

**PRIMARY SCHOOL TEACHERS' DISPOSITIONS IN USING ENGLISH TO
TEACH SCIENCE**

by

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'DISPOSITIONS' GURU SEKOLAH RENDAH DALAM MENGGUNAKAN BAHASA INGGERIS UNTUK MENGAJAR SAINS

ABSTRAK

Kajian ini dijalankan setelah mengambil kira beberapa pertimbangan terhadap keraguan guru-guru yang timbul hasil daripada tanggungjawab untuk melaksanakan pengajaran Sains dalam Bahasa Inggeris. Menyedari tentang hakikat ini, kajian ini telah merintis arah untuk menyedarkan masyarakat umum mengenai kepentingan 'disposition' guru dan bagaimana ia dapat mempengaruhi aras motivasi dalam menjadi guru Sains yang cemerlang. 'Disposition' ialah pemikiran, persepsi, sikap, dan personaliti seseorang guru yang diterjemahkan melalui perlakuan.

Tujuan utama kajian ini ialah untuk mengumpul maklumat yang terperinci mengenai 'disposiition' guru-guru berkaitan dengan: (a) profesion perguruan; (b) pengajaran Sains dalam Bahasa Inggeris; dan (c) aras motivasi mereka dalam menuju kearah pembentukan guru Sains yang efektif. Adalah penting dalam menentukan 'disposition' guru-guru agar pihak yang bertanggungjawab dapat merangka kurikulum/program/kursus dalam penyediaan guru (mempunyai 'disposition' yang positif yang menyumbang kepada pembentukan guru Sains yang cemerlang).

Kajian ini telah mengguna kaedah kajian kes agar penyelidikan dapat dijalankan secara mendalam dan terperinci untuk lebih memahami tentang 'disposition' responden dalam pengajaran dan pembelajaran mereka. Empat orang guru sekolah rendah telah dipilih sebagai responden untuk kajian ini untuk memperolehi dapatan yang ekstensif, deskriptif dan menyeluruh.

Instrumen kajian menggunakan kaedah kajian soal selidik tinjau balik (questionnaires-study with retrospection) dan juga instrumen-instrumen yang lain. Kajian ini merupakan satu kajian dari sudut perspektif sosio-psikolinguistik dan menggunakan pendekatan kualitatif. Kerangka Katz telah dibina dan *Weiner's Attribution Theory on Motivation for Achievement* telah diadaptasi dan digunakan dalam kajian ini. Hasil kajian telah menunjukkan bahawa responden mempunyai disposisi iatu: (a) perasaan ingin tahu; (b) menghargai hasilan bukti, (c) daya refleksi yang kritis; dan (d) fleksibel. Walau bagaimanapun tahap motivasi intrinsik responden turut berbeza-beza disebabkan oleh tahap keraguan yang berkaitan dengan masalah bahasa yang di alami. Hal ini seterusnya telah mempengaruhi tahap konfiden dan kompeten responden ini dalam pengajaran Sains mereka. Justeru, adalah wajar untuk pendidik disemua peringkat menitikberatkan isu 'disposition' guru kerana ia memberi pengaruh yang penting dalam menghasilkan guru Sains yang efektif secara khususnya dan guru yang berkualiti secara amnya.

PRIMARY SCHOOL TEACHERS' DISPOSITIONS IN USING ENGLISH TO TEACH SCIENCE

ABSTRACT

This study is carried out after much consideration on the teachers' worries that developed as the result of using English to teach Science. Realizing the importance of teachers' dispositions that contributed to the level of motivation for achievement has made this study possible. 'Dispositions' is a summary of actions (thoughts, perceptions, attitudes, and personalities of teachers) that are translated into behavior.

The main intention of this study was to examine the teachers' dispositions in relation to: (a) the teaching profession; (b) subject-matter which is Science and the language of instruction which is English and (c) their level of motivation to become effective Science teachers. It is important to consider teachers' dispositions so that teacher educators can design curricular/programs/courses/teacher preparation that reflect individual differences, and ultimately, improve teacher behavior (favorable/positive dispositions and dispositions of effective Science teachers).

Four respondents are used to make the data collection possible and analyses are done extensively so that a holistic interpretation is obtained. This study adopted a case study approach in order to have a better understanding of the intricacies of the phenomenon under study, which was using English to teach Science. The focus of the study was the teachers' dispositions, which is

one of the most important factors in developing effective Science teachers. In the effort to gain a good understanding of the phenomenon, only four respondents are used. The nature of the questions and issues investigated demanded that the responses be extensive, descriptive and thorough; therefore questionnaires-study in retrospect is used as the central method of data collection although other methods of data collection are also used. This study adopted the approach from a socio-psycholinguistic theoretical orientation. Katz's (1985) Framework on Dispositions of Effective Science teachers is developed and Weiner's Attribution Theory of Motivation for Achievement (1986) is adapted for this study to help in giving a holistic understanding of the complex interactive relationships between constructs.

Findings and analyses from this study showed that these primary school teachers possessed the identified teaching dispositions in using English to teach Science. Dispositions that are examined were: (a) curiosity; (b) respect for evidence; (c) critical reflection; and (d) flexibility (Katz, 1985). The central worry was the language (English) that affected their teaching as a whole. Nevertheless, their level of intrinsic motivation in becoming effective Science teachers varied due to their worries that affected their level of confidence and self-perceived competence.

CHAPTER ONE INTRODUCTION

1.0 Introduction

The era of globalization and the advancement of information communication technology (ICT) have reemphasized the importance of the English Language as the language of knowledge and the language for global communication. These functions have focused and given a special emphasis on the English Language as an important educational issue. Education plays an important role in making important contributions towards the attainment of Malaysia's long-term development plans, for the purpose of rapid economic expansion and social development. As our nation has to take up this challenge, it in turn demanded more from our students especially where English Language is concerned.

The information age revolution requires a higher level of skill and knowledge from all individuals compared to during the industrial revolution, which is geared towards factory production. Individuals in this age ought to be able to reason analytically, solve complex problems, gather and synthesize data as well as communicate effectively to meet the demands of e-learning and k-economy. Therefore, students' performance in school must be raised to a higher level.

As the society raises its expectation for students' achievement, it must concomitantly raise standards of the teachers. Teachers must be able to help their students to increase their conceptual understanding and analytical ability in

fulfilling the market-sensitive education system that is evolving now in Malaysia. The Ministry of Education is continuously developing, innovating, and implementing various programs and policies in order to take up the challenge of globalization. It has not only changed and improved the content of the curriculum and programs, but also, and most importantly, the delivery system. One of the policy introduced or reintroduced, was the teaching of Mathematics and Science in English.

The year 2003 saw the implementation of the teaching and learning of Mathematics and Science in English in schools. In implementing this policy, especially to primary school students, it is important to take into account in understanding the teachers' dispositions (in relation to the use of English as the medium of instruction). We need to understand how these dispositions developed based on the changes in the teachers' teaching behaviors, and whether these dispositions contributed to the level of motivation for achievement in becoming effective teachers.

1.1 Background of Study

Based on Noran's study (1992) on teachers' personality traits, she has briefly traced the historical development of the education system in Malaysia. It is found that teachers who used English to teach Mathematics and Science in English especially to the primary school students came from the various 'era' of education systems such as from the 'English Medium' (for teachers who are above 40 years of age) and the 'Malay Medium' (for teachers who are below 40 years of age). It gave the implications that teachers in schools now have various

level of fluency in the English Language based on their educational background. According to Clegg (2003), the level of fluency in the English language usage determined the level of motivation to use English as the medium of instruction. This ultimately will develop either positive or negative dispositions towards their teaching practices.

Teachers' dispositions have always been regarded by many researchers, practitioners and educators (Wascisko, 2002), as one of the most important variables that could either facilitate or hinder the teaching and learning process. To start with, the term 'dispositions' has been used by many researchers (Katz, 1985; Pajares, 1992; Wascisko, 2002) to describe attitude, aptitude, perceptions, beliefs, etc. that form the basis of behavior.

There is a significant body of research (Nunan, 1989; Pajares, 1992; McCombs, 2001) indicating that teachers' dispositions about students, about teaching, and about themselves; strongly influence the impact they have on students' learning and teachers' professional development. In short, those who deal with teacher education ultimately would aim to transform the organization as well as the enactment of teachers' work.

The issue that was currently of concern to the public especially in the Malaysian education system, as well as those involved in the education field, especially teachers, was, whether the policy of using English Language as the Medium of Instruction to teach Science, could be implemented effectively without considering teachers' dispositions. This is because disposition is one of

the important factors that contributed to effective Science teaching and ultimately effective Science teachers (Clegg, 2003).

Efforts in choosing and enhancing the development of positive teaching dispositions and the level of motivation in the teaching profession in general, posed concerns to many parties, but most importantly to the teachers themselves. Amla (*Berita Harian*, Okt. 1994) gave the implications that subject teachers were afraid that if they teach through a second language, they would need to change their practice. They are already burdened with work and responsibilities; and working in the second language themselves might be difficult enough, quite apart from an increased work burden that learning new teaching methods might imply. Similarly, education authorities might think that teaching a subject in the second language is the same as teaching it in the first language.

The overarching goal of this study was to better understand the teachers' dispositions in relation to using English to teach Science. This study specifically aimed to investigate teachers' dispositions that contribute to their confidence and self-perceived competence in using English as the medium of instruction to teach Science and their level of motivation for achievement in becoming effective Science teachers in the future.

1.1.1 Public Worries in relation to the new Policy (using English to teach Science)

Transmitting an education program through a second language could be difficult when the teachers themselves do not speak the language (English)

fluently (Thamilmani, 2000). English is treated as the Second Language (L2) in Malaysia, but in recent years has become the Foreign Language (FL) due to the well-defined uses and limited functions in the government as well as the private sectors (CDC, 2002).

It was evident that teachers who used English to teach Science, had to do two things at once: first, they had to learn the subject-matter knowledge (for those teachers who did not take the Science subject as their major in college), and second, they also had to acquire the language ability in order to deliver the knowledge (Science) to the students. The requirements of English Language of Science are very much different from the English language that we teach as a subject (Clegg, 2003). The usage and function of English is different for both (language as the medium of instruction and language as a subject). As such, it was not surprising that the Malaysian public is concerned with the implementation of the policy.

The Curriculum Development Center (CDC, 2002) received numerous comments on the issue of the implementation of the policy from various parties such as individuals; parents and teachers; as well as from the opposition parties. Some of the public worries were listed below (CDC, 2002). Although possible solutions are given to satisfy their concerns, the public is still concerned about it.

Figure 1.1: Public Worries and the Solutions (CDC, 2002)

Worries	Solutions
<ol style="list-style-type: none"> 1. English Language is difficult to master. 2. Bilingualism tampers with the child's cognitive development. 3. Teachers' acceptability. 4. Teachers have no confidence. 5. Differences in the achievement between students in the rural and urban schools. 6. Losing the nation's identity. 7. Countries that do not use English are developed and developing all the same without using English as the language of importance. 8. Differences in academic achievement among students who are weak in English with those who are proficient. 9. Why implement in an 'ad hoc' manner? 10. Sudden implementation. 	<ol style="list-style-type: none"> 1. It is good to introduce the Foreign Language at an early age. 2. Studies have proven that bilingualism helps in the cognitive development of a child. 3. Enough courses are and will be given. 4. Courseware materials for teaching, teachers' manuals, etc. are available. Courses in the English Language proficiency are ongoing. 5. The use of information technology. The transition program for 2 to 3 months at the beginning of the schooling year and English Language will be used in progression. This program will narrow the gap between achievement in the English Language and academic achievement. 6. It is proven that it is not true to refer to the example of Singapore – the first language is still being used as the main medium of instruction. 7. These countries have their own tradition and civilized knowledge. For example Germany, Sweden and Japan have advanced since Meiji's time. 8. The implementation in stages assured that the students and the schools have enough time to prepare. Questions and Answers in 2 languages (bilinguals) in the exam for a period of 5 years. 9. Malaysia has to make a leap in obtaining knowledge because we do not have our own knowledge tradition. 10. Careful planning and implementation meet the schedule. Implementation is in stages so that schools have enough time to prepare.

1.1.2 Curriculum Issues

When there is a change in the curriculum (or curriculum reforms), then, the curriculum is viewed and understood from several perspectives. According to Purkey and Smith (1983), from the administrator's point of view, is the intended curriculum, that is, the curriculum produced by the curriculum

developers. From the teachers' point of view, is the implemented curriculum, that is, the curriculum as presented to the students in their classrooms. From the students' point of view, is the attained or realized curriculum, that is, the curriculum as learnt or assimilated by them. Hence, the interpretation of the curriculum change itself varies from different parties and stakeholders.

This latest curriculum change in Malaysia witnessed teachers being identified by the individual school administrators and sent for trainings provided by the Ministry of Education in preparing them to use English to teach Science. The teachers are required to attend the EteMS courses (English for Teaching Mathematics and Science) and underwent various phases of training in preparing them the basic skills to teach Mathematics and Science in English.

These teachers either Science trained or otherwise, went through phases of training in the hope of being able to teach Mathematics and Science in English. The personnel and administrators in the Education Ministry, when designing the modules for trainings assumed that the teachers have acquired the English Language since they have learnt it as a subject throughout their schooling years and also in the teacher-training colleges/institutions, either formally or informally. The knowledge of English that they gained all these years is considered enough for the teachers to acquire sufficient knowledge and ability to teach Mathematics and Science in English especially to the primary school students. From observations and readings of the modules, considerations on teachers' personal factors such as their attitudes;

perceptions; and beliefs that the teachers have about the language; their level of confidence; competence; and motivation; are not clearly defined and seen.

Teachers play significant roles in effecting the curriculum reforms. Nevertheless, curriculum packages by themselves cannot improve teaching and learning. According to Nespor (1987) and Pajares (1992), the way in which teachers interpret events (for example, teaching Science in English), are influenced by their constructs, schema, dispositions and understandings, that included their background or basic knowledge that they received. The teachers' dispositions would determine the manner in which they recall old information and process new ones, and colour the ways in which they pass the knowledge to their students. The individual teacher is expected to influence the students' learning through the curriculum but research (Clegg, 2003) have shown that this is not usually the case due to several factors such as: (i) lack of clarity about new rules or reforms, (ii) lack of teaching skills, and, (iii) incompatibility with the existing school practices, especially when the medium of instruction has changed from one language to another language.

Studies linking instructional processes and teacher characteristics (traits) to students' achievement have shown that students' learning is not a simple direct consequence of the teachers teaching them (Dornyei, 2001). It is influenced by them (the teachers themselves) through their teaching methods, attitudes or dispositions, knowledge, experience, trainings, and motivation. The teachers' own characteristics such as their personalities, behaviors, and dispositions cast important impressions on the students' minds for learning to take place.

Figure 1.1, is adapted from the report by the Australian Ministerial Advisory Council on the Quality of Teaching (2000) because it resembled what the Malaysian Education System was going through. It showed the issues that were of concern and gave impact especially to the teaching of Science in English to the primary school students in Malaysia. The issues involved were the syllabus/curriculum implementation issues; social justice issues; and policy issues.

Figure 1.2 showed three main issues that were of concern at all levels in relation to the policy of using English to teach Science: (1) the syllabus implementation issues; (2) the social justice issues; and (3) the policy issues. The adoption of English as the medium of instruction has posed worries and concerns among the Malaysian educators and the public especially at the implementation level. According to *New Sunday Times* (July, 2002), these concerned parties are worried with the teachers' ability to use the second language (English) as the medium of instruction. They are also concerned that the teachers did not have the confidence and competence in using English to teach Science, thus affecting the process and effectiveness of teaching.

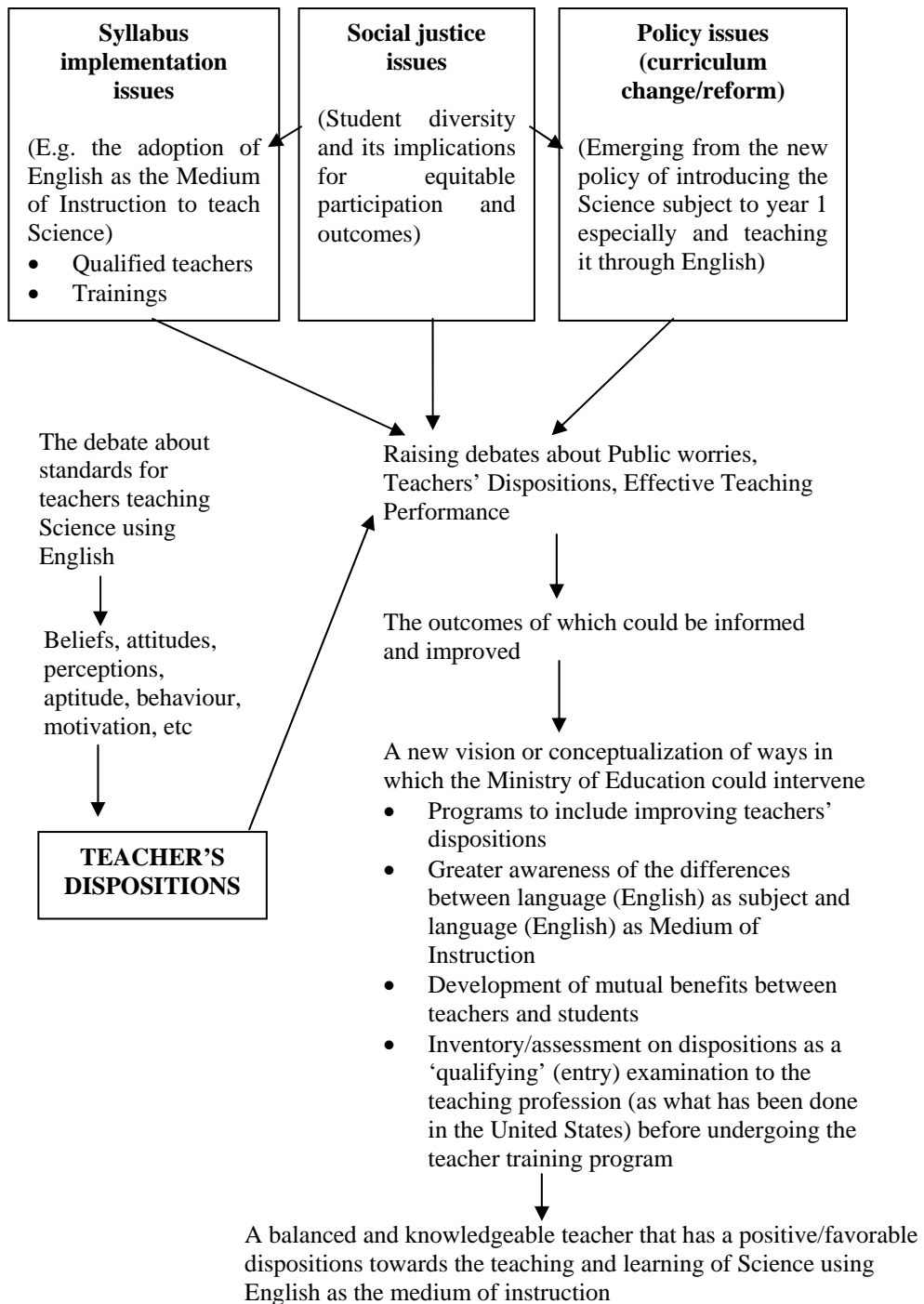
As seen in Figure 1.2, the public is also concerned with the social justice issues because students' diversities and abilities need to be taken into consideration. Teachers need to be confident and competent in order to be able to handle their lessons. Motivation and positive dispositions are important in sustaining and maintaining interest of the students and the teachers. Motivation

is a strong factor to be considered if we are to develop effective Science teachers (Dornyei, 2001).

From Figure 1.2, the policy issue showed another important area of concern and this included the curriculum changes and challenges. Razali (1999) stated that there were five factors that contributed to curriculum changes and challenges in Malaysia: (1) development in the government policy; (2) society's needs for continuous change; (3) the emergence or development of new knowledge; (4) new or innovated ideas introduced in the field of education; and (5) weaknesses in the existing policy or curriculum. In order to meet these challenges, teachers have to be prepared to play their roles in educating the future generations.

Conversely, it was crucial to look at teachers' dispositions due to the roles teachers play in the classroom. The effectiveness of imparting knowledge to the students would be based on the teachers' motivation in developing themselves to become effective Science teachers.

Figure 1.2: Issues of using English to teach Science



1.2 Rationale of the Study

Studying teachers' dispositions is rather new to the Malaysian education context. Although some forms of dispositions' assessments are done in selecting teachers for the teachers' training programs, emphasis is not made due to the lack of understanding on the importance of considering teachers' dispositions and their relationship with effective teaching performance.

Although dispositions' assessments are done in nursing programs (Katz, 2002), not much attention is paid in the area of teachers' dispositions in teaching. Prawat (1992) stated that good teaching was dependent, in part, on the personality factors and dispositions of individuals who wished to take up teaching as a career. It is important to choose the best persons/candidates who possess the appropriate dispositions so that we could develop them into effective teachers (Montross, 1954). Murray (1972) also shared the same view when he commented that with the appropriate dispositions possessed, will influence the behavior of teachers in many ways, such as interactions/communications with the students; methods selected; and also their pedagogical moves made in handling their classrooms.

With regards to what was happening in the Malaysian education system especially the curriculum change (using English to teach Science), the implication was that any teacher with the teaching qualification (regardless of areas or subject of specializations) is considered able to teach Science in English especially to the primary school students. The issues that were of

concern due to this curriculum change were: (1) subject matter which was Science; and (2) language of instruction, which was English.

According to Clegg (2003), if teachers want to teach their students a subject in the second language (English), when they are not fluent in that language, subject teachers (Science) are the ones who have to shoulder much of the burden of the students' language development rather than the language teachers. This issue, however, is overlooked by many parties that are responsible in developing and implementing this curriculum change. According to Bruner (1996) and Kennedy (1997), prior beliefs held by teachers hindered their learning about teaching. The policy makers and administrators have to take into account the importance of the teachers' dispositions that contributed to the confidence and self-perceived competence in using English to teach Science as well as the motivation for achievement.

As such, the importance of teachers' dispositions in the process of innovation and reforms cannot be underestimated. According to Nespor (1987), two teachers might have a similar knowledge of Science but would teach in very different ways because teachers' dispositions are more powerful than their knowledge in shaping the way in which they teach.

The advantages of identifying teachers dispositions rather than beliefs per se are: (1) dispositions are closely related to skills and practices, therefore, the focus seems to move away from the dicey topic of 'beliefs' only that involves the processes of the mind and personality characteristics; (2) dispositions could

be written at a convenient level of abstraction, not 'micro' and not 'macro', therefore, teacher trainers and curriculum planners might most likely agree on a set as a focus for developing a particular teacher training program; and (3) dispositions could be strengthened (motivated) by modeling as well as through developing appropriate attributions. These were some of the reasons why the term 'dispositions' has taken the center stage and not just 'beliefs' for this study.

Many researches (Combs, 1974; Pajares, 1992; Katz, 2002) showed that the beliefs held by teachers about education (the teaching profession) influenced the effectiveness of the teaching performance, and the level of motivation for achievement. This study adopted the term used by Katz (1985) where she offered an insight and introduced to the field of education the notion of 'dispositions'. In Katz's (1985) work, she used the term dispositions as 'a summary of actions' observed. Perhaps it was beneficial to change the focus of 'beliefs' per se to 'dispositions'. It was more appropriate according to her, to say that what was meant by dispositions was to strengthen certain dispositions in the teachers' repertoire, that is, dispositions that almost surely already existed in these teachers such as the level of confidence and competence in the teaching profession. When teachers already possessed a certain level of confidence and self-perceived competence, it was worth to examine whether these teachers would change their dispositions towards teaching if there was a change in the curriculum or policy.

At the macro level, this study has the potential to make three significant contributions to the field of education especially in Malaysia. Firstly, the

knowledge that is gained from this study would be valuable to policy makers and those involved in the education field for future implementation and innovation of curriculum or policies. The identification of teachers' dispositions that contributed to confidence and self-perceived competence in teaching provided the administrators a new approach to the task of preparing in-service and pre-service teachers in using English to teach Science. Secondly, the findings of this study could shed some light in developing assessment inventories in the process of preparing and training the pre-service and in-service teachers, with respect to subject matter and language of instruction. The administrators and the teacher-trainers could use this study as a form of guideline in developing inventory/assessment on dispositions as a tool to select teachers to teach Science in English. This approach could also be applied for teacher selection for the teaching programs, not just qualifying entry test but other means of clinical assessment in the area of motivation for achievement, dispositions, attributions, and personality assessments (Noran, 1992). This is to determine whether one is really interested in the teaching profession or merely as a last choice, when other job applications are not successful. Being an effective teacher needs interest, commitment, as well as motivation in facing lots of demands from the profession itself (Katz et. al, 1985). Thirdly, this study would hopefully be an important first step towards a focus on teachers' dispositions in teaching Science using English for continued learning and growth especially in the field of education.

At the micro level, significant contributions of this study to our knowledge of teachers' dispositions relates to two issues: first, the focus on teachers'

profiling, for example, the system of beliefs held by individual teachers; and, second, on the practical level, an understanding of teachers' dispositions could assist in designing professional development programs as well as teachers' training programs. It is hoped that awareness towards the importance of teachers' dispositions and motivation in relation to effective teaching performance, would produce better and quality teachers of Science specifically, and issues of quantity versus quality would be minimized.

This study on teachers' dispositions involved identifying teachers' dispositions that contributed to their confidence and self-perceived competence towards their teaching profession, and using English to teach Science. These dispositions that determined their level of motivation for achievement was discovered from their worries that included their concerns, challenges and expectations in relation to the language-related problems when using English to teach Science. It is hoped that through this study, curriculum developers, trainers, teachers, and the public would have an insight on how teachers' dispositions contributed to effective teaching especially the teaching of Science in English for the benefit of the future generations. It was important to identify quality and effective teachers than quantity but ineffective teachers for the future because students of today would be potential leaders of tomorrow. Therefore, molding the teachers with the appropriate teaching dispositions would provide good teaching and learning environment for the students and would definitely produce quality and knowledgeable leaders of the future.

1.3 Significance of the Study

Why would this study investigate dispositions? It was important to understand that this study carried various significances, especially to the teachers themselves, the public and also the education system.

According to Clegg (2003), subject teachers who taught in a second language were often confident about their subject, but not about their second language. His study showed that the teachers felt that they were not fluent in the language and thus developed dispositions about themselves (negative or positive) that contributed to their level of confidence and self-perceived competence in teaching that particular subject, thus affecting the process of implementation. The overall combination of the language-related problems was probably the major cause of the difficulties teachers encountered in their approach to teaching the Science subject. Hence, it was important to investigate whether the Malaysian teachers (especially the primary school teachers) faced the same problem/dilemma as claimed by Clegg.

The role of linguistic mastery in the teaching and learning of Science and in expressing the acquired knowledge has been the object of attention in many contexts (Clegg, 2003). As the result, this study clarified a few issues of concern in relation to this curriculum change. Teachers should be aware of the differences between teaching English as content specific and using English as a medium of instruction or English as language of instruction. According to Prawat (1992), positive dispositions developed produced good and effective teachers that gave benefits to all stakeholders. It was also important to note that positive

dispositions produce good environment for both teaching and learning (T&L) processes to take place. It is hoped that this study would highlight the issue of the importance of having positive/favorable dispositions and intrinsic motivation for achievement before committing oneself to the challenges of using English to teach Science.

Not surprisingly, there is a significant body of research indicating that teachers' dispositions about students, about teaching, and about themselves, strongly influenced the impact that they had on the students' learning and their development (Pajares, 1992). Specifically, there are three significant contributions what this study could offer. Firstly, the investigation of teachers' dispositions in using English to teach Science in relation to their confidence and self-perceived competence in teaching, and the level of motivation for achievement in becoming effective Science teachers in the future are new especially in the Malaysian context. Through this study would give insights on the importance of considering teachers' dispositions and the level of motivation for achievement so that better assessment criteria could be developed for future teacher training programs.

Secondly, the investigation on teaching dispositions would help in identifying a supportive teaching and learning environment. It could also reveal the changing of teaching dispositions in the teachers as they worked with the curriculum. The information gathered could help in developing strategies for Science teachers to teach with understanding (Eccles and Wigfield, 1995).

Thirdly, trying to understand the teachers' dispositions in relation to using English to teach Science and their motivation to become effective Science teachers is a step in identifying the 'behind-the-scene' realities of what happened in the classroom and the dilemma faced by the teachers within themselves (the confidence and self-perceived competence). Identifying teachers' dispositions and their motivation to become effective Science teachers would nevertheless determine the success or failure in implementing this curriculum change.

In general, this study helps us in providing a preliminary perspective on how teachers respond to new ideas, knowledge, technologies and instructional pedagogy, when dealing with confidence and self-perception of competence. These factors according to Pajares (1996), contributed to the development of positive or negative dispositions which are related to the level of motivation for achievement especially in using English to teach Science and to the teaching profession in general.

1.4 The Problem

Roberts (1998) reported that the study of teachers' dispositions formed part of the process of understanding how teachers conceptualized their work. In order to understand how teachers approached their work, it is necessary to understand the dispositions and the level of motivation that they operated from. Constructivist theories of teacher development saw the construction of personal theories of teaching as a central task for teachers (Rotter, 1982).

The issue that concerned the public as well as those involved in the field of education, especially teachers, was whether the policy of using English to teach Science (or English as the medium of instruction to teach Science) could be implemented effectively without considering teachers' dispositions, which was one of the important factors in contributing to the level of motivation for achievement in teaching. According to Dato' Seri Dr. Mahathir Mohamad (1993), Malaysia is undergoing a 'market-sensitive' education system, therefore, support from all parties especially teachers, students, parents and the community is very important. It is crucial for the teachers who played an important role in educating the nation, to be able to possess the appropriate (positive) dispositions to become effective teachers of Science for the benefit of our future generation. Due to this, this study attempted to explore the dispositions that the teachers held in implementing the policy, and how these dispositions are developed and influenced their level of motivation for achievement. Studies have proven that teachers' dispositions were important consideration for good teaching (Dornyei, 2001; Pajares, 1992).

As stated earlier by Nespor (1987), teachers' dispositions are more powerful than their knowledge in shaping the way they teach. The dispositions developed in the process of integrating the subject (Science) and the language (English) in teaching Science using English was the central issue for this study where teachers' dispositions are developed due to their language-related problems.

This study, therefore, had the overarching goal of investigating teachers' dispositions developed based on the language-related problems in using English to teach Science and the level of motivation for achievement in becoming effective Science teachers in the future. This study examined the teachers' dispositions towards their teaching in general; teachers' dispositions towards the Science subject; teachers' disposition towards the use of English as the medium of instruction to teach Science, and teachers' strategies (level of motivation) in coping with or avoiding their worries (concerns, challenges, expectations) on the issue of language (English), especially, and content (Science) in the classroom.

Through these identification of teachers' dispositions would shed some light on the role played by individual teacher's dispositions in shaping their teaching performance and becoming effective Science teachers. These issues are important to be considered if the policy is to be successful.

1.5 Objectives of the Study

Understanding teachers' dispositions and how they are related to changes in their teaching behavior provided valuable information especially for teacher educators and policy makers with regards to teacher preparation. This study aimed to investigate teachers' dispositions in relation to confidence and self-perceived competence in using English (as the medium of instruction) to teach Science and their level of motivation for achievement in becoming effective Science teachers. This was in light of the fact that English is not the first language of the teachers and the students.

Since the study on teachers' dispositions was quite new to the Malaysian education context (Noran, 1992); this study adopted a case study approach so that an in-depth study could be carried out. This is done in order to have a better understanding of the intricacies of the phenomenon under study, which was using English to teach Science. Teachers' dispositions in relation to confidence and self-perceived competence as the focus of the study, is among the important contributors to the development of effective Science teachers (Pajares, 1992). In the effort to gain in-depth data collections of the phenomenon, only a small number of respondents is used. The conceptual framework (Figure 1.4) acted as a guide in conceptualizing the issues of the teachers' dispositions and effective teachers of Science thus acted as the basis of developing a set of objectives for this study. In particular, the specific objectives of this study were as follows:

1. Finding out the respondents' worries in relation to their concerns, challenges and expectations that they have experienced in developing their dispositions in using English to teach Science (based on language-related problems).
2. Understanding the respondents' dispositions as teachers that contributed to their confidence and self-perceived competence based on adapted Katz's Framework on Dispositions of Effective teachers (1985):
 - a) Examining the respondents' dispositions towards the teaching profession in general

- b) Examining the respondents' perceived changes in dispositions in using English to teach Science
3. Examining the respondents' level of Motivation for Achievement in determining their success and failure in using English to teach Science based on adapted Weiner's Attribution Theory of Achievement (1986):
- a) Finding out how respondents view these attribution factors in contributing to their success and failure in using English to teach Science:
 - i) ability
 - ii) effort
 - iii) task difficulty
 - iv) luck
 - b) Finding out how the three attribution dimensions affected their achievement-related behavior (internal or external motivation):
 - i) locus of causality
 - ii) stability
 - iii) controllability
4. Establishing the dispositions that contribute to the level of motivation for achievement in facing the task of using English to teach Science.

Therefore in order to meet the above objectives on teachers' dispositions, several research questions were posed.

1.6 Research Questions

- RQ1. What were the respondents' worries in relation to their concerns, challenges and expectations that they have experienced in developing their dispositions in using English to teach Science (based on language-related problems)?
- RQ2. Understanding respondents' dispositions as teachers that contributed to their confidence and self-perceived competence based on adapted Katz's Framework on Dispositions of Effective Science teachers (1985):
- a) What were the respondents' dispositions towards the teaching profession in general?
 - b) What were the respondents' perceived changes in dispositions in using English to teach Science?
- RQ3. Examining the respondents' level of Motivation for Achievement in contributing to their success and failure in using English to teach Science based on adapted Weiner's Attribution Theory of Achievement (1986):
- a) How did the respondents view these attribution factors in determining their success and failure in using English to teach Science?
 - i) ability
 - ii) effort
 - iii) task difficulty
 - iv) luck
 - b) How did the three attribution dimensions affect their achievement-related behavior?