

## Teaching Higher-Order Thinking Skills in Classrooms: Learning From the Experiences of Malaysia

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### Introduction

Over the past two decades, we have been thinking a lot about thinking (Sternberg and Spear-Swerling, 1996). Helping students to become independent learners and developing their ability to think are more and more becoming commonly stated educational aims. As a result of this, the teaching of thinking skills is slowly becoming an integral part of the school curriculum. What used to be the content taught to only elite students is becoming part of the curriculum used to teach all students (Resnick, 1987).

There are many compelling reasons that justify the teaching and learning of thinking skills in classrooms. Many developing countries are attempting to teach these thinking skills to all students using the normal curricula. The aim of this paper is to investigate the systemic attempt carried out in Malaysia, with particular focus on teachers' knowledge, pedagogical skills and attitude to teach thinking skills in classrooms. There will also be discussion on factors that may influence teachers' knowledge, skills and attitude, and time allocated to teach thinking skills in classrooms. This paper was prepared on data obtained for a research on teaching higher-order thinking skills in language classrooms in Malaysia.

### Why Teach Thinking Skills?

In Malaysia the need for students to learn to manipulate ideas and feelings that are contained in the text they read, for which, it is assumed they need thinking skills, is being given attention (Indramalar, 1997a, July 6). There has also been an announcement by the Ministry of Education in Malaysia that, "the education system will be revamped to encourage rational and analytical thinking." (Indramalar, 1997b, September 3). The basic issue justifying the efforts to teaching thinking skills is that, be it in the United States or in Malaysia, there is a general understanding that after 12 or 13 years of public education, many students are unable to give evidence of a more than superficial understanding of concepts and relationships that are fundamental to the subjects they have studied, or an ability to apply the content knowledge they have acquired to real-world problems (Nickerson, 1988).

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In one study (Perkins, 1985), subjects drawn from the first and fourth years of high school, college, and graduate school were asked to consider specific public issues (e.g., Does violence on television significantly increase the likelihood of violence in real life?) and to develop a position and supporting arguments on the issues. Perkins characterizes his results as showing a tendency to underexplore issues, and notes that this is consistent with findings of Gettys (1983) and Gettys and Englemann (1983) that when subjects are asked to explain a situation or to generate plans of action, they typically do a less than thorough job of exploring possibilities. The evidence, once again, seems to suggest that general education, as a rule, does not change this tendency very much.

There is great interest among researchers and educators, at the present, in the teaching of thinking (Resnick, 1987; Nickerson, 1988). As Resnick (1987) suggests, there are attempts to include the teaching of thinking skills in all subjects to all students. Therefore, it becomes important to teach thinking skills explicitly besides the school subjects. In this respect, it seems important to revisit the issue of how we define and teach the respective school subjects in relation to whether we teach students to think critically and creatively. To be literate now, for example, seems to require that students know more about how to think; not just how to read.

To help students develop higher-order thinking abilities, teachers need to relegate more time to instruction concerning high-quality thinking with printed and spoken material. Implications of these suggestions are that teaching in the language arts classrooms, for example, should go beyond the mere teaching of listening, speaking, reading and writing. Efforts should be made to acquire the critical and creative thinking skills, as Langer (1991) suggests, "the current era requires that students acquire the kinds of critical thinking skills that needed to use the communication devices and technologies we meet on a daily basis in our everyday living and in entry-level jobs" (p. 12).

### How Are Higher-order Thinking Skills Defined?

Researchers and educators have advocated many conceptions in relation to "thinking": critical thinking, divergent or creative thinking, reasoning (moral, inductive, deductive, formal, informal), problem solving, and decision making. Literatures on these topics, while interrelated, are remarkably distinct and self-contained. Nickerson, in this respect, (1988) suggests that, "if there is one point on which most investigators agree, it is that thinking is complex and many faceted and, in spite of considerable productive research, not yet very well understood" (p.9).

Different conceptions about thinking can all be subsumed under the larger construct of higher-order thinking and made distinct from lower-order thinking (Onosko and Newmann, 1994, p.28). Resnick's (1987) discussion, for example, characterized higher-order thinking as nonalgorithmic, complex, self-regulative, meaningful, effortful and providing multiple solutions, nuanced judgments, multiple criteria, and uncertainty, all defined in terms of cognitive traits and processes of individuals. Chipman (1986) characterized higher-order thinking as a consensus among cognitive scientists that successful thinking depends on organization of cognitive activity with a hierarchy of goals and operations.

For the purpose of this study, higher-order thinking was defined broadly, as the expanded use of the mind to meet new challenges. Expanded use of mind occurs when a person must interpret, analyze, or manipulate information, because a question to be answered or a problem to be solved cannot be resolved through the routine application of previously learned knowledge (Onosko and Newmann, 1994). In the classroom, it

requires students to critically think about information, ideas, and opinions. Students draw conclusions, inferences or generalizations. Besides that, they produce original communications, make predictions, propose solutions, create, solve life-like problems, judge ideas, express opinions, and make choices and decisions.

On the other hand, lower-order thinking represents routine, mechanistic application and limited use of the mind. This process generally involves repetitive operations such as listing information previously learned formulae, applying procedural rules, and other routinized or algorithmic mental activities. It requires students to recall or recognize information. Students are also required to describe, compare, contrast, summarize, relate, apply, provide an example, and solve.

### Malaysia's Attempt to Teach Thinking Skills

Malaysia is a multiracial country with a population of 22 million consisting of three main races: Malays; Chinese; and Indians. The country has a centralized education system with almost all the funding for public schools coming from the Federal Government. The Ministry of Education, together with the State Education Departments and the District Education Offices, is responsible for administering the education system. The Ministry of Education has various professional and administrative divisions responsible for the numerous aspects of policy formulation and implementation. The State Education Departments, District Education Offices and schools help implement the policies formulated by the Ministry of Education.

Reform efforts in education started even before the country gained its independence in 1957. However, the most significant reform efforts in Malaysia (Malaya until 1965) were started in 1956 (Ahmad, 1993). The Razak Report which was implemented in 1956 laid the foundation for a new education system reflecting the characteristics of a new independent and multiracial Malaysia.

Reform efforts to further improve the education system are ongoing efforts in Malaysia. In 1979, for example, the Cabinet Committee to Review the Implementation of Education Policy presented a comprehensive report on the various aspects of the education system of the country (Curriculum Development Center, 1989, p.1). Based on the recommendations of this Committee, the Ministry of Education undertook to review the existing curricula for both the primary and secondary schools. Subsequently, the Teacher Education Programs were also modified to accommodate the new requirements. The New Primary School Curriculum which was later named as the Integrated Primary School Curriculum was implemented in 1982, whereas the Integrated Curriculum for Secondary Schools was implemented in 1988 (Curriculum Development Center, 1989, p.1).

At the same time, in order to clarify and give further direction to education in Malaysia with a view to creating good citizens and good human beings, concerted efforts were undertaken to define the National Philosophy of Education (NPE), which was documented in 1987. The National Philosophy of Education states,

Education in Malaysia is an on-going effort towards further developing the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion in God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving a high level

of personal well-being as well as being able to contribute to the betterment of the society and the nation at large.

(Educational Planning and Research Division, 1994, p. vii)

Reform efforts of the 1980s were based on the principles of the National Philosophy of Education to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious. However, in the 1990s, reform efforts were focused on, besides the principles of the National Philosophy of Education, on the demands of the Vision 2020 of the government. The goal of Vision 2020 is to make Malaysia a 'Developed Country', not only in the economic sense, but a nation that is fully developed along the dimensions: economically, politically, socially, spiritually, psychologically, and culturally (Mohamed, 1991).

One of the outcomes of these reform efforts was the introduction of a more serious and explicit attempt to teaching thinking skills in schools. A more explicit attempt to teach thinking skills was started in schools in 1993 and in teacher education colleges in 1994. However, it has to be noted that various attempts to improve students' thinking abilities have taken place even before this period. In order to prepare teachers and teacher college lecturers to teach these skills, there were short courses and workshops on teaching thinking skills. Such workshops and seminars have been conducted on 'Accelerated Learning', 'Optimal Learning', 'Critical and Creative Thinking' and De Bono's 'CoRT Thinking Tools' since the 1980s in Malaysia.

### Teaching Of Higher-Order Thinking Skills In Schools.

One of the objectives of secondary school education in Malaysia is to "Develop and enhance their (students) intellectual capacity with respect to rational, critical and creative thinking" (Curriculum Development Center, 1989, p.2). Although there are other objectives like "to acquire knowledge and to a mastery of skills and to use them in daily life," the explicit mention of developing students' rational, critical and creative thinking in the curriculum has necessitated the teaching of thinking skills in the schools. To further emphasize the importance of teaching thinking skills, the curriculum states, "The contents of the curriculum promote the development of thinking abilities to enable students to analyze, synthesize, explain, draw conclusions, and produce ideas that are both constructive and useful" (Curriculum Development Center, 1989, p.6). The Integrated Curriculum for Secondary Schools (ICSS) also states that,

Another primary consideration in the ICSS is the development of thinking abilities. Every teacher is required to use teaching-learning methods and techniques which will stimulate, encourage, and develop the thinking abilities of students. This strategy is closely linked with the aims of the ICSS which emphasize the development of the human intellect (p.27).

The Ministry of Education, in 1993, when implementing the thinking skills program in schools in a more systematic manner and to streamline the existing thinking skills programs, identified four models which could be used in the classrooms (Curriculum Development Center, 1993). The first model is by Robert Swartz and Sandra Parks (1994) and this model was prepared by the National Center for Teaching Thinking in Boston. This model is popularly known in Malaysia as the 'Boston Model'. The second model in the 'KWHL Model', where 'K' is for 'knowledge', 'W' is for 'what', 'H'

is for 'how', and 'L' is for 'learnt'. The third model consists of CoRT 1 (Widening the Perception) and CoRT 4 (Creative and Lateral Thinking), which were both developed by Edward de Bono. The last model is called 'Programmed Instruction in the Learning of Thinking Skills (PILTS)' which were developed by two local academics, John Arul Phillips and Fatimah Hashim. The guidelines from the Ministry of Education proposes various strategies, techniques, and activities which could be used by teachers to teach thinking skills in the classrooms.

Selected teachers from various districts who are called 'key-personnel' were exposed to the new curriculum for teaching thinking, as is usually done in other curriculum implementation processes. All four models seem to have been exposed to the key-personnel. These key-personnel were required to impart their knowledge and experience with at least one teacher from each school in their districts. These teachers in turn are supposed to share their knowledge and experiences with all teachers in their respective schools. While these training provided extra opportunities for serving teachers, there were also attempts to expose preservice teachers to this innovation.

The Teacher Education Division made changes to its Five Semester Basic Teacher Education Program and the Two Semester Post-Degree Education Program to accommodate the necessary changes to teach higher-order thinking skills explicitly in 1993. These changes were implemented in the teacher education colleges in June 1994. The Teacher Education Division basically adopted the 'Boston Model' to train teacher educators to teach prospective teachers. Almost all adjustments to the existing curricula for various subjects were based on this model. Special guidelines and resource books for teacher educators in the teacher education colleges were developed in late 1993 and in early 1994 (Teacher Education Division, 1994).

Teacher Education College lecturers were exposed to the 'Boston Model', CoRT Thinking Tools, the ways to incorporate the teaching of thinking skills using the 'infusion approach' in the various content areas, and teaching and learning strategies during four-day workshops in their respective colleges in early 1994. Various materials on the program, strategies and techniques, and model lesson plans were distributed to the lecturers in these workshops. Specifically, model lessons showing how thinking skills could be taught using the infusion approach on various subjects like Malay Language, English Language, Math, Science and History were prepared by the Teacher Education Division and were used as important resource materials in these workshops.

Besides the curriculum and the guidelines consisting of the four models, strategies, techniques, and activities, model lesson plans showing how thinking skills could be taught together with subject matter using the 'infusion approach' were prepared and distributed to teachers. These model lesson plans are based on various subjects and teachers are encouraged to use them as models to plan their own lessons. Text book writers were also encouraged to include thinking skills in their materials. Other supporting materials like 'Teaching and Learning Styles with Left/Right Brain Techniques' (Curriculum Development Center, 1994) were prepared and distributed to key-personnel from time to time to be shared with teachers in schools.

The Ministry of Education certainly have a specific aim of teaching thinking skills in schools. In view of fulfilling the principles of the National Philosophy of Education and to meet the demands of the challenges of Vision 2020, the Ministry of Education announced a policy in 1994 that by the year 2000, a minimum of 60 per cent of the public examination questions will be testing the creative and analytical thinking skills of the students.

The curriculum, guidelines, text books, and resource materials have been prepared, and at least some training has been provided, as will be discussed below, to the teachers. But the question is how are teachers accepting yet another innovation to

the existing curricula, how much of knowledge and skills do teachers possess to teach thinking skills in the classrooms, how are the thinking skills taught, and how are the students learning are many questions which need to be addressed if teaching of higher-order thinking skills is to be effective and students are to be ready to face examinations in the year 2000.

### What have Malaysia Learned From The Attempt To Teach Thinking Skills?

The following section will provide data and discussion on form two Malay and English Language teachers' perceptions of their knowledge, pedagogical skills, and attitude towards teaching Malay or English Language and higher-order thinking skills. Data presented here were obtained from 104 teachers, who represent 93 percent of all form two Malay and English Language teachers in one of the school districts in Malaysia, the Perdana School District. Besides teachers' perceptions of their knowledge, skills, attitude, the discussion will also involve if there are any factors which have influenced their perceptions. Also, there will be a brief discussion about the class time they allocate to teach Malay or English Language and higher-order thinking skills in their own classrooms.

#### Teachers' Perceptions Of Their Subject Matter Knowledge

Teachers were requested to provide responses on eight items which cover many aspects of the curriculum, knowledge about planning, using different strategies, using the infusion approach and involving students in the teaching and learning processes. The aim of the items (Refer to Table 1) was to investigate what are teachers' perceptions of their knowledge for teaching Malay or English Language and higher-order thinking skills. It has to be noted that these eight items had an Alpha level of .9231 in the reliability analysis test.

It could be seen (Table 1) that the means of all items for the teaching and learning of Malay or English Language is consistently higher than the means of all items for the teaching of higher-order thinking skills. For example, on the item whether teachers think they know the details of the curriculum for both the Malay or English Language and higher-order thinking skills, the mean for language teaching is 3.94 and for higher-order thinking skills is 3.19. Also for the item, whether teachers think they know how to plan to teach Malay or English Language and higher-order thinking skills, the mean for language teaching is 4.11 and for higher-order thinking skills is 3.52. Teachers responded on Likert scale of 1 to 5, with 1 being the value for strongly disagree and 5 being the value for strongly agree. This suggests that for both the items stated above, the Malay and English Language teachers have indicated that their average response is 3.94 or above which means they state their agreement on the items for Malay or English Language teaching. Whereas, their average responses for items on higher-order thinking skills are 3.19 and 3.52 which means that they are more undecided on these items. Also for each of the items pertaining to teachers' perceptions of their knowledge to teach Malay or English Language and higher-order thinking skills, teachers feel they are better prepared to teach Malay or English Language than to teach higher-order thinking skills.

Table 1: Teachers' perceptions of their knowledge to teach Malay or English Language and Higher-Order Thinking Skills

		Mean	Std. Dev	t value	sig (2 - tailed)
know details of the curriculum for	ML/EL	3.94	.74	7.467	.001
	HOT	3.19	.96		
know how to plan to teach	ML/EL	4.11	.70	6.678	.000
	HOT	3.52	1.00		
know how to use different strategies and techniques to teach	ML/EL	3.86	.77	6.316	.000
	HOT	3.38	.94		
know how to teach ML/EL and HOT using the infusion approach	ML/EL	3.17	1.03	2.232	.028
	HOT	3.02	1.01		
know how to stratify the learning components to the level of students for	ML/EL	3.81	.73	6.723	.000
	HOT	3.30	.90		
know how to involve students actively in the teaching and learning processes in	ML/EL	3.87	.70	5.292	.000
	HOT	3.47	.95		
know how to develop the individual potential of students in	ML/EL	3.70	.73	3.855	.000
	HOT	3.43	.93		
know how to evaluate student improvement	ML/EL	3.75	.71	5.085	.000
	HOT	3.35	.93		

Key: Responses were on a Likert scale

1 - Strongly disagree

5 - Strongly agree

ML- Malay Language/EL- English Language

HOT – Higher-Order Thinking Skills

Table 1 also shows that the standard deviation of all items for teaching Malay or English Language is consistently lower than the standard deviation of all items for the teaching of higher-order thinking skills. For the item whether teachers' think they know the details of the curriculum, for example, the standard deviation for language teaching is .74 and for higher-order thinking skills is .96. The Malay and English Language teachers' responses were consistently more dispersed from the mean for higher-order thinking skills as compared to the teaching of Malay or English Language. T-test results indicate (Table 1) that the Malay and English Language teachers significantly differed in their responses for each of the items for the teaching of Malay or English Language and higher-order thinking skills.

Table 2 shows the composite values of all eight items constituting the knowledge component for teaching Malay or English Language and higher-order thinking skills. The composite mean of all items for teaching Malay or English Language is 3.78 and higher-order thinking skills is 3.33 suggesting teachers rate their perceptions of their knowledge to teach Malay or English Language as higher than their knowledge to teach higher-

order thinking skills. The composite standard deviation for all eight items (Table 2) for teaching Malay or English Language is .52 and higher-order thinking skills is .77 suggesting the Malay and English Language teachers are more dispersed from the mean about their perceptions of their knowledge to teach higher-order thinking skills compared to teaching Malay or English Language. This suggests that there is relatively a larger variation in the Malay and English Language teachers' perceptions of their knowledge to higher-order thinking skills as compared to teaching Malay or English Language. There is also a statistically significant difference ( $p = .000$ ) in teachers' perceptions of their knowledge to teach Malay or English Language and higher-order thinking skills.

**Table 2: Malay and English Language teachers' knowledge (composite - 8 items) to teach Malay or English Language and Higher-order thinking skills**

	Mean	Std. Dev.	t value	Sig (2 - tailed)
Malay and English Language teachers' perceptions of their <u>knowledge</u> to teach Malay or English Language	3.7823	.5245	7.863	.000
Malay and English Language teachers' perceptions of their <u>knowledge</u> to teach higher-order thinking skills	3.3346	.7750		

Key: Responses were on a Likert scale  
 1 - Strongly disagree  
 5 - Strongly agree

Teachers who participated in this study teach Malay and English Language in form two classes. It was important to investigate whether these teachers who teach two different subjects, Malay and English Language, differed significantly in their responses on their knowledge towards teaching Malay or English Language and higher-order thinking skills.

**Table 3: ANOVA of Malay and English Language teachers' knowledge to teach Malay or English Language and Higher-order thinking skills**

	Mean Sq.	F Ratio	F Prob.
Malay & English Language teachers' perceptions of their knowledge to <u>teach Malay or English Language</u>	.0144	.0514	.8210

Malay and English Language teachers' perceptions of their knowledge to <u>teach higher-order thinking skills.</u>	1.348	2.273	.134

ANOVA test results (Table 3) suggest that there is no significant difference in the Malay or English Language teachers' responses for teaching Malay or English Language ( $p = .8210$ ) and higher-order thinking skills ( $p = .134$ ). This suggests that the Malay and English Language did not significantly differ in their responses suggesting that they are better prepared in terms of knowledge to teach Malay or English Language as compared to teaching higher-order thinking skills.

### Teachers' Perceptions Of Their Pedagogical Skills

Besides knowing what the Malay and English Language teachers perceive of their knowledge to teach Malay or English Language and higher-order thinking skills, it also seems important to investigate what these teachers perceive of their pedagogical skills to teach Malay or English and higher-order thinking skills. Teachers were requested to provide responses on nine items which cover many aspects including planning a lesson to teach, being able to use different strategies and techniques, using resource materials, involving students in the teaching and learning, and evaluating student improvement. The aim of the items (Refer to Table 4) was to investigate what are teachers' perceptions about their pedagogical skills to teach both Malay or English Language and higher-order thinking skills. It has to be noted that these nine items had an Alpha level of .9511 in the reliability analysis test.

It could be seen (Table 4) that, except for one item, the means of all items for the teaching and learning of Malay or English Language is consistently higher than the means of all items for the teaching of higher-order thinking skills. For example, on the item whether teachers think they are able to plan a lesson to teach for both the Malay or English Language and higher-order thinking skills, the mean for language teaching is 3.99 and for higher-order thinking skills is 3.42. Also for the item, whether teachers think they are able to use different strategies and techniques to teach Malay or English Language and higher-order thinking skills, the mean for language teaching is 3.79 and for higher-order thinking skills is 3.35. The only item where the mean score was higher for the teaching of higher-order thinking skills (3.49) than the teaching of Malay or English Language (3.38) was for the item whether teachers think that they are able to use resource materials for the effective learning of Malay or English Language and higher-order thinking skills.

Table 4: Teachers' perceptions of their pedagogical skills to teach Malay or English Language and Higher-Order Thinking Skills

		Mean	Std. Dev	t value	sig (2 - tailed)
able to plan a lesson to teach	ML/EL	3.99	.74	6.625	.000

	HOT	3.42	.82		
able to use different strategies and techniques to teach	ML/EL	3.79	.72	6.284	.000
	HOT	3.35	.84		
able to teach ML/EL and HOT using the infusion approach	ML/EL	3.26	.84	3.228	.002
	HOT	3.09	.94		
able to stratify the learning components to the level of students for	ML/EL	3.81	.70	6.673	.000
	HOT	3.36	.93		
able to use resource materials for the effective learning of	ML/EL	3.38	.73	5.638	.000
	HOT	3.49	.88		
able to provide feedback to students for the effective learning of	ML/EL	3.84	.68	5.708	.000
	HOT	3.41	.83		
able to involve students actively in the teaching and learning processes in	ML/EL	3.83	.73	5.858	.000
	HOT	3.42	.94		
able to develop the individual potential of students in	ML/EL	3.61	.76	3.764	.000
	HOT	3.37	.94		
able to evaluate student improvement in	ML/EL	3.71	.71	4.701	.000
	HOT	3.38	.93		

Key: Responses were on a Likert scale

1 - Strongly disagree

5 - Strongly agree

ML- Malay Language/EL- English Language

HOT – Higher-Order Thinking Skills

Except the responses for one item, teachers' perceptions of their pedagogical skills to teach Malay or English Language and higher-order thinking skills seem to suggest that teachers feel they are better prepared to teach Malay or English Language than to teach higher-order thinking skills.

The Table 4 also shows that the standard deviation of all items for teaching Malay or English Language is consistently lower than the standard deviation of all items for the teaching of higher-order thinking skills. For the item, for example, whether teachers' think they are able to stratify the learning components to the level of students, the standard deviation for language teaching is .70 and for higher-order thinking skills is .93. Teachers' responses were consistently more dispersed from the mean for higher-order thinking skills as compared to the teaching of Malay or English Language. T-test results indicate (Table 4) that the teachers significantly differed in their responses for each of the items for the teaching of Malay or English Language and higher-order thinking skills.

Table 5 below shows the composite values of all items constituting the pedagogical skills component for teaching Malay or English Language and higher-order thinking skills. The composite mean of all items for teaching Malay or English Language is 3.75 and higher-order thinking skills is 3.36 suggesting teachers rate their perceptions

of their pedagogical skills to teach Malay or English Language as higher than their pedagogical skills to teach higher-order thinking skills. The composite standard deviation for all items for teaching Malay or English Language is .53 and higher-order thinking skills is .76 suggesting teachers are more dispersed about their perceptions of their pedagogical skills to teach higher-order thinking skills compared to teaching Malay or English Language. There is also a significant difference ( $p=.000$ ) in teachers' perceptions of their knowledge to teach Malay or English Language and higher-order thinking skills.

**Table 5: Malay and English Language teachers' pedagogical skills (composite - 9 items) to teach Malay or English Language and Higher-order thinking skills**

	Mean	Std. Dev	t value	Sig (2 - tailed)
Malay and English Language teachers' perceptions of their <u>pedagogical skills</u> to teach Malay or English Language	3.7594	.5393	7.287	.000
Malay and English Language teachers' perceptions of their <u>pedagogical skills</u> to teach higher-order thinking skills	3.3683	.7683		

Key: Responses were on a Likert scale  
 1 - Strongly disagree  
 5 - Strongly agree

ANOVA test results (Table 6) suggest that there is no significant difference in the Malay or English Language teachers' responses for teaching Malay or English Language ( $p= .74$ ) and higher-order thinking skills ( $p= .55$ ).

**Table 6: ANOVA of Malay and English Language teachers' pedagogical skills to teach Malay or English Language and Higher-order thinking skills**

	Mean Sq.	F Ratio	F Prob.
Malay & English Language teachers' perceptions of their pedagogical skills to <u>teach</u> Malay or English Language	.0307	.1046	.7470

Malay and English Language teachers' perceptions of their pedagogical skills to <u>teach higher-order thinking skills.</u>	.2108	.3548	.552

This again suggests that the Malay and English Language did not significantly differ in their responses suggesting that they are better prepared in terms of their pedagogical skills to teach Malay or English Language as compared to teaching higher-order thinking skills.

### Teachers' Attitude Towards Teaching Malay Or English Language And Higher-Order Thinking Skills

General pedagogical knowledge includes a teacher's knowledge and beliefs about teaching, learning, and learners. When teachers try to learn new instructional practices, as in this case where teachers are expected to teach thinking skills in content instruction, their existing views of teaching and learning and their knowledge of instructional strategies can have a profound influence on the changes they actually make (Putnam & Borko, 1996).

Teachers were requested to provide responses on eleven items to which reflect their attitude and beliefs towards teaching Malay or English Language and higher-order thinking skills. The items include teachers' perceptions on their responsibilities, satisfaction in teaching, influence on the life of students, the need for teachers to receive continuous training to teach, and what they think of teaching thinking and preparing students for tests and examinations (Refer to table 7). It has to be noted that these eleven items had an Alpha level of .8049 in the reliability analysis test.

It could be seen (Table 7) that the means of all items for the teaching and learning of Malay or English Language is consistently higher than the means of all items for the teaching of higher-order thinking skills. On the item whether teachers find a great deal of satisfaction in teaching for both the Malay or English Language and higher-order thinking skills, for example, the mean for Malay or English Language teaching is 3.51 and for higher-order thinking skills is 3.33. Also for the item, whether teachers think that to be a better teacher one needs continuous training to teach Malay or English Language and higher-order thinking skills, the mean for language teaching is 4.22 and for higher-order thinking skills is 4.05.

Table 7: Teachers' attitude towards teaching Malay or English Language and Higher-Order Thinking Skills

		Mean	Std. Dev	t value	sig (2 - tailed)
Teachers' responsibilities are confined to the school and its working hours in terms of	ML/EL	2.85	1.31	.324	.747
	HOT	2.82	1.16		

teaching					
I find a great deal of satisfaction in teaching	ML/EL	3.51	.98	2.877	.005
	HOT	3.33	.90		
I have an important influence in life of my students in terms of teaching	ML/EL	3.46	.90	3.234	.002
	HOT	3.29	.91		
teaching never gets monotonous when teaching	ML/EL	3.51	.90	1.618	.109
	HOT	3.41	.94		
new and better ways of teaching are always being discovered in	ML/EL	3.69	.89	2.130	.036
	HOT	3.49	.89		
is the duty of the teacher to know more on their own for	ML/EL	4.18	.77	4.294	.000
	HOT	3.91	.90		
to be a better teacher one needs continuous training in	ML/EL	4.22	.79	3.378	.001
	HOT	4.05	.87		
A good teacher should adapt the curriculum to the needs of students even if this involves adding more work	ML/EL	4.21	.82	3.770	.000
	HOT	3.96	.86		
A teacher should modify the curriculum for the good of students even if this means not following the established curriculum	ML/EL	4.07	.89	4.777	.000
	HOT	3.77	.99		
I would rather prepare students to face examinations than to teach them the thinking skills. In fact that is what everybody wants	ML/EL	3.10	1.16	1.040	.301
	HOT	3.01	1.05		
I have a problem in preparing students for examinations and at the same time teaching them how to think	ML/EL	3.40	1.10	1.347	.181
	HOT	3.27	1.09		

Key: Responses were on a Likert scale

1 - Strongly disagree

5 - Strongly agree

ML- Malay Language/EL- English Language

HOT – Higher-Order Thinking Skills

Teachers' perceptions on all items seem to suggest that they demonstrate better attitude and beliefs to the teaching of Malay or English Language than the teaching of higher-order thinking skills. However, it has to be noted here that the last two items, "I would rather prepare students to face examinations than to teach them the thinking skills. In fact that is what everybody wants," and "I have problem in preparing students for examinations and at the same time teaching them how to think" were both not very effective in eliciting teachers' responses pertaining to these particular issues. The reason is that these items do not seem to make a clear difference between the teaching of Malay or English Language and higher-order thinking skills. Furthermore, the "I would rather prepare students..." for the teaching of Malay or English and higher-order thinking

skills had a correlation coefficient of .683, and the item “I have a problem in preparing...” for the teaching of Malay or English Language and higher-order thinking skills had a correlation coefficient of .808, suggesting that there was a very high correlation between the responses for these items for both the teaching of Malay or English Language and higher-order thinking skills.

Although the mean scores of all items were higher for the teaching of Malay or English Language than higher-order thinking skills, the standard deviation of these items are mixed (Table 7). Unlike the trends in the knowledge and pedagogical components, the standard deviation was lower for the teaching of Malay or English Language than higher-order thinking skills in five items, equal for both in one item, and was lower for the teaching of higher-order thinking skills in four items.

For items on teachers’ responsibilities, finding a great deal of satisfaction in teaching, preferring to prepare students for examinations than to teach thinking skills, and having a problem in both of this, the standard deviation of teachers’ responses for Malay or English Language was higher than the standard deviation for higher-order thinking skills. The Malay and English Language teachers’ responses for Malay or English Language teaching for these items were more dispersed from the mean suggesting teachers had a bigger range of variations as compared to the teaching of higher-order thinking skills. This could be attributed, once again, to the fact that these items did not really make a difference between the teaching of Malay or English Language and higher-order thinking. In other words, teachers seem not to make a difference between the responses for the teaching of Malay or English Language and higher-order thinking skills. As was stated earlier, the items, “I would rather prepare...,” and “I have a problem preparing..,” high correlation for both the teaching of Malay or English Language and higher-order thinking skills. Likewise, teachers’ responses for items, “Teachers’ responsibilities are...,” for both the teaching of Malay or English Language and higher-order thinking skills had a correlation of .728, and “I find a great deal of satisfaction...,” for both the teaching of Malay or English Language and higher-order thinking skills had a correlation of .724.

Whereas, for items, influence on the life of students, teaching never gets monotonous, duty of the teacher to know more on their own, teacher needs continuous training, adapting the curriculum, and modifying the curriculum, the standard deviation for the teaching of Malay or English Language was lower than that of higher-order thinking skills. This suggests that teachers’ responses for these items were spread out much around the mean as compared to the responses for higher-order thinking skills. In other words, the Malay and English Language teachers’ perceptions of different pedagogical tasks explained by these six items had much less variations in relation to teaching of Malay or English Language as compared to the teaching of higher-order thinking skills. For the items, new and better ways of teaching are always being discovered, the standard deviation was the same for both the teaching of Malay or English Language and higher-order thinking skills.

T-test results indicate (Table 7) that the teachers significantly differed in their responses for seven items for the teaching of Malay or English Language and higher-order thinking skills. Again suggesting that teachers’ possessed significantly different and better attitude towards teaching Malay or English Language as compared to the teaching of higher-order thinking skills. However, for four items on teachers’ responsibilities ( $p = .747$ ), teaching never gets monotonous ( $p = .109$ ), would rather prepare students for examinations than to teach them thinking skills ( $p = .301$ ) and have a problem preparing students for examinations and teaching thinking ( $p = .181$ ) teachers did not significantly differ in their responses for the teaching of Malay or English Language and higher-order thinking skills.

Table 8 shows the composite values of all eleven items constituting the attitude component for teaching Malay or English Language and higher-order thinking skills. The composite mean of all items for teaching Malay or English Language is 3.65 and higher-order thinking skills is 3.49, suggesting that teachers have relatively better attitude and beliefs for teaching Malay or English Language as compared to teaching higher-order thinking skills. The composite standard deviation for all items for teaching Malay or English Language is .44 and higher-order thinking skills is .52. Although, there were four items for which the standard deviation was lower for the teaching of higher-order thinking skills than the teaching of Malay or English Language, the composite standard deviation of .44 for Malay or English Language was lower than that of .52 for higher-order thinking skills. This suggests that teachers' responses for attitude towards teaching Malay or English Language, on average, was spread much around the mean as compared to the responses for higher-order thinking skills. There is also a statistically significant difference ( $p = .000$ ) in teachers' attitude towards teaching Malay or English Language and higher-order thinking skills.

Table 8: Malay and English Language teachers' attitude (composite - 11 items) to teach Malay or English Language and Higher-order thinking skills

	Mean	Std. Dev	t value	Sig (2 - tailed)
Malay and English Language teachers' <u>attitude</u> towards teaching Malay or English Language	3.6514	.4369	3.774	.000
Malay and English Language teachers' <u>attitude</u> towards teaching higher-order thinking skills	3.4937	.5231		

Key: Responses were on a Likert scale  
 1 - Strongly disagree  
 5 - Strongly agree

ANOVA test results (Table 9) suggest that there is no significant difference in the Malay or English Language teachers' responses for teaching higher-order thinking skills ( $p = .236$ ). However, it seems interesting to note that the Malay and English Language teachers significantly differed ( $p = .005$ ) in their responses to items suggesting their attitude for the teaching of Malay and English Language.

Table 9: ANOVA of Malay and English Language teachers' attitude for teaching Malay or English Language and Higher-order thinking skills

	Mean Sq.	F Ratio	F Prob.
Malay & English Language teachers' attitude towards	1.440	8.330	.005

teaching <u>Malay or English Language</u>			
Malay and English Language teachers' attitude towards teaching <u>higher-order thinking skills.</u>	.387	1.422	.236

On the whole, it seems that the Malay and English Language teachers significantly differed in their perceptions of their attitude as explained by these eleven items for the teaching of Malay and English Languages. Although the Malay and English Language teachers differed significantly in their responses for items reflecting their attitudes for the teaching of Malay and English Language, they did not significantly differ in their responses for higher-order thinking skills, suggesting that they have a better attitude towards teaching Malay or English Language as compared to the teaching of higher-order thinking skills.

#### Are There Any Factors Influencing Teachers' Perceptions Of Their Knowledge, Skills And Attitude?

Multivariate tests of significance were conducted on teachers' perceptions of their knowledge, pedagogical skills and attitude towards teaching Malay or English Language and higher-order thinking skills. Six background variables: sex; subject taught; number of years of teaching; academic qualification; professional qualification; and training to teach higher-order thinking skills were tested for their influence on teachers' perceptions of their knowledge, pedagogical skills, and attitude.

Except for the variable the number of years of teaching, other variables sex, the different school subjects taught, academic qualifications, professional qualifications, and training to teach higher-order thinking skills did not have significant influence on teachers' perceptions of their knowledge, skills and attitudes towards teaching Malay or English Language and higher-order thinking skills. What seems surprising in this is that teachers' training to teach higher-order thinking skills, in which case, 41.3 percent of the teachers have informed that they did not receive any form of training to teach higher-order thinking skills, did not have a significant influence on how teachers perceive their preparedness to teach Malay or English Language and higher-order thinking skills. It seems that whether or not these teachers had some kind of training (58.7 percent), or did not receive any kind of training (41.3 percent) to teach higher-order thinking skills did not have any significant influence in their perceptions of their knowledge, skills and attitude, especially for the teaching of higher-order thinking skills.

The only variable which had a significant influence on teachers' perceptions was the years of teaching. Even in this case, the number of years the teachers have been teaching has had significant influence on only on teachers' perceptions of their knowledge, and pedagogical skills to teach Malay or English Language and higher-order thinking skills. The number of years the teachers have been teaching did not have a significant influence on teachers' attitude towards teaching both Malay or English Language and higher-order thinking skills.

What Percentage Of Their Class Time Do Teachers Allocate For The Teaching Of Higher-Order Thinking Skills?

Teachers were requested to state the percentage of time they allocate for the teaching of Malay or English Language and higher-order thinking skills using the infusion approach in a medium standard form two Malay or English Language. The aim of this item was to investigate the common practices among form two Malay and English Language teachers in the Perdana School District pertaining to the teaching of higher-order thinking skills.

It could be seen from the Table 10 below that among teachers in this school district, 26 percent of the teachers indicated that they do not allocate any of the class time for the teaching of Malay or English Language and higher-order thinking skills using the infusion approach. Another 52.1 percent of the teachers suggested that they use 10 percent or less of the class time for teaching higher-order thinking skills.

Table 10: Percentage of class time allocated for teaching content and higher-order thinking skills using the infusion approach

Percentage of class time (35/70 mins)	Frequency	Percentage
0	27	26.0
1 - 10	54	52.1
11 - 20	17	16.3
21 - 30	1	1.0
31 - 40	1	1.0
41 - 100	1	1.0
Missing	3	2.9
Total	104	100

Among the teachers, 16.3 percent of them suggested that they allocate between 11 to 20 percent of the class time for the teaching content and higher-order thinking skills using the infusion approach. In other words, 77.7 percent or more than three-fourths of all Malay and English Language teachers in the Perdana School District allocate 10 percent or less of the class time to teach Malay or English Language and higher-order thinking skills using the infusion approach.

Summary and Conclusion

The form two Malay and English Language teachers in this study perceived that they are better prepared in terms of their knowledge, pedagogical skills, and attitude to teach Malay or English Language as compared to teaching higher-order thinking skills. Their perceptions are significantly different for the teaching of Malay or English Language as compared to the teaching of higher-order thinking skills. Yet, they are expected to teach both the content and higher-order thinking skills in their classrooms. More importantly, they expected to teach both the content and higher-order thinking skills using the infusion approach.

Data presented above suggest that these teachers perceive that they lack in at least two of the four categories (Grossman, 1990) required to construct the pedagogical content knowledge, the overarching conception of teaching a subject, and in the knowledge of instructional strategies and representations for teaching particular topics, especially in higher-order thinking skills. The other two categories, knowledge of students' understandings and potential misunderstandings, and knowledge of curriculum and curriculum materials were not adequately investigated in this study. There seems to be sufficient data, however, to suggest that teachers lack in the first two categories. Given this situation, it is no surprise that they find it difficult to construct the pedagogical content knowledge to teach higher-order thinking skills. Numerous writers have argued that teaching that emphasizes student understanding, reasoning, and problem solving requires richer and more flexible understandings of subject matter (Cohen, 1988).

As a result, as has been indicated by these teachers who are required to teach higher-order thinking skills in their content instruction, 26 percent of them do not allocate any class time to do this, and 77.7 percent of the teachers allocate 10 percent or less of their class time to do this in their classrooms. Even if they do attempt to teach, one could see the complex problems they face in their own classrooms, like in the case of teachers in this study reported elsewhere (Rajendran, 1998a).

The basic problem seems to be that they are not adequately prepared to make this innovation in their classrooms. It seems that there has to be a comprehensive approach in preparing teachers to carry out such innovations in their classrooms. Providing the 'sit and get' type of courses certainly do not seem to make a difference. Although 59 percent of the teachers have received some form of training to teach higher-order thinking skills, and the rest of 41 percent of the teachers did not receive any training to teach higher-order thinking skills, this did not seem to have significantly influenced their perceptions of their knowledge, pedagogical skills, and attitude to teach Malay or English Language and higher-order thinking skills. It seems that the 60 percent of the teachers who received their training may not even think that they are better prepared than those who did not receive any training to teach higher-order thinking skills. A close analysis of practices of teachers in this study reported elsewhere (Rajendran, 1998a) seems to provide much more information to understand how teachers grapple with this and many other issues. There also seems to be a real need to help all teachers learn, more so for those who have taught for more than 10 years, about this new reform and ultimately make changes in their practices in their classrooms.

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