



Faculty of Cognitive Sciences and Human Development

**IN-SERVICE SCIENCE TEACHERS' READINESS IN TEACHING
SCIENCE SUBJECTS IN ENGLISH:
A CASE STUDY IN UNIMAS**

JAMILAH BINTI JAMIL

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IN ENGLISH: A CASE STUDY IN UNIMAS**

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JAMILAH JAMIL

This project is submitted in partial fulfillment of the requirements for a
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The project entitled 'In-Service Science Teachers' Readiness in Teaching Science Subjects in English: A Case Study in UNIMAS' was prepared by *Jamilah Jamil* and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfillment of the requirements for a Bachelor of Education with Honours (English as a Second Language)

Received for examination by:

.....
(SOUBAKEAVATHI RETHINASAMY)
Supervisor

Date:

Grade

ABSTRACT

IN-SERVICE SCIENCE TEACHERS' READINESS IN TEACHING SCIENCE SUBJECTS IN ENGLISH: A CASE STUDY IN UNIMAS

Jamilah Jamil

One of the most significant curricular changes in the Malaysian education system is the teaching of Science and Mathematics in English. After 39 years of teaching Science and Mathematics in first languages, making the transition to teach the same subjects in English poses many challenges to the teachers concerned. Thus, the Ministry of Education has provided them with professional development courses, in preparing them to stand and deliver in English competently. This study looks into the in-service Science teachers' readiness in teaching Science subjects in English. This study aims to investigate how ready are the in-service teachers (who had been earlier trained to teach Science in BM or Mandarin) to teach Science in English after completing the PKPG degree course in UNIMAS. The participants of the study were the in-service Science teachers who are currently attending degree course in UNIMAS. A set of semi-structures questions was utilised to find out (a) the participant experiences in teaching Science before attending the degree course, (b) how the course had prepared them to teach Science in English and (c) their readiness in meeting the challenges upon completion of their degree course. The data were qualitatively analysed into categories based on the responses gathered. A significant finding is that though the teachers clarified they were ready and had improved both in content subject and English proficiency; a small number mentioned the need for more assistance particularly in teaching and delivering Science subjects in English. The valuable information yielded by this study is expected to help Bahagian Pendidikan Guru (BPG), Ministry of Education (MoE) and the UNIMAS administration to develop programmes and strategies in accordance to the teachers' needs to equip them well to teach Science subjects in English.

ABSTRAK

KESEDIAAN GURU-GURU SAINS DALAM PERKHIDMATAN MENGAJAR SUBJEK-SUBJEK SAINS DALAM BAHASA INGGERIS: KAJIAN KES DI UNIMAS

Jamilah Jamil

Satu perubahan pekeliling penting dalam pendidikan di Malaysia ialah pengajaran Sains dan Matematik dalam Bahasa Inggeris. Setelah 39 tahun pengajaran Sains dan Matematik dalam bahasa pertama, membuat perubahan untuk mengajar subjek yang sama dalam Bahasa Inggeris menimbulkan banyak cabaran kepada guru-guru berkaitan. Oleh yang demikian, Kementerian Pelajaran telah menyediakan mereka dengan kursus-kursus peningkatan profesional, dalam menyediakan mereka untuk mengajar menggunakan Bahasa Inggeris dengan berkesan. Kajian ini melihat kepada kesediaan guru-guru Sains dalam perkhidmatan mengajar subjek-subjek Sains dalam Bahasa Inggeris. Matlamat kajian ini ialah menyiasat sejauh mana kesediaan guru-guru dalam perkhidmatan (yang terdahulu dilatih mengajar Sains dalam Bahasa Malaysia atau Mandarin) mengajar Sains dalam Bahasa Inggeris selepas tamat kursus ijazah PKPG di UNIMAS. Peserta-peserta kajian ini ialah guru-guru Sains dalam perkhidmatan yang sedang mengikuti kursus ijazah PKPG di UNIMAS. Satu set soalan semi-struktur digunakan untuk melihat (a) pengalaman peserta mengajar Sains sebelum mengikuti kursus ijazah, (b) bagaimana kursus ini telah menyediakan mereka untuk mengajar Sains dalam Bahasa Inggeris dan (c) kesediaan mereka dalam menghadapi cabaran setelah tamat kursus ijazah. Data telah dianalisa secara kualitatif mengikut beberapa kategori berdasarkan maklumbalas yang diperolehi. Dapatan kajian mendapati bahawa guru-guru ini menjelaskan mereka bersedia dan menunjukkan peningkatan dalam kedua-dua kandungan subjek dan kemahiran Bahasa Inggeris; sebilangan kecil menyarankan supaya lebih bantuan khasnya dalam kemahiran pengajaran dan penyampaian dalam Bahasa Inggeris. Maklumat bernilai yang diperolehi dari kajian ini akan dapat membantu Bahagian Pendidikan Guru (BPG), Kementerian Pelajaran dan pentadbiran UNIMAS untuk membuat program dan strategi yang bersesuaian berdasarkan kehendak guru-guru dalam menyediakan mereka sebaiknya untuk mengajar subjek-subjek Sains dalam Bahasa Inggeris.

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CHAPTER ONE

INTRODUCTION

1.0 Chapter Overview

This introductory chapter serves as the preface to the study. It starts by presenting the background to the study. Then, it provides the statement of problem, briefly explains the present study, research aim, research questions, and gives the definition of key terms linked to the study.

1.1 Background Of The Study

English has been used widely in Malaysia ever since it was known as Malaya. In fact, English was firstly introduced in schools when the country was colonised by British (Spolsky, 2004). During this colonial period, four types of schools existed – English schools where English was used as the medium of instruction and three types of vernacular schools; Malay, Chinese and Indian.

In 1970, all the English medium schools were replaced by Malay medium schools and by 1983; all national secondary and university education was conducted in the national language. Thus, Bahasa Malaysia, the national language has been the medium of instruction for about 20 years. During this time, English was referred to second language status though in some remote parts of the country and in monolingual environments, it has become more or less a foreign language (Mauzy, 1985).

It was on 6 May 2002 that then Prime Minister Mahathir Mohamad announced that the government was eager to re-introduce English-medium education. Thus, on 11 May 2002, the previous Education Minister, Musa Mohamad, confirmed that a bilingual system would be set up with English used for teaching Mathematics and Science. On 21 July 2002, Musa Mohamad announced details of the implementation of the new system in national schools: a phased-in bilingual system (Azirah, 2003). In January 2003, the implementation policy is initiated to classes in Year 1, Form 1 and Lower Six classes.

The government's decision to change the medium of instruction in the teaching of Mathematics and Science from Bahasa Malaysia to English affects the Mathematics and Science teachers generally. For more than twenty years, teachers trained in the Malay medium as well as those trained in English have largely used Bahasa Malaysia as a medium of instruction so most teachers were sceptical about their own confidence and capabilities in delivering the subject matter in English. Therefore, the decision to teach Mathematics and Science in English is a "big challenge" for many of the teachers (Mohammad, 2004).

The implementation of 2003 curriculum, English for teaching Mathematics and Science raised many issues and challenges among classroom practitioners.

Some of them are positive and excited by the prospects of teaching Mathematics and Science in English but there are also some who are indifferent and negative about it. In times of change, different reactions are considered normal (Koon, 2005).

With the ongoing language proficiency, courseware and monitoring programmes, teachers are continually inducted into the new curriculum. Therefore, it is pertinent that teachers adapt to their situations and exercise their skills in pedagogy to maximize opportunities and troubleshoot any problems that may arise. One of the ways to improve their knowledge, skill and language command, some of these teachers have decided to undergo courses conducted by the ministry.

One of the courses conducted is Program Khas Pensiswazahan Guru (PKPG). It is a special programme prepared by Ministry of Education (MoE), for non-graduate Education Service teachers serving in primary schools. It is also extended to education officers serving in District Education Offices, State Education Departments and divisions in the Ministry of Education. This is a three-year programme. The first year is spent at a teachers training college, while the second and third years at selected universities. Course participants who achieve the pre-determined level in the first year will continue studies in the second and third years. Participants who pass their examinations and meet the conditions will be awarded the Bachelors degree.

1.2 Statement of Problem

The medium of instruction for Science in Malaysia was Bahasa Malaysia (BM) until recently. Even in the teacher's institution, the teachers were trained in BM and used BM as the medium of instruction in schools to deliver the subject

content. After taught in BM for years, the medium of instruction of Science was changed to English starting from June 2002.

The reactions from teachers towards this change were mixed. Teachers play a key role in the curricular change. The performance of the students is largely dependent on them. It is important that they are not only equipped with knowledge, skills and the right attitude towards teaching and learning but also positive self-efficacy to teach well.

Due to these various reactions by teachers, government has decided to conduct programmes and courses to overcome the issue. PKPG is one of the courses planned for these teachers. Basically, the course is conducted in English. Thus, this study intentionally to investigate how much the course has prepared these in-service Science teachers to teach Science subjects in English.

1.3 The Present Study

The present study is carried out to investigate in-service Science teachers' readiness in teaching Science subjects in English. It differs from previous studies because it aims to find out how much had the PKPG degree course that was conducted in UNIMAS prepared these in-service Science teachers for the of teaching Science subjects in English specifically for secondary school level. They had been trained in Bahasa Malaysia (BM) and taught Science in primary school using BM and Mandarin, until the 2003 implementation, whereby English is used as the medium of instruction for teaching Mathematics and Science.

Not only that, the study utilised their experiences and views in teaching Science subjects before attending PKPG course and during their course in UNIMAS.

1.3.1 Research Aim

The underlying aim of the study is;

1. To investigate how ready are the in-service teachers (who had been earlier trained to teach Science in BM or Mandarin) to teach Science in English after completing the PKPG degree course.

1.3.2 Research Questions

The following research questions were formulated to meet the research aim as mentioned above;

1. What are the in-service teachers' opinions on teaching Science subjects in BM/ Mandarin and English before attending PKPG course?
2. How has the PKPG course prepared the in-service teachers' for the teaching of Science subjects in English?
3. Are the in-service teachers' ready to teach Science subjects in English after completing their PKPG degree course?

1.4 Significance of the Study

The study seeks to get insight information among the 18 in-service Science teachers of the PKPG degree course in preparing them to teach Science subjects in English. The information gathered are intended as reference for the policy makers of the actual feelings, thoughts, knowledge and skills of the target group in the teaching of secondary Science subjects in English.

Hence, the present study is attempted to investigate the in-service Science teachers' opinion after attending the PKPG degree course and their preparedness in teaching Science subjects in English.

Bearing in mind the limitation of a study of this kind on a small target group, it would be rather presumptuous to conclude that the findings represented the actual and true level of preparedness of teachers in Malaysia towards the teaching of Science in English. However, the valuable information yielded by this study would be able to help Bahagian Pendidikan Guru (BPG), Ministry of Education (MoE) and the UNIMAS administration to develop programmes and strategies in accordance to the teachers' needs to equip them well to teach Science in English.

1.5 Definition of Key Terms

The terminology applied is defined accordingly to the requirements of the words or phrases in this study.

1.5.1 Readiness

Readiness refers to, '*when you are prepared for something or willingness to do something*' (Longman, 2005, p.1044). In this study, readiness refers to teachers' preparedness, examples, in terms of their subject content knowledge, pedagogic skills, mastery of English language etc; and confidence to teach Science subjects in English particularly to students of secondary school level.

1.5.2 Program Khas Pensiswazahan Guru (PKPG)

Program Khas Pensiswazahan Guru (PKPG) is an in-service staff development programme, which is introduced by Ministry of Education (MoE) to make the non-graduate teachers into graduate teachers. It is a three-year degree programme; held one year in teacher institutions and two years in universities. In this study, it refers to the Bachelor of Education programme specifying in Biology and Chemistry conducted in UNIMAS.

1.5.3 Secondary School

Secondary school in this study refers to the classes of Form 1 to 5. Secondary school education is the second stage of formal education in Malaysia. Secondary education for Malaysian students starts at age 13 and continues for of five to seven years. Ujian Penilaian Sekolah Rendah (UPSR) is a public examination taken by Year 6 pupils, upon the completion of their primary school learning. After completing UPSR, pupils then continue their journey education in Secondary School for five (5) years. Here in Malaysia, Secondary School Education is informally divided into two parts:

- Lower Secondary (Form 1 to Form 3)
- Upper Secondary (Form 4 to Form 5)

Students will spend their first three years in Lower Secondary. They will study a minimum of eight subjects which are grouped as Core Subjects and Choice Subjects. Based on their PMR result pupils have several choices in where they can continue their education in Upper Secondary for the next two years (Form 4 to Form 5). These choices or streams are based on the combination of subjects they choose to study. There are four core subjects that all streams will study: Bahasa Melayu, English, Mathematics, Islamic Studies or Moral and History. There are three main streams in Upper Secondary:

- Academic Stream (Humanity/Arts/Science)
- Technical and Vocational Stream
- Islamic Schools

Secondary schooling represents a stage of academic development where the foundation developed at the primary level is built upon and strengthened in preparation for tertiary or vocational training.

1.5.4 Secondary Science

In lower secondary, all pupils in Malaysia are required to take Science as one of their core subjects. Meanwhile in upper secondary, pupils can choose between the two main academic streams. The core subjects for the Science stream students are Chemistry, Physics and Biology and Additional Mathematics. The non-Science streams are categorised into two groups; the Humanity stream and Art stream. The pupils in Humanity stream will take Additional Science and either one of the pure science subjects (Chemistry, Physics or Biology) with English for

Science and Technology (EST). Meanwhile the Art stream pupils will take General Science.

1.6 Scope of the Study

This study attempted to find out the in-service teachers' opinion after attending the PKPG course and their preparedness in teaching Science subjects in English. It was carried out among the last and only one batch of third year PKPG Science in-service teachers. Despite the fact that the present study had investigated in detail the PKPG degree course that conducted in UNIMAS, previous studies inline with the change in medium of instruction had also been reviewed.

1.7 Chapter Review

This opening chapter portrayed the introduction of English as medium of instruction in the teaching of Science subjects. The 2003 implementation had given great impacts to the country, especially teachers who were trained in Bahasa Malaysia. The chapter also summarized the background of the study, problem of statement, the objectives and research questions, the significance of the study. It also contained the definition of key terms used in the study.

The next chapter presents on review of the literature which focus on the concept and previous researches, articles and journals related to the present study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Chapter Overview

This chapter provides the literature review for this study. It discusses several sub-topics; the teaching and learning in non-first language, Malaysian Education System and Science curriculum. Then it looks at the teaching Science in English before discussing the related study and the overview of the present study.

2.1 Teaching and Learning in Non-First Language

Teaching and learning in non-native language, like English; is referred to people first or second language; and they practise English as the medium of instruction in teaching and learning other subjects, like Mathematics, Science, Geography and so forth (Kelman, 1971). Such phenomenon is sometimes known as bilingualism and some mentioned as multilingualism. It depends on the numbers of languages employed in the education system (Stewart, 1968).

Generally Malaysia can best be described as multilingualism or linguistic pluralism, which prescribes that all four main languages (BM, English, Mandarin and Tamil) should be treated as equal in schools (Josey, 1971). In actual practice, however, few would argue seriously that all the languages can be treated exactly equal. Among the four, English is a non-native language which has evolved to become the ‘tool’ in imparting knowledge.

The change in the recent policy is basically an emergent response to current needs (Kamisah, 1999). The language can just about be any language but it just so happened that English has become an international language being widely spoken around the world and that much of the world’s knowledge is locked within this language (Parkinson, 2004).

When Bahasa Malaysia gained prominence, Malaysia experienced a serious shortage of Malay materials especially in the area of science and technology. There was also lack of Malay words for many technological terms. Gill (2003) strongly asserted that the scientific and technological terms were non-existent in the Malay language. Although the materials problem was partly solved at the primary and secondary school levels, and at university levels, Malaysian students still had to use textbooks written in English. Asmah (1987) attributes two causes:

“One reason for this is the lack of books in Malay for the various disciplines at the tertiary level. Another reason is the general attitude, now becoming policy, which requires Malaysians reaching the level of tertiary education to have acquired a second language. To the Malaysians, English is the logical choice for the obvious reason that this is the only language of wider diffusion that they had

been most familiar with for the last two hundreds years or so. Hence the teaching of English is not only compulsory at the school but also at the University.” (p.165)

Furthermore, it was becoming increasingly challenging to translate the latest technological developments into BM. For example, in Chemistry, since the beginning of the 1990s, more than 1 million articles had appeared in specialized journals every 2 years. In Biology, in 1977 scientists determined the method designed to distinguish 500 bases sequence of the letters that codified the information in DNA; but today, they could decipher the 3 billion bases of the human genome in a few years. In Mathematics: 100,000 new theorems were created per year (Subahan, Lilia, Khalijah and Ruhizan, 2001). Accelerated change with enhanced technologies had given the nation with no choice if Malaysians wanted to be global players (Lee, 1992).

Nik Safiah (1987) is quoted in detail:

“While the policy is to use the national language in all official instances, in many important domains of language...English is still the preferred language. Such being the case, Malay cannot remain forever a language of basic communication. English has become a language by means of which complex ideas and feelings are communicated effectively and beautifully...a language of science and technology...” (p. 5)

Hence, English language has a strong influence on Malaysian society, particularly in the education domain, as it is a tool and means of getting knowledge, information and resources.