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A Policy Analysis of the Delivery of Primary and Secondary School Mathematics and Science in English

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This paper offers an analysis of the development and implementation of the policy to teach Science and Mathematics in English (PPSMI) in Malaysian primary schools, commencing in 2003, in the context of the 2009 reversal of the policy. The original study focused particularly on the impact of the policy on the children of the Federal Land Development Schemes (FELDA), arguably among the most economically disadvantaged groups in Malaysia, and with the least access to English Language. The analysis is set in the context of successive changes to the national language policy that followed, towards the Malaysian Education Blueprint 2013-2025, and the aspiration for Malaysia to achieve a developed nation status to compete in the increasingly globalised world economy.

Introduction

This paper offers an analysis of the development and implementation of the policy to teach Science and Mathematics in English (PPSMI) in Malaysian primary schools, commencing in 2003, in the context of the 2009 reversal of the policy. The original study focused particularly on the impact of the policy on the children of the Federal Land Development Schemes (FELDA), arguably among the most economically disadvantaged groups in Malaysia, and with the least access to English Language.

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Background

English was accorded the status of second most important language when Malaysia gained independence in 1957 (The Razak Report, 1956).The Razak Report led to the Education Ordinance (1957) which presented the government's blueprint to create a national education system with a common examination for all, aimed at fostering national integration post-British colonialism. English was previously established as the medium of instruction, especially in the Christian missionaries' schools. The constitution permitted vernacular, or traditional Malay 'sekolah pondok' or village schools taught in Malay and Arabic, while Chinese primary schools used Mandarin and Indian schools used Tamil. Ultimately, the goal was to make the official language Malay, the medium of instruction. In 1957 only 2,315 (2.9%) Malay students were enrolled in Malay medium schools while 48,235 (59.8%) enrolled in the English medium schools (David & Govindasamy, 2005:133). This worried Malay nationalists as the main purpose of this policy was to eradicate "identification of race with economic function and geographical location" (Wong & James, 2000:214).

The Rahman Talib Report (1961) introduced a series of educational reforms designed to establish a national policy to preserve the identity, language and culture of the Malays and establish Islam as the official religion of the country. Emphasis was on a Malaysian oriented curriculum which concentrated on the 3Rs, reading, writing and arithmetic; schooling was extended from nine to 11 years; and upper secondary education offered two streams, academic and vocational (Mohandhas, 2011).

After racial riots in 1969, the newly established government implemented the New Economic Policy (NEP) in 1970 with the rationale that a national identity would be ensured by the use of one common language, the Malay language, in all fields including education. The NEP also aimed to bring about a better balance between Malays and non-Malays in the university sector. To reduce disparity between rural, urban and non-Malays the 'quota

system' for entry to the university was initiated. Although Malay nationalists considered this move timely, intellectuals had reservations. They were concerned about the 'suitability of the Malay language for academic purposes, given its development at that point in time' (David & Govindasamy, 2005:135). The concern was based not only on the need for book translations into the Malay language but translations of the more difficult technical language of Mathematics and Science (Asmah, 1981:76; Suhaimi, 1981:273)

Phasing out of all English medium schools to university level was complete by 1983 and a new primary curriculum, Kuriculum Baru Sekolah Rendah (KBSR) was introduced. Although in theory the changes were designed to foster a common Malaysian identity, in practice it was more Malay and, progressively, more Islamic. Malay nationalists, regarded the policy change positively as they felt that the rural Malays had little chance to improve their English proficiency level and therefore progressively fell behind other races and the city Malays (Gill 2005:246; Azman,2006:103). It must be noted that Tun Mahathir Mohamad, then Education Minister, mooted this idea.

Tun Mahathir Mohamad, then Prime Minister stressed in his keynote at the launch of the VISION 2020 (28th February 1991), that the main goal was "the creation of a Malaysian nation that was truly developed by 2020." Of the nine challenges spelt out in his paper, five were educational goals. The sixth particularly stood out:

> the challenge of establishing a scientific and progressive society, a society that is innovative and forward-looking, one that is not only a consumer of technology but also a contributor to the scientific and technological civilisation of the future.

The statement signalled need for improvement in universal education and English language proficiency. Historically, Malaysia experienced a shortage of trained teachers. All teacher

training in Malaysia is the responsibility of the Ministry of Education and by 1998 there were 28 teacher-training colleges (Information Malaysia Yearbook 1998:514). The 7th Malaysia Plan (1995:311) reported a shortage of 4,600 Mathematics, Science and English teachers at the secondary school level. As early as 1992, Gaudart (1992:31) observed that the teachers sent to the rural areas lacked proficiency in English language and language teaching skills and therefore needed remedial instruction. In 1999 (NSTP 31.1.99) the government required other subject teachers to undertake retraining to reduce the acute shortage of English language teachers.

Unemployability of Malay Graduates

The UMNO Vice-President, Muhammad Muhammad Taib, opening the Sixth Malay Language and Literature Congress (September 2002) said that 90% of the unemployed Malays were unable to speak English well, and asked how they were supposed to represent the country on the global front (NSTP 6.9.2002). This concern was echoed when data collected in 2002 showed that 94% of unemployed graduates were Malays (NST 13.5.2002). The 2005 Economic Planning Unit census showed 60,000 unemployed graduates had applied for jobs through the Human Resource Ministry (NSTP 3.11.2005). The Science, Technology and Innovation Deputy Minister Datuk Kong Chu Ha cited poor communication skills in English as a major factorhindering graduate employability, arguing that, "In an era where the emphasis is on knowledge workers and human resource capital, the lack of communication skills among graduates needs to be tackled quickly" (NSTP 11.12.2005). Globalisation has led to a desperate race in many countries to upgrade the skills of their workforce faster than their economies are being forced up the value chain (Graddol 2006:70).

In the 8th Malaysia Plan, (including the first part of the Vision 2020 plan), Prime Minister Tun Mahathir Mohamad identified education and resource development as key factors in the march

towards the knowledge-based economy and technological excellence, essential for achieving developed-nation status (NSTP 3.4.2001). However, the 9th Malaysia Plan (2005) announced by Prime Minister, Datuk Seri Abdullah Badawi, moved into the second part of Vision 2020, with Malaysia still striving towards "developed nation status' (NSTP 31.9.05). In 2008 of the 47,910 unemployed graduates, 41,813 were Malays; in 2010, 90% of 30,000 graduates who could not find employment were Malays (Lopez, 2011). These figures were incompatible with the government's drive for a world-class education system.

The Quality of English

In 1996 Prime Minister Tun Mahathir Mohamad promoted the need to improve the quality of English and to achieve a good foundation in the subject, as English was the medium of instruction for various academic disciplines in the universities (NSTP 12.10.1996). In 1998, Pillay argued that "a quantum leap was needed to improve English standards" (cited in Wong & James, 2000:219). The private Higher Educational Institutions Act (1996) allowed courses to be conducted in English with the approval of the Minister of Education. The pursuit of higher learning through the Malay language has been severely hindered by the lack of printed materials. Most book translations had to borrow rhetoric and lexicon of the English language. Malay learners have difficulty translating into the Malay language information gathered from various sources, especially since most are written in English. Thus there was a need for the Malay learners to improve their English language in order to succeed in higher education.

At secondary level, the Sijil Pelajaran Tinggi Malaysia (Malaysian Certificate of Education) English paper was reformatted in 1997, increasing the level of difficulty. This move was to ensure the validity and quality of the examination, so that the results would be accepted at foreign centres of learning. All Malaysian students who went overseas had to take other tests, such as the Teaching of

English as a Foreign Language (TOEFL) or International English Language Tests (IELTS) because English Language proficiency grades from Malaysia were not internationally accepted (The Star 5.4.1998). In 1999, The Malaysian University English Test (MUET) was introduced to measure English language proficiency levels of pre-university students. Prospective degree students in Malaysian institutions of higher learning are required to take this test (Koh, 2005:vi). In 2015, when tabling the Budget, Prime Minister Datuk Seri Tun Najib announced that "the minimum MUET band to enter public universities will be raised based on the students' field of study" (The Star,M'sia, Stareducate: 19.10.2014:8). Medicine and Law would require a Band Four. The Budget 2015 seeks to strengthen education plans and policies already in place.

As part of Malaysia's globalisation process, the 'Smart School Program' was announced in 1997 (The Star 4.4.1997). The concept was to enhance learning by using extensive multi-media technology; the country's 10,000 schools were to be converted into smart schools by equipping them with information and communications technology (ICT) by 2010. However, as the medium of education was still the Malay language, and all available multi-media programs were in English, they had to be translated into the Malay language before the program could be feasible.

On May 7th 2002, Prime Minister Tun Mahathir Mohamad announced that English-medium schools would be reintroduced if the citizenry wanted it (NSTP 7.5.2002). Two newspaper polls produced mixed responses: The Star newspaper showed that 97% or 4,142 respondents were in favour of reviving English–medium schools (NSTP 13.5.2002); the New Straits Times (NSTP), reported more than 70% of 1,089 votes supported the move, while only 24% defended the current Malay Language system. On 21st July 2002, the Education Minister, Tan Sri Musa Mohamad announced the Malaysian Cabinet's approval for implementation of English as the medium of instruction for Science and

Mathematics in Primary 1, Form 1 and Lower Six. Musa stressed that this decision was "imperative in order that students have a solid foundation in Mathematics and Science" and as a means of enhancing students' knowledge in the two subjects and "not really a platform for them to study English", because the "bulk of information and knowledge in Science and Technology was in English" (NSTP 21.7.2002). In March 2003, Prime Minister Tun Mahathir announced that it was mandatory for every Malaysian to know and master English as it had become an international language. He did not want people to make an issue of learning a foreign language in relation to nationalism if the end product was good for the nation (The Sunday Star 17.3.2003).

The teaching of Mathematics and Science in English (ETeMS) policy

The teaching of Mathematics and Science in English (ETeMS), better known as Pengajaran dan Pembelajaran Sains dan Matematik dalam Bahasa Inggeris (PPSMI), was the Prime Minister's strategy for improving the standard of English. In August 2002, Deputy Prime Minister Datuk Seri Abdullah Badawi declared that national-type Chinese and Tamil schools would not be excluded from this policy change as it aimed to provide the younger generation with an opportunity to master English and to ensure that all students underwent the same curriculum (NSTP 2.8.2002). The Indians and Chinese sought immediate assurance that the character of the Tamil and Chinese schools would be safeguarded as enshrined in the Education Act of 1996. They also wanted assurances that all subjects other than the English language, the Malay language, Mathematics and Science, would continue to be taught in Tamil and Chinese languages respectively.

Malays were apprehensive that this policy change would diminish the status of the Malay as the language of Education in the country. On Friday 10th May 2002 the United Malay National Organisation (UMNO) the majority component of the ruling

National Front party Supreme Council rejected the proposal to give more prominence to English in all subjects and instead called for the teaching of Mathematics and Science subjects in English starting from primary schools (NSTP 13.5.2002). Datuk Seri Najib Tun Razak, then Education Minister criticised rural Malays for continuing to regard English as a legacy of British colonialism, but these Malays were the most disempowered group, with least proficiency in English. Implementation of this new policy was intended to bring about an increased exposure to English (NSTP 26.5.99), but it was a language for which they had no use in their rural townships.

Fears about social and education disadvantage of rural children were attributed to colonial practices of the pre-independence era (Gill, 2005:246; Azman, 2006:103). Rural Malays also believed that learning and speaking English was not patriotic (The Star, 29.1.2000). Differences in belief, between rural and urban Malays, especially those from rural non-English speaking environments such as the FELDA townships caused them to fall behind urban Malays (Chandrasegaran, 1979). Prime Minister Tun Mahathir condemned the erroneous belief that rural Malay students had about learning English. Tun Mahathir acknowledged English as the lingua-franca in business and commerce and stated that this was the reason why the government wanted to raise standards in English for Malaysians (NSTP, 13.5.2002). Education Minister, Datuk Seri Hishammuddin Tun Hussein reassured teachers attending the 2003 English Language Teachers' Conference that use of English in the teaching of Mathematics and Science was not "a policy reversal" but instead a 'response to the country's emerging needs' (NSTP 3.12.2003).

The New Straits Times Press identified three factors that would determine the success of this policy: well-distributed resources; effective methodology; and the passion of the teachers (NSTP 31.12.2002). This study focused on implementation of the EteMS policy.

The Study

The research reported in this paper offers an analysis of the development and implementation of the policy to teach Science and Mathematics in English (PPSMI) in Malaysian primary schools, commencing in 2003. The framework for this policy research was modified from Vidovich's (2002, 2007) expansion of Ball's model of the policy cycle (Ball 1994a), reflected in Figure 1. The investigation involved an examination of the relevant theoretical and empirical perspectives regarding the Context of Influence, the Context of Enactment and the Context of Practice, as it is these contexts that reveal "what governments do", and "the goals to be achieved" (Dudley & Vidovich 1995:14). It can clearly be seen how in Ball's terms this policy was both a 'process' and a 'product' (Ball 1994b, 2006; Ozga, 2000).

This policy trajectory study traces the process of the Malaysian language policy change from the context of influence through to the context of enactment to the context of practice where this study is situated. The three levels or contexts, of Influence, Enactment and Practice, are interconnected and together facilitate explanation of this policy change. In a policy analysis of this nature, understanding each context contributes knowledge that enables a more thorough and 'complete picture' to be produced (Vidovich, 2002). It captures the tensions of policy development at the Macro, the Meso and the Micro levels. The main focus of this study was on the context of practice but this context cannot be fully understood, without first situating the policy in the other two contexts of influence and enactment. Vidovich's framework combines Ball's pluralist ideas with conceptions of a globalised market and to produce an understanding of the influences on the policy of each developing country (Vidovich, 2002).

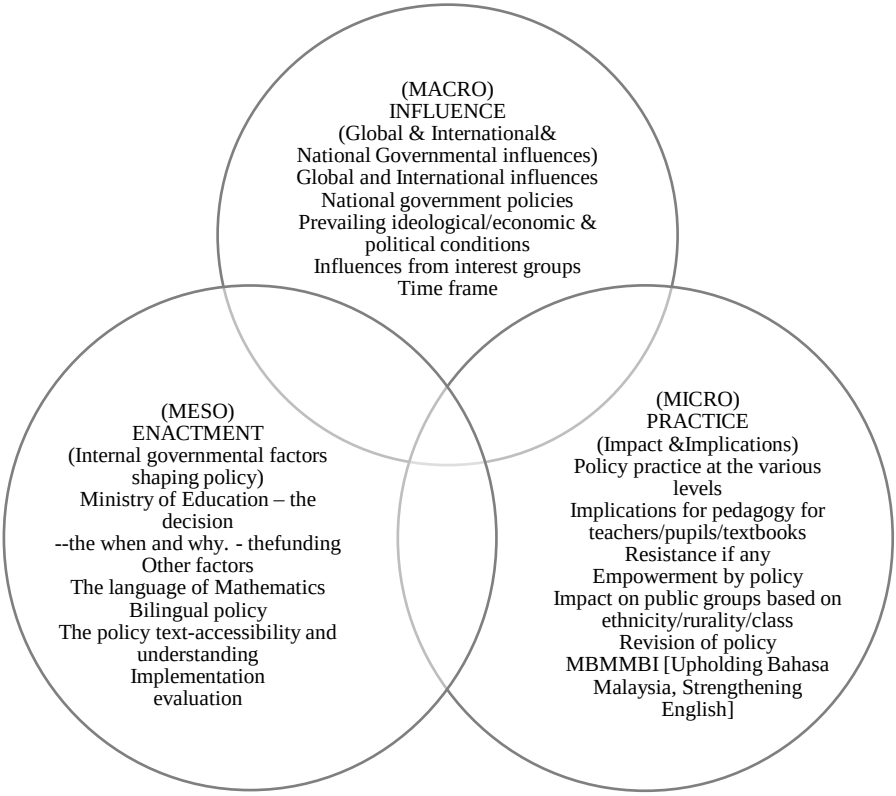

Figure 1: Context of Change (adapted from Vidovich's Framework 2002; 2007)

Location of the research: The Federal Land Development Schemes (FELDA)

This study focused on the effect of the policy on the children of the FELDA (Federal Land Development Authority) schemes. Little townships were established throughout Malaysia in the 1950s by sponsoredfederal government schemes to uplift the economic status of the rural Malay population. These land schemes administered by a board accountable directly to the Deputy Prime Minister were situated in remote rural areas where large tracts of jungle were cleared for agricultural development. FELDA schemes were to plan and implement land development by promoting effective agricultural practices among poor Malay settlers and encouraging progressive and disciplined community development. The areas selected for these schemes were forested regions far from the urban areas (NSTP, 29.8.2007).

These townships are 100% Malay settlements and Muslim communities. The only languages spoken are Malay and their own dialects such as Javanese (an Indonesian dialect). There is a lot of code-switching between the two languages. This mixed lexicon results in a different variety of Malay which differs from formal or school Malay (Pakir, 1993). Alongside their formal education, students attend religious or 'Agama' schools where they are taught the Islamic scriptures in Arabic, yet another language to master. Almost no English is heard or spoken outside language classrooms as there is neither opportunity norneed for it in the townships. Even television programs in English are rarely watched. Learning English in schools is like learning a foreign language as there is little contact with the nearest town where there might be some exposure to English.

Findings and Discussion

The Context of Influence (Macro level)

As Education Minister in 1970, Tun Dr Mahathir Mohamad changed the language of instruction from English to Malay for nationalistic reasons (The Sun 17.3.03). Thirty-two years later, as Prime Minister, Tun Dr. Mahathir to promote Malaysia's international competitiveness in global trading reversed his view and urged a return to English as the language of school instruction (Table 1). However, as Mahathir insisted, it was crucial to guide Malaysia into the global arena where it could achieve the 'status of a fully industrialised and developed country' (Mahathir, 1991). Here, Vidovich's utilisation of Ball's ideas provides for a theoretical framework within which globalisation influences on policy in a developing country can be shown. Vidovich's application of Ball's ideas provides a theoretical framework within which globalisation influences on policy in a developing country can be located.

Table 1: Changes to Education Policy under Tun Dr Mahathir Mohamad

Role	Year/s	Changes
As Education Minister (1970-1983)	1970-1983	English Education phased out in favour of Malay All levels completed in 1983
As Prime Minister- (1981-Oct 2003)	2002	Wanted to revert medium of education to English
	2003	Succeed in getting cabinet support for 2 subjects- Mathematics & Science - to be taught in English
	2009	Retired but still consulted by Education Minister on reversion
	2011	Voiced opposition to change

The 'top-down' policy to teach Science and Mathematics in English (PPSMI) in Malaysian primary schools implemented in 2003 was decided at the Cabinet level without prior consultation with Ministry of Education officers or the teachers who would implement it. The decision to put the policy into practice within six months left the education Ministry and the teachers with little option.

By January 1st 2003, seven months from the first announcement, the policy was in place. Ill-prepared teachers and students throughout the country were forced to carry out the change-over, teaching and learning Mathematics and Science completely in English. According to Asiah Abu Samah (2008), the former director General of Education in Malaysia, in mid-2002, with only six months to prepare, the curriculum division was tasked with preparing the materials which included text books, CDs, workbooks and guide books for the teachers. A special committee headed by the Minister of Education rejected the packages, and the division was tasked with redrafting the whole syllabus to be completed by September 2002. The task of preparing the materials based on the new revised syllabus was then given to book publishers who were required to have the English language textbooks ready for distribution by January 2003 (Asiah, 2008:172).

The decision to revert to English for Mathematics and Science was not met enthusiastically by the Ministry of Education or the teachers, the majority of whom were taught in Malay in the universities and knew all the Mathematical terminology in Malay. The teachers were not prepared to teach in a completely new language, English. They would first have to be proficient in English and only then could they translate the concepts of Mathematics into English.

The minority ethnic stakeholders, the Chinese and Indians, also voiced unhappiness about this change, as it meant that their mother-tongue subjects would be jeopardised in the vernacular

schools. Vernacular schools had been guaranteed autonomy by law, so they naturally felt insecure with these changes. Datuk Seri S. SamyVellu, the President of The Malaysian Indian Congress (MIC) - a major Indian component party within the National Front - conditionally accepted the use of English on behalf of the Indians (NSTP 11.8.2002). He said that in the vernacular schools 58.6% of the teaching and learning time would be in Tamil while only 41.4% would be in the Malay and English languages (Sunday Star 11.8.2002).

Datuk Seri Dr Ling Liong Sik, the President of The Malaysian Chinese Association (MCA) – a major Chinese component party within the National Front - while fully supporting the change, asked that careful and comprehensive studies be conducted to produce effective strategies to implement these new policy changes. He said that there were 600,000 pupils in Chinese schools nationwide in 2003 as compared to 240,000 in 1967 and of these about 10% were non-Chinese (Sunday Star-Nation 11.8.2002). In August 2003, the MCA and the National Headmasters Union agreed to a common stand on the use of Mandarin in the medium of teaching Mathematics and Science in Chinese schools. It was also agreed that Mandarin be made the principal medium for all subjects in examinations in the Chinese schools (NSTP 29.9.2003). Mathematics was taught in Chinese and English as two subjects in the timetable and the examination papers were set bilingually as well (that is, the questions were printed in English with the Chinese translations below each question). This practice applied to all mediums. In 2003, even though the then Prime Minister tried to allay fears by issuing a statement that "there was no necessity for other subjects to be taught in English", the Chinese and Indians were not satisfied (NSTP 29.1.2003).

In 2009 Tun Dr Mahathir conducted an online poll through his blog to gauge the people's attitudes to the abolition of the PPSMI, and reversion to the Malay language and vernacular languages in phases starting 2012. About 80% of 26,000 poll respondents did

not support the teaching of Science and Mathematics in the Malay language. Dr Mahathir defended the policy by saying that "It is not about trying to learn English or Malay... it is simply an acknowledgement that today knowledge comes to us in the English language" (BERNAMA, 10 July 2009). When asked about the transition from the PPSMI into Memartabatkan Bahasa Melayu dan Memperkasakan Bahasa Inggeris (MBMMBI), a policy to "uplift the usage of the national language and strengthening the command of English" among school students announced in 2009, he expressed support for such a move as an advocate of the usage of the national language, with a caveat:

> However, when it comes to the future of our country, I have to be practical and make the necessary decision. I don't want Malaysians to be ignorant in this age of Science and technological developments. If we cannot master the knowledge of Science, we will not progress. We won't be able to take the country to new heights in terms of scientific development … the issue had nothing to do with being disloyal towards the national language (ibid).

In 2011, Tun Dr. Mahathir Mohamad expressed concern over the reversal of PPSMI policy. The former Prime Minister feared the country would lag in terms of scientific development and knowledge when the two subjects are reverted to being taught in the Malay language:

> The idea of teaching Science in Malay is like taking a step backwards. Not that I don't have any respect for my national language but the fact is that Science is a different subject. It is not a static knowledge. It keeps on going and improving. Everyday people do research and come out with new developments in the scientific field (NSTP, M'sia, 5.11.2011).

He went on to say that he hoped he could stop the government going back to using Malay to teach Mathematics and Science but he was no longer in power and therefore had to accept the government's decision although "it may not be that good for the country" (ibid).

The Context of Enactment (Meso Level)

The Government's proposal was to implement this policy in stages, to give 147,000 teachers and students time to adjust to the changes (Figure 2). From 2003 all public examinations – UPSR (The Primary School Evaluation Examinations), PMR (The Lower Secondary Examinations, SPM (Malaysian School Certificate Examinations), and the STPM (The Pre-University Examinations) were bilingual with questions in both English and Malay. Students could answer either entirely, or partially, in one or both languages during this interim period (ibid).

		2003	2004	2005	2006	2007	2008
	Year 1	•	•	•	•	•	•
	Year 2		•	•	•	•	•
	Year 3			•	•	•	•
	Year 4				•	•	•
	Year 5					•	•
	Year 6(UPSR)						•
	Form 1	•	•	•	•	•	•
	Form 2		•	•	•	•	•
	Form 3 (PMR)			•	•	•	•
	Form 4				•	•	•
	Form 5 (SPM)					•	•
	Lower 6	•	•	•	•	•	•
	Upper6 (STPM)		•	•	•	•	•
	Matriculation		•	•	•	•	•
	Polytechnics						•
	Universities			•	•	•	•

Figure 2: Dates for the implementation of the teaching of Mathematics & Science in English (adaptedfrom Sunday Star, 21.7.2002:2)

In 2000, the first batch of 413,358 students who were taught Mathematics in English from Form 1 sat for the PMR (The Lower Secondary Examination). Only 27% of these students answered the Mathematics paper completely in English, while the rest used a mixture of Malay and English. The Education Director-General Dato Dr Ahamad Sipon reported that after only three years of implementation, the English language results were the best achieved so far (NST On-Line, 24.12.2005). Matriculation colleges had to teach Science and Mathematics-based subjects in English from 2004, while polytechnics had to do so by 2008 when they took in the first batch of SPM students trained in English. All public universities made the switch to English as the medium of instruction in Science and Technology subjects in 2005 when the first batch of STPM students taught in English gained admission to the university. The sequence of these changes is reflected in Figure 2.

The Ministry of Education in Malaysia manages the whole education system for the country and implements the policy changes as instructed by the Cabinet. In implementing the PPSMI, its first task was to retrain all Mathematics and Science teachers. The first set of trainers hired were English language teachers and this caused problems as the Mathematics teachers found it hard to accept trainers with little or no knowledge of Mathematics.

For very senior teachers, implementation meant reverting to English (in which they had been instructed years earlier) and brushing up their vocabulary; for younger teachers who had only studied in Malay through school and university, a complete and drastic change was required. Exacerbating the problem, the language of Mathematics has specialist terminology, so a mediating language (Malay or English) was necessary to help students understand mathematical concepts and processes. Teachers and students needed to be proficient in the mediating language. With the introduction of English many problems of translating and understanding arose and festered for the next five years.

Following constant public criticism and resistance, the government reviewed the policy in 2008. Asiah Abu Samah (2008:328) had lambasted the 2002 policy as "a classic case of a top down decision made at the highest political and Ministerial levels without much consideration of expert educational opinion". A noveloutcome was public demand for flexibility rather than uniformity in federal policy. There were requests for the blanket standardisation which had applied since the Razak Report (Malaya 1956) to be replaced by flexibility in the language of assessment. The need for decentralisation and flexibility was acknowledged in some aspects of development in the 10th Malaysia Plan 2011-2015 (Malaysia 2010).

The five Round-table Conferences held in 2009 were influential in shaping government thinking and produced seven alternatives. The objective of these conferences was to gather opinions and facts before a final decision was presented to Cabinet. The main issues discussed were the position of the Malay language, the decline in English language proficiency and the effectiveness of English as a medium of instruction for Mathematics and Science. As a participant observer of the 5th Round-table Conference on the policy recommendations, the researcher was privy to the final discussions among teachers, bureaucrats and Muslims.

It was a foregone conclusion this policy would be changed significantly because the repercussions were seriously affecting the government's political standing. It was obvious what the ultimate choice between the use of a foreign language, (English) versus the mother tongue (Malay for the Malays, Mandarin for the Chinese and Tamil for the Indians) would be. It was a notable shift from the fatally flawed 'top-down' policy implementation in 2003, when the voices of the teachers and students were not heard.

Interestingly, a powerful urban lobby group, the Parents Action Group for Education (PAGE), which emerged from the on-going debate between 2003- 2009, fought and is still fighting for the continuation of this original policy. PAGE, the majority of whose

members are well educated and speak English, advocated the possibility of a dual language use and proposed that the choice of the language should be decided at the school level (The Star, M'sia. 7.3.2013).

In March 2013, Datin Noor Azimah Abdul Rahman, Chairperson of PAGE, commended the Deputy Prime Minister, who also was the Education Minister, for considering making English a 'compulsory pass' subject in SPM in five years' time. He suggested that acknowledgement of the importance of this proposal be ensured by including it in the Malaysia Education Blueprint 2013-2025. As mentioned earlier, the sixth goal of Vision 2020 (28.2.1991) was one reason Tun Mahathir pushed for the PPSMI policy to pave the way forward. PAGE argued that PPSMI enabled students to absorb scientific knowledge at a faster pace, improving students' proficiency in English and providing a "seamless transition into a scientific higher education" that would enable the young to keep abreast with "improvements in the best practices of Science education in the world" (The Star, M'sia. 7.3.2013). Datin Noor Azimah Abdul Rahman felt that the seriousness of the government intention to enhance English was further stunted by the new policy, Uphold the National Language, Strengthen English (MBMMBI), where language immersion hours in English were reduced to only five hours per week, an increase of one hour for the lower primary and seven hours for the upper primary.

The Context of Practice (Micro level)

In the context of practice, in a 'top-down' trajectory policy process, there would appear to be no choices choice other than to carry out the instructions. Vidovich's trajectory framework proposed a 'bottom-up' process which was missing in the original case of Malaysia. However the 'bottom-up' process can be seen to have emerged in 2009 when there was talk of a reversion and the focus was on the teachers as the cause of policy failure.

In 2002, RM 5 billion was allocated to the Education Ministry to ensure effective and the smooth transition into the PPSMI policy. A large portion went to the training of teachers and a launching grant for schools and computer labs for all schools (Mahathir 2002b). Teachers were also supplied with computer notebooks, LCD projectors and related equipment (The Star 21.9.02). Between 2002 and 2007, a further RM2.21 Billion was spent, of which RM317 million funded teachers' retraining programs, RM638 million on Mathematics and Science teachers' incentives, RM2.21 billion on computer equipment and RM2.4 million on software. This news was not well received by opposition political parties (Malaysiakini, 14.5.2008). It would seem that the government was serious about ensuring the success of this policy, but lack of in-depth study that should have been carried out across the country, involving both rural and urban schools prior to its implementation, impeded its smooth acceptance.

There was little doubt that teachers all over the country tried to carry out the original instructions, but with varying degrees of success. Participants of this study, who were officers from the education department at the district level, principals and teachers of schools in the district and FELDA schemes, were actors in this process.

One participant, a senior officer **(ED1)** at the district level reflected the general acceptance of the policy change:

> **ED1** We are living in an increasingly borderless world & this means a free flow of ideas as well. The major link between countries today is language, specifically the English Language. This makes English a major & useful communication tool… Previously the workforce was concentrated only in Malaysia. Today however we have our workers working abroad in global companies & they have to be proficient in English in order to do this. Under present employment conditions, mastery of English is very important (Mohandhas, 2011:140)

This study focused on the opinions of the FELDA teachers in one particular district, and therefore is not representative of all micro level participants. While the FELDA teachers understood the international trade and global competition issues driving the policy, they did not consider this policy change desirable for their already disadvantaged rural students. They believed that the majority of these students would be unlikely to leave the FELDA schemes, and might never need to use or listen to the English language.

Teachers were not always able to maintain teaching in English as the weaker students had to be taught in mother-tongue (Malay) for Mathematics learning at all to take place. The government policy-makers had failed to recognise teachers' confidence in their ability to use English and their ability to negotiate through the concepts of Mathematics, and most importantly their students' willingness to be empowered in English asfactors crucial to the success of this policy. One principal reflected on the importance of the culture in the school:

> **P3...**it is the culture of that school that forms the teachers' attitudes eventually. I believe if the Administrator of the school, its Head is active, proactive and goes against all odds in favour of teaching in English, I'm sure the teachers will follow suit.
> But if the Pengetua (principal) is quite active in this matter, very supportive, always doing his or her rounds, then it makes a big difference… If you have FELDA Principals who are quite hesitant in practicing English or promoting English or supporting teaching in English, I'm sure the teachers themselves will be lax in their teaching of Maths and Science in English…(Mohandhas, 2011:147)

One participant, a principal **(P1),** found it difficult to enforce the policy at his school as his own proficiency in the English language was low. He also found it difficult to gauge the proficiency level of his teachers and therefore he left the responsibility of enforcing and carrying out the policy to his department heads of Mathematics and Science:

> **P1** My English itself is weak & I feel I myself was not made fully prepared by the Education Ministry & State Education Department for this transition to teaching Maths in English. Therefore I had problems & because I had problems, my teachers also had problems. So, do I have to say much about the fate of the students? (ibid: 142)

The teachers, in comparison to the education administrators, appeared to have a rather mixed attitude to the long term practice of teaching Mathematics in English. There seemed to be some recognition of the importance of English in the long term and for tertiary purposes. However, the paucity of spoken English in FELDA schemes was clearly a major obstacle for teachers struggling to teach in English. Some felt confident and agreed that sufficient training had been provided to help them use English to teach the complexities of the content material in Mathematics and Science. It was a challenge for them to use the vocabulary of technical terms and ensure their students understood and could verbalise Mathematics and Science concepts in English.
One positive teacher **(TR1)** who grew up in a home where English was used commented:

> **TR1** I don't have a problem at all. This is because I was brought up in a family which uses English as a second language. In University also, English is also what they use. So, it is not a big deal for me. (ibid: 144)

Two other Malay teachers **(TR2)** and **(TR3)** were apprehensive as they said:

> **TR2** At that time I did not know how to teach Maths in bahasa Inggeris (English Language). Then, even my students could not follow. (ibid: 144)

> **TR3** For me, there was a great difficulty initially with Mathematical terms. They were so different from what I was familiar with. But I could cope. Even then, in class I would sometimes state the math terms in English but end up explaining the lesson in Malay. This is despite the fact that the

> Mathematical terms and questions are written on the board in English (ibid: 144)

In classes where English proficiency was better, students fared better in their academic performance in Mathematics and Science despite an initial drop in their results. Once they learned the vocabulary and understood the concepts in English their performances improved. The longer and wider exposure to English also improved their proficiency in English. The majority of the students in this study belonged to the lower proficiency in English group and therefore, found learning Mathematics and Science in English even more difficult. A principal **(P1)** felt that there could be a 'dual language' used instead of causing confusion in the classrooms:

> **P1** I think more should have been done, especially with non-English speaking rural FELDA students & weaker students in mind. The policy should have included allowances for teaching in dual language & teaching wholly in Malay for weaker students. This should have been done as a strategy of familiarisation for students, instead of turning things around 180 degrees & causing confusion in the classrooms.

A teacher agreed:

> **TR3** I feel teaching in English is only suitable for the bright FELDA students and the rest should continue to be taught in Malay. For those students with poor English they will still have a bright future even if they are put in Vocational schools. But I feel there are also many intelligent FELDA students with potential and these students should be pushed to strive harder. After all, I am a FELDA child myself. (Mohandhas, 2011:162)

A contributory difficulty in implementation of this policy was incentives offered especially for Mathematics and Science teachers (NSTP 9.1.2003). At the school level the teachers to teach the specific classes were selected by the principals of the individual schools. However, incentives offered by the Public Services Department (PSD) to all English, Mathematics and

Science teachers at all levels (ibid) created competition from teachers trained in or teaching other subjects (NSTP 29.01.2003). Not all teachers met the eligibility conditions specified in the Education Ministry circular. Teachers not specialised in Science, Mathematics or English would have to teach for three years before qualifying for the incentive allowance. This caused frustration among teachers as more than 50% did not qualify. An unhealthy situation occurred when teachers saw that although all did the same work, some were not eligible for the incentive and were less willing to make the effort to teach in English (**Mas Nida Md. Khambari et al;** 2010:556).

Initial results of the PPSMI policy

The importance of English to Malaysian parents was demonstrated in a 2005 survey by the Merdeka Centre. Eighty percent of students attended extra English classes, and about 75% attended Mathematics classes, at a cost of RM 360 million a month or RM 4.3 billion a year. Parents saw tuition as indispensable as they feared their children might not be able to do well in these subjects (NST Online, 24.12.2005). The Opposition party (PAS) tried to foster political unrest over the issue among the rural population in the East coast of Peninsular Malaysia, but Education Minister, Datuk Seri Hishammuddin Hussein, denied any"grounds for critics, or even skeptics. to question the effectiveness of the policy". Hishammuddin suggested that the success of this policy change would be demonstrated by the results of the PMR or Penilaian Menengah Rendah (The Lower Secondary Evaluation Examination) (NSTP, 20.11.05).

The results showed improvement, assuaging community concerns about the impact of change in the medium of instruction. Although passes recorded for Mathematics reached 84%, only 27% of students answered Mathematics examination questions in English. Many who were used to the Malay language, used English Mathematical terms as they had studied them in English from Form 1 of secondary education. Examiners noted that more rural

students still opted to use Malay rather than English (The Star Online. 23.12.2005). Students had the option of using Malay until 2008 after which they were to use only English. The pioneer batch of primary six students who were taught these subjects in English from Year One in 2003 did significantly better (The Star 14.11.2008), with a 4.4 % increase in the number of pupils who scored "A"s in English, compared with the national average of the past five years. There was also a 4.8% increase in competent students (those who scored A, B or C) in English. Compared with just 0.2% in 2007, 46.6% of pupils chose to answer the Mathematics paper in English (The Star 14.11.2008).

"Their level of proficiency in English is getting better," announced Education Ministry Director-General Datuk Alimuddin Mohd Dom, after releasing the UPSR results. The policy reversal effective from 2012 may be at the expense of current cohorts of primary students, because there is uncertainty as to whether they can continue and complete their Mathematics education in English. Examination results may have shown improvement, but the citizenry, especially the rural population, did not and still do not see the necessity for change and forced the reversal on an electorally sensitive Barisan National Cabinet.

The Report of The Sultan Idris Education University (Ishak Haron)

This Government sponsored review of the policy, conducted by the Universiti Pendidikan Sultan Idris (Sultan Idris Education University) showed mainly negative results and "exposed many weaknesses" in its implementation, particularly "teachers' lack of fluency in English" (Ishak Haron et al; 2008:13).This officially sanctioned report recommended that pupils be taught in their mother-tongue and to learn another language at a much older age. The findings indicated that the PPSMI policy "had failed to facilitate students' learning and performance and that it had not improved the students' mastery of the English language". Findings from research carried out between February 2007 and January

2008 indicated that 75% of the pupils from 68 primary schools either could not or could barely comprehend their Mathematics teachers.

The Report recommended alternative approaches for rural and urban children as a standardised approach to teaching English would not be effective. English proficiency could be effectively enhanced by intensive English language lessons which incorporated practice in the four skills (reading, writing, speaking and listening) and poetry and stories. Mathematics and Science were not effective tools to improve English proficiency.

The policy reversion

The policy reversion was announced on July 8th 2009 and the plan was that it should not be implemented in schools until the beginning of 2012. As Prime Minister Najib Tun Razak put it, "our aim of making Malaysians more proficient in English has not changed, only the method," (NSTP Nation, 10.7.2009). One of the main reasons given for the reversion was that "students in the rural schools have been suffering under PPSMI as many of them do not understand English well." This supports the contention (and that of PAGE) that while this PPSMI policy may have been a good policy for the country in general it may not have been the best policy for the rural and FELDA students whose English proficiency was low (The Star, 12.7.2009).

While many academics supported maintenance of the policy they felt that the standard of English of the teachers had to be improved. Academics, such as Professor Datuk Dr. Nik Safiah Karim (adviser to the Linguistics Society, Malaysia) promoted a "win-win" situation to give due recognition to Malay as the National Language,with English accepted as an important language in a global setting, and used to teach subjects such as History and Literature (The Star, 27.12.2008). Professor Datuk Dr Abdul Latiff Abu Bakar from the Federation of National Writers (GAPENA) concurred with her view stressing that while reverting

the teaching of Mathematics and Science to the Malay language, teaching of the English language as a subject must be strengthened (ibid).

Based on the study reported here and completed in 2010, it is argued that modifications should be made to ensure a continued emphasis on English as a language. However, Mathematics and Science ought to be taught in the Malay language in the National and Malay schools and the mother-tongue in the vernacular schools. The choice of the medium should be given to the district education officers who together with the principals of the schools in the district could select and divide the schools into clusters.Extra time for English should be given and language activities integrated within these clusters.

For the urban school, the upper primary classes could continue to be taught using the bilingual approach and then slowly switch to the Malay language as the students become confident in learning Mathematics in the Malay language. The FELDA school teachers may find switching to the Malay language immediately more productive. In 2011 all primary one students began the process of learning Mathematics in the Malay language.

Education Director-General Tan Sri Alimuddin Mohd Dom announced in 2009 that the teaching and learning of Science and Mathematics for Year 4 in 2012-2014 and Year 5 in 2013-2015 and Year 6 in 2014-2016 would be conducted in two languages**.** Science and Mathematics examinations would be carried out in two languages until 2016. In secondary schools, both subjects would be taught in two languages in Form 4 in 2012-2014 and Form 5 in 2013-2015. The Sijil Pelajaran Malaysia examinations for both subjects would be carried out in two languages until 2015 (BERNAMA, 11.8.2009)

The ‘soft-landing’ approach may be the best way out of this contentious issue and gradually pave the way for the Malay language to be fully reinstated by 2016 at the primary school level

and 2021 at the secondary school level (NSTP, M'sia 5.11.2011).The clarification was made by Deputy PrimeMinister Tan Sri Muhyiddin Yassin regarding the government's decision to revert the teaching of both subjects to Malay in national schools, and Chinese and Tamil in vernacular schools from 2012. Tan Sri Muhyiddin Yassin stressed that the interests of the three million children who were involved in PPSMI must come first in the move to gradually abandon the PPSMI policy. He revealed that "only six to seven per cent of classrooms across the country used the English language entirely for the two subjects", indicating"flaws in the implementation of the policy rather than the policy itself" (NSTP, M'sia 6.11.2011). Factors in the lack of proper implementation ranged from the shortage of teachers competent to teach Mathematics and Science in English and the failure of school children to grasp English, further impeding the grasp of the Mathematics and Science information taught in a language not familiar to them.

On the 5th November, 2011, the Deputy Prime Minister announced that despite introduction of the PPSMI policy, teachers and pupils in most schools had been teaching and learning both subjects in the Malay language. Studies conducted in schools under the purview of the Ministry of Education revealed that less than five percent of classes at 7,495 primary schools fully used the English language for the teaching and learning of the two subjects. Of the 2,192 secondary schools he said that less than nine percent fully adopted PPSMI (NSTP, M'sia 5.11.2011).

The Director General argued that the policy reversal should not be allowed to distract from the main issue of the standards of education in Malaysia. More pressing was the need for deeper reforms to put Malaysia back on par or even higher than some close competitors. To benchmark Malaysian schools to global standards, an overhaul of the whole system of education, from teacher training to school infrastructure and curriculum was needed (NSTP, M'sia 6.11.2011).

Uphold the National Language, strengthen English (MBMMBI policy)

The MBMMBI Policy replaced the PPSMI policy. It was the policy of the Ministry of Education Malaysia to ensure the usage of the Malay Language as a medium of communication in all national schools and secondary schools, and to ensure that each child mastered fluency in both Malay and English languages.

The PPSMI Policy made English the medium of teaching and learning the subjects of science and mathematics in national schools, Tamil national-type schools, and secondary schools. The MBMMBI policy sets the Malay Language as the medium of teaching and learning at the national schools and secondary schools, and Mandarin at the Chinese national-type schools and Tamil at all the Tamil national-type schools.

The MBMMBI Policy was introduced after studies conducted by various parties found that the implementation of PPSMI was not carried out as desired. Studies also disclosed that pupils found it difficult to learn Mathematics and Science in English as they were not proficient in the English Language. This has forced teachers to teach both the subjects in the Malay language to help pupils understand the subject matter better. This problem was prevalent in the rural as well as urban areas. If the PPSMI policy continued, a larger number of pupils would fail to master Mathematics and Science and would eventually be left behind. Studies conducted by the Education Ministry have shown that most schools have begun to carry out the teaching and learning of Mathematics and Science in the Malay language.

The MBMMBI policy was implemented in schools from 2010, reinstating the Malay language as the medium of learning and teaching Science and Mathematics, increasing the proficiency of the Malay Language and English Language through extra teaching and learning periods, curriculum transformation, increase in teaching capacity and human resources, availability of materials

and equipment as well as integration of information technology and communication into teaching and learning. To ensure that teachers would be competent and qualified to carry out this policy the Ministry of Education planned and carried out various training programs. Courses were formulated as a retraining program for in-service English teachers to enhance their professional development as well as equip them with pedagogical skills.

In 2008, the Ministry of Education decided to employ native speakers as experts or mentors to assist in capacity building of primary school English teachers and lecturers at teacher training institutions in Malaysia. The program was implemented from 2011 to 2013. The Key Performance Indicator for the Native Speaker Program was to increase the capacity of English language teachers in 1800 primary schools and lecturers at five Teachers Training Institutes which were named as Centres of Excellence. English language Assistants were also sent to help the teachers. The role of the Training Fellows placed in the five Centres of Excellence was to mentor and coach English Language Lecturers in order to enhance their professional development. Both training fellows and lecturers worked together to develop training programs. The role of training fellows was in-line with the needs and requirements of the aforesaid teacher training institutes.

Mentors placed in primary schools were to assist the English Language teachers in the following areas to:

- plan and carry out professional development training programs for English Language teachers;
- organise and carry out programs/workshops/trainings within district clusters and zones;
- co-operate and organise activities with mentors from other clusters and zones;
- plan and organise co-curriculum activities;
- assist in support activities during teaching and learning;
- conduct suitable action research;

- work with Ministry officials for the assessment of the program; and
- create a team of potential master trainers amongst the teachers.

Guide books such as **'**Pedagogy Standards for English Language Teaching' (PSELT) were published by the English Language Teaching Centre (ELTC) to guide teachers to ascertain their training needs for continuous professional development. To help teachers to teach speaking skills for communication effectively for Form 1 pupils, in 2012 the Oral Proficiency in English for Secondary Schools (OPS-ENGLISH) books for the teacher and the pupils were published too.A CD to assist them to teach speaking skills for communication was also supplied. The Technological Education Division supplied digital materials to all schools. These materials were specially chosen for the teaching and learning of Malay and English. The lessons emphasised language skills infused with fun elements.

New methods of assessment were developed: Formative Assessment - assessment to be carried out continuously with the aim of improving and enhancing the learning process (Assessment for learning); and Summative Assessment – assessment to be carried out at the end of the learning process in order to evaluate how much was learnt and acquired. This was to ensure higher thinking order skills in the secondary schools (accessed from the Ministry of Education, Malaysia website, 7.8.2013)

"The shelving of the policy to teach Mathematics and Science in English is only temporary," said Datuk Mary Yap, the Deputy Education Minister. She explained that the Ministry was not against the PPSMI policy but was more concerned about improving English language proficiency among students and teachers. This could be done by "upskilling programs and bringing in native speakers to act as tutors and mentors" (The Star-Nation, 15.6.2013). The Ministry was also working towards the possibility of making English a compulsory pass subject by 2016. Datuk Mary Yap, the Deputy Education Minister's statement backs Tan

Sri Muhyddin Yassin, the Education Minister's statement in a TV3 question and answer session in November 2011, that once proficiency in English had been improved sufficiently then PPSMI could be revisited.

Based on this possibility, the government must first ensure that there are well trained and qualified teachers to teach English. Then Deputy Education Minister Datuk Dr Wee Ka Siong announced:

> It will take at least five years to train some 60,000 teachers to prepare for making English a compulsory pass subject in the Sijil Pelajaran Malaysia (SPM) Examination. Currently, 5,000 teachers have already been trained and the Government will be recruiting 9,000 more English teachers. (The Star-Nation, 26.2.2013).

This was followed up by Deputy Prime Minister Tan Sri Muhyiddin Yassin, who is also the Education Minister, who said English language would be made a must-pass subject in the SPM examination when teachers and students were ready for it. He also commented that in preparing for this, parents, teachers and students must work together to improve the quality of English in the country.

The Malaysia Education Blueprint 2013-2025 (MEB)

In October 2011, the Malaysian Education System was reviewed in order to develop a preliminary report on the National Education Blueprint that was launched in September 2012 (The Star online. 12.9.2012). The main focus of this 'frank and bold' blueprint was on the making of effective teachers and critical learners. Datuk Seri NajibTun Razak, the Prime Minister stressed that weaknesses in the present education system had to be acknowledged if the country were to move forward. The focus of the National Education Blueprint 2013-2025 was to be "on the making of effective teachers and critical learners". These two elements would get greater emphasis in the transformation of the education system (The Star-on line.1.6.2013). The Blueprint aims to produce

students with six key attributes knowledge, thinking skills, leadership skills, bilingual proficiency, ethics and spirituality, and national identity.

The Prime Minister stressed that in order to compete in the global market where "the thrust was knowledge, innovation and technology"; students "had to be prepared for jobs yet to exist". To solve existing weaknesses in the system required "creative and innovative approaches" to teaching and learning. He also suggested that becauseMalaysia was a multicultural country, Malaysians needed to be "bilingual, if not multilingual".

The preliminary report, following research and public engagements by the Education Ministry, aimed to establish a clear vision for the next 13 years, and outline a "futuristic" and comprehensive transformation program for education. The views of about 50,000 stakeholders contributed to development of the Malaysia Education Blueprint, the closest the Government had ever come to a referendum on educational issues. The Blueprint mentioned that "ministry officials, teachers, principals, parents, students, and members of the public across Malaysia were engaged via interviews, focus groups, surveys, National Dialogue town halls and roundtable discussions".

"This is the first time in the country's history that an education development plan was prepared through public discussion, over 90% of feedback received was taken into account," Deputy Prime Minister Tan Sri Muhyiddin Yassin said at the launch of the preliminary report of the Blueprint presented to Parliament in December 2012. He went on to elaborate that "unlike the previous education reform that paid greater attention to physical infrastructure and systems, the Blueprint for 2013 to 2025 looks at teachers as the driving force behind a superior education system". Hence, teacher training, retraining and "up-skilling" would be the priorities of the Blueprint. Seventy thousand English teachers would have to sit for the Cambridge Placement Test and those

found to be low or non-proficient would be given intensive "up-skilling" courses.

Conclusion

This analysis of the impact of the PPSMI on the children of the FELDA suggests that the policy failed at the Macro, Meso and Micro levels of context. Although significant factors of national interest were identified at the level of Influence, at the level of Enactment key influences on the development and implementation of the policy were not negotiated sufficiently with key stakeholders. As a result, implementation in the context of Practice, particularly in the FELDA environment was largely ineffective.

The reversal of the PPSMI, announced in 2009 was strongly contested by lobby groups such as PAGE who argued for more localised decisions on the language of instruction. The MBMMBI policy to replace PPSMI was similarly a product of top-down decision making, and rapidly overtaken by the review of the whole Malaysian National Education system in 2011.

In contrast, development of the Malaysia Education Blueprint 2013-2025, has been widely canvassed and key areas of reform necessary to the implementation phases have been identified. The most critical factor in the project appears to be capacity building in development of the human capital essential to achieving the goals of the education Blueprint 2015-2025 and Vision 2020. The tabling of the Budget 2015 revealed that RM 56Billion would be allocated to the Education Ministry to carry out teaching and learning programmes. This ensures that the proficiency level in English would be improved as more Trust schools would be established in more states. One of the aims of the Malaysia Education Blueprint 2013-2025 was to establish 500 trust schools by 2025 (The Sunday Star, Stareducate:19.10.2014:8) One step towards changes as established in the Blueprint is the introduction of the PT3 (Pentaksiran Tingkatan 3), the new system of assessment and examination that replaces the PMR examination

(NSTP; 14.6.2014). The National Education Advisory Council (MPPK), in reviewing the issues and problems in the implementation of the Education Blueprint, asserts that "Malaysia faces challenges as a result of globalisation and that tertiary education can lead the nation to the global arena and make it world-class" (NSTP, 9.9.2014:7). Narrowing the gap between the urban and rural schools must be the target and teachers must "go beyond teaching students to just pass examinations but to also develop other thinking skills" (ibid)

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