, computer)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUDIO SUPPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) reading texts aloud (teacher / student)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii) playing a tape / CD / streamed audio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MULTIMEDIA SUPPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii) CD/DVD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii) Web resource (streaming video with links)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**APPENDIX E – Observation grid**
Observation period: **Baseline / Period 1 / Period 2 / Period 3**

<table>
<thead>
<tr>
<th>Use of specific teaching techniques</th>
<th>✓ if observed</th>
<th>Comments</th>
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<tbody>
<tr>
<td><strong>SUPPORTIVE PEDAGOGICAL BEHAVIOUR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Verbal encouragement when student hesitates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii) Body language – nods, smiles, hand gestures, to make student feel at ease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii) Waits/allows silence while student formulates/reformulates answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv) fosters climate of respect and collaboration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) models respectful behavior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) expects students to respect each other (no waving of hands or talking when another student is working out a problem)</td>
<td></td>
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</tr>
<tr>
<td>c) models scaffolding for students</td>
<td></td>
<td></td>
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<tr>
<td>d) encourages students to scaffold each other’s learning in pair/group work</td>
<td></td>
<td></td>
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<tr>
<td>e) prepares activities that specifically build on students prior knowledge</td>
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</table>
**APPENDIX E – Observation grid**
Observation period: **Baseline / Period 1 / Period 2 / Period 3**

<table>
<thead>
<tr>
<th>MANIPULATIVES</th>
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<td>i) clearly labeled</td>
<td></td>
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<tr>
<td>ii) instructions provided</td>
<td></td>
</tr>
<tr>
<td>iii) clear instructions on use</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
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<tr>
<td>i) clearly labeled</td>
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</tr>
<tr>
<td>ii) instructions provided</td>
<td></td>
</tr>
<tr>
<td>iii) clear instructions on use</td>
<td></td>
</tr>
</tbody>
</table>

**OTHER COMMENTS**
(Order of presentation, student-teacher interaction, student – student interaction, etc)
APPENDIX F – MST interview questions

**Interview with MST (Baseline)**

1) Can you describe your educational background as an MST?

2) How long have you been teaching? What is your teaching philosophy/approach?

3) How long have you been teaching in this school? Can you tell me your impressions about your school in terms of infrastructure (library, classroom equipment, lab equipment, computers), administration and academic achievement?

4) How many classes do you teach in school? Could you briefly talk about the number of students per class, their economic background and their motivation as learners?

5) Can you talk briefly tell me what you know of the ELIMS policy? What is your opinion about it?

6) What steps were taken to help you to implement this policy? Do you feel well prepared for doing so?

7) Can you name some useful resources provided, either by the school or the Ministry of Education, that makes implementing this policy easier for MST? Do you feel that the support from the school or the Ministry is sufficient?

8) What are the biggest challenges in teaching MS in English for you at this point in time? How do you intend to face these challenges?

9) What do you know about the SPM Mathematics and Science exams? Can you tell me the differences between the previous Mathematics and Science SPM exam in Bahasa Melayu and the Mathematics and Science exams in English?

10) What difficulties do you think you might experience in preparing your students to face this exam?

11) What are the difficulties you think students will encounter with this exam being in English?
APPENDIX G – Student interview questions

**Interview with Secondary Four and Five students: [Baseline]**

1) How do you consider your knowledge and understanding of Mathematics and Sciences in English?

2) Did you ever learn Mathematics and Science in another language?

3) When did you start learning Mathematics and Science in English?

4) How do you find learning Mathematics and Science in English?

5) Compared to learning Mathematics and Science in Malay, how do you find learning these subjects in English? Do you think that you are equally good in these subjects in English or Malay?

6) If learning Mathematics and Science in English is easy, why do you find it easy? If it is difficult, why do you find it hard?

7) How do you find the SPM Mathematics and Sciences exam in English in terms of difficulty? What are your comments or feedback about it?

8) How are you preparing for this exam? Can you describe specific study methods that you feel are helpful?

9) At present, what do you feel is your biggest challenge in preparing for this exam?

10) How do you see the school as a learning environment? What could the school or your teachers do to help make learning M&S in English better?
2. EXPLANATORY NOTES ON SENSITIVE ISSUES

1. In the context of national security, sensitive issues mean any issue that can cause prejudice, hatred, enmity or contempt between or towards any ethnic or religious group and can affect public safety, national security and/or the integrity of the Government and is generally connected with the following acts or behaviour:

1.1 Questioning the implementation of certain government policies pertaining to economic development, education and social matters.

1.2 Questioning the implementation of particular provisions in the Federal and State Constitutions pertaining to Federal Laws, the freedom of religion, the special position of the indigenous community (Bumiputera), citizenship and rights of the other communities.

1.3 Regarding a racial or religious group as neglected or given preference in the implementation of a particular policy without providing the background or reasons that necessitate it.

1.4 Promoting the success of one racial or religious group on the basis of the preference and facilities provided by the government to individuals or the ethnic group concerned.

1.5 Questioning the authority, wisdom and abilities of a group in a particular area on an ethnic basis.

1.6 Associating and blaming a racial or religious group as the cause of an incident.

1.7 Publicising the name or the ethnic group involved.

1.8 Publicising the details of an incident or violent happening that can arouse anger amongst those who read and/or hear about it.

1.9 Publicising and displaying of photograph or sketch that shows the racial origin or religion of the parties involved in causing the incident.
APPENDIX H – Explanatory notes from EPU concerning sensitive issues

1.10 Conveying the impression that the authorities have failed or are unable to control the situation and are rude and unjust in the discharge of their duties.

1.11 Exaggerating an incident or using rumours or information as the basis for reports that can cause panic or apprehension amongst the people.

1.12 Exaggerating the weakness of the government to particular groups overseas with the intention of demeaning the integrity or eroding the confidence of the international community in the authority of the government.
APPENDIX I – MST Informed Consent Form

INFORMED CONSENT FORM TO PARTICIPATE IN RESEARCH

This is to state that I agree to participate in the research project entitled:

Educational change in exam – oriented contexts: The implementation of English as the language of instruction for Mathematics and Science in Malaysian Secondary Schools

conducted by Tan Hui May, a student in the PhD (TESL) programme at McGill University, Department of Integrated Studies in Education.

Purpose:
This research project would like to examine the perception and personal experiences of teachers concerning the recent educational policy on using English to teach Mathematics and Science currently being implemented in Malaysia.

Procedure:
With your permission, classroom observations and interviews will take place 4 times during the course of the study. Each of these observation periods will last approximately two to four weeks.

Each observation will take place during normal teaching time and will not require additional time on the part of the participant. However, the interviews (30 - 60 mins) will take place outside of class time.

During each observation period, the participants will be asked to complete a short questionnaire.

All information obtained from the observations, interviews and questionnaires will be kept confidential.

All participants will be given code numbers and pseudonyms. The data obtained will be filed under these code numbers and pseudonyms.

Participation conditions: The data obtained from participants will be used in a PhD thesis, and possibly for other purely research purposes in the future. Data will be aggregated and participants will be quoted, but no real names will be used – as mentioned above, participant identities will be kept strictly confidential. The participants will be provided with a copy of the complete study if they so wish.
APPENDIX I – MST Informed Consent Form

- I understand the purpose of this study and know about the benefits and inconveniences.
- I understand that I am free to withdraw at any time from the study without any penalty or prejudice.
- I understand how confidentiality will be maintained during this research project.
- I understand the anticipated uses of data, especially with respect to the publication, communication and dissemination of results.

- I know that quotations from interviews conducted with me may be cited in the study. I consent to the use of these quotations.
  ———————————— (Please write your initials here)

- I give my permission to videotape me in class for data collection purposes.
  ———————————— (Please write your initials here)

- I give my permission to videotape me in class for presentation purposes in conferences and classes.
  ———————————— (Please write your initials here)

I have carefully studied the above and understand my participation in this agreement. I freely consent and voluntarily agree to participate in this study.

Name (please print) _______________________________________

Signature _______________________________________

Date__________________________________
Sample of bilingual SPM format (SPM Math 2005)
## APPENDIX K – Table of communalities of items in factor analysis

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Extraction Method: Principal Component Analysis.