

Malaysian Teachers' Attitudes, Competency and Practices in the Teaching of Thinking

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Abstract: The development of the third wave of Information and Communication Technology is accompanied by the growing concern on the decline of an individual's ability to think sharply and wisely. In Malaysia, this concern has brought to fore the prominence of teaching thinking skills within the school system and teachers were expected to be the agents of this change. Are teachers aware of the importance of this thinking ability? Have they been adequately prepared for this paradigm shift? Do they personally feel competent teaching for thinking in the classrooms? This survey attempts to answer these questions and investigates the relationship between teachers' attitudes and practices. It also examines if there exists any significant differences in teachers' beliefs and their practices with respect to gender, course attendance and teaching experience. Finally, it explores some of the problems faced by teachers in teaching for thinking.

Teaching thinking in school is important as it enables students to solve problems and make decisions in their daily lives. Thinking has a profound status in both Western and Islamic traditions. Socrates, the Greek philosopher representing the West was known to emphasize thinking to the extent that he was quoted as saying, "an unexamined life is not worth living for." He left the infamous Socratic method of teaching which fires one question after another in an effort to stir the mind to think. In the Islamic *weltanschauung* (world view), thinking is a vital function of the mind (*'aql*), a unique faculty that God has bestowed upon man. This is an honour for man who has been conferred a special favour above other creation.¹ God has given man the thinking

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ability so that he can read, think, reflect and understand His signs in the Qur'ān and in the world. In fact, the first verse revealed to the Prophet Muhammad (SAS) urges Muslims to think and reflect on creation.²

Thinking does not only help human beings to fulfil their responsibilities as *khalifah* (vicegerent) of God but it is also the essence of humanity as summed up in Descartes' dictum, *cogito ergo sum* (I think, therefore I am). For this reason, God equates human beings who do not think to animals because they have lost their essence of being.³ The Qur'ān uses repeatedly such terms as *fakkara* (to think), *faqih* (to understand), *dabbara* (to consider), *'aqala* (to think), and *fahima* (to understand) to emphasise thinking, and uses rhetorical questions to encourage believers to reflect.⁴

The development of thinking capability and the improvement of its quality so that students would become enlightened individuals has always been one of the major goals of education. Developing good thinking enable students to apply and make use of what they have learned beyond the classroom so that their life chances and well being will be enhanced. However, in recent years this noble goal has been superseded by pressures for content coverage and learning factual information in preparation for examinations. There was a great public alarm in the United States when test scores on higher-order tasks began to decline as revealed in the National Assessment of Educational Progress and other reports on the quality of primary and secondary education. This concern is not only expressed by scholars and school teachers but also by the business community. They are at the receiving end of the school products. Recent studies by Lipman, and Sternberg and Spear-Swerling, indicate the growing concern for the teaching of thinking among philosophers and psychologists.⁵

The Problem

Thinking skill is defined by Swartz and Perkins as "a competency that contributes to some kind of thinking."⁶ They argue that better thinking helps to improve: (a) the awareness of one's own thinking; (b) the effort in thinking; (c) the attitude towards thinking processes; (d) the organization of the thinking processes; (e) the development of sub skills; and (f) the smoothness in the thinking process. One of the ways to improve thinking is to learn about thinking and practising it as well.⁷

Thus, the underlying assumption is that thinking can be learned, and hence, taught.⁸

Given that there are many different views on thinking, many different teaching programmes have emerged and have been tested. Scholars are not in agreement on the best approach for teaching thinking. According to Barbieri and Valerie the different views of experts in this field contributed to the emergence of different programmes that used different methods and approaches to teach thinking in schools.

The development of these programmes compelled researchers to conduct experimental studies to evaluate the extent of the effectiveness of these programmes. Nickerson, Perkins and Smith's extensive review of the different types of teaching thinking programmes resulted in the conviction that none of the programmes were manifestly superior or inferior to all others.⁹ They found variability with respect to quality and concluded that the range of approaches being experimented with indicated the exploratory nature of this enterprise. They concluded that the results of any programme depended heavily on the quality of the teaching involved and that depends on the extent to which the programme helps the teacher with the teaching, rather than just providing the content to be taught.

Hugo and Ferron conducted further studies on the success and problems of implementing the teaching of thinking programme.¹⁰ They found that the success of the programme actually depends on teachers' attitudes and behaviour toward the implemented programme. A change in teachers' attitudes and behaviour would lead to a change in better teaching strategies and more inquiry learning. They found that there was a link between the development of students' thinking abilities and the development of teachers' thinking abilities. Based on the studies, Hugo and Ferron suggested that the success of a programme actually depends on what teachers think of the programme and how they teach thinking to their students as a way of implementing the programme.

It has been found that in many classroom settings, teachers have a tendency to talk to students about thinking more than to stimulate them to use it. Brandt and Costa have distinguished between teaching *for*, *of*, and *about* thinking.¹¹ Teaching *about* thinking concentrates on drawing student's attention to thinking as a subject matter and teaching about it. This makes students passive recipients of information.

Teaching *for* thinking involves creating an environment that stimulates active thinking such as allowing an open discussion and asking challenging questions in a rather implicit and indirect way. Teaching *of* thinking involves techniques that stimulate thinking, but is done in a more direct and explicit way.

Evaluative studies of teaching thinking programmes have led to the concern for teachers' role in developing students' thinking. It is true that many factors determine the success of teaching thinking, but the teacher factor seems more responsible for the success of teaching thinking in the classroom.

The Malaysian Ministry of Education, having realized its importance, incorporated critical thinking abilities among students in the school system in the early 1990s concurrent with the introduction of the Integrated Curriculum for Secondary Schools (KBSM). However, the teaching of thinking in the education system received its greatest impetus only after the Prime Minister unveiled "Vision 2020" for the nation in 1991. Malaysia's Vision 2020 describes the nation's aspiration to develop holistically in the various dimensions such as economics, social, political, psychological, spiritual, and cultural and the nine challenges facing it. One of the major challenges listed in the Plan was to foster and develop a mature democratic society, practicing a form of mature consensual, community-oriented Malaysian democracy. To meet this challenge would require Malaysians to think positively, critically and creatively. The next significant move made by the Ministry after the KBSM was the introduction of the concept of the "smart school" in 1997, whereby creative and critical thinking would become one of its landmarks, the other being the emphasis on the application of information and communication technologies in teaching and learning. Subsequently, the teacher education programmes in teacher colleges introduced a course on critical and creative thinking skills (KBKK) in 1997.

These developments gave prominence to teaching thinking skills within the school system and teachers were expected to be the agents of this change. Were the Malaysian teachers adequately prepared for this change? Were the courses offered to pre-service and in-service teachers sufficient? What were their attitudes towards value of good thinking among their students, and hence teaching for thinking? Do they personally feel competent to teach thinking in the classrooms?

Have they imbued teaching strategies and behaviours that foster the disposition to critical thinking? This study attempts to answer these questions. In addition, it investigates the relationship between teacher attitudes and practices. Finally, it examines whether there exists any significant differences in teachers' beliefs and their practices with respect to gender, course attendance and teaching experience, and the problems faced by teachers in teaching thinking.

Definition of Terms

The current thinking skill movement emphasizes four categories of thinking skills: critical thinking, creative thinking, problem solving and decision-making skills. Despite overlaps, these categories are analytically distinct. Critical thinking is concerned with critical examination and evaluation of beliefs and courses of action. It involves making critical judgement based on reliable facts and sound arguments. Creative thinking is concerned with thinking that is original and effective. It involves the production of some kind of complex product such as a piece of painting, a poem, a scientific theory, or the proof of a theorem. Critical thinking and creative thinking overlaps in the sense that creative thinking always requires critical thinking in formulating the goal and refining it, selecting alternative approaches, or refining possible solutions. On the other hand, critical thinking is always aided by creative thinking in generating reasons. Yet these two categories of thinking are distinct in that creative thinking does not yield as its product a critical assessment of a belief while critical thinking does not yield a complex, original product. Decision making and problem solving skills also overlap with critical and creative thinking skills. However, the aim of decision making is to reach for a "decision point," while that of problem solving is to reach a "solution." Another category of thinking that merits consideration is meta-cognition, which refers to "one's knowledge about, awareness of, and control over one's own mind and thinking."¹² A well-designed instruction should encourage students to become meta-cognitive because this will lead them to be in control of their own thinking.

Of the four categories of thinking, this study focuses only on the critical thinking skills. According to Swartz and Parks, there are two levels of critical thinking skills, the lower order and the higher order.¹³ The lower order critical thinking skills (LOTS) includes the ability to

compare and contrast, categorize, organize according to sequence or order, determine the parts and the whole relationship, and to reason. Meanwhile, the higher order critical thinking skills (HOTS) involves more complex thinking skills. These include the ability to predict, examine the basis of assumptions, make inferences, verify sources and evidence, generalize, establish causes, and to conclude.

Teacher attitude towards the value of teaching thinking is based on their views on the importance of thinking skills for improvement in academic achievement, its usefulness and relevance for students' success in activities outside of school and for work. Teachers' belief of their teaching competency refers to their own assessment of their own teaching competence or their sense of personal teaching efficacy. Teachers' efficacy expectations influence "their thoughts and feelings, their choice of activities, the amount of efforts they expend, and the extent of their persistence in the face of obstacles."¹⁴

Teaching strategies for teaching thinking refer to the techniques and methods employed to promote thinking skills and processes among students. This include: (a) using structured questioning; (b) applying Bloom's taxonomy of educational objectives in levels of questioning; (c) using open question more frequently than a closed question which requires only one right answer; (d) using graphical organizer; (e) using mind mapping; (f) organizing small-group work; (g) varying between individual work; (h) small-group work and whole class discussion during instruction; (i) engaging students in writing for reflection, and (j) story telling.¹⁵

Teachers' behaviour for teaching thinking refers to teachers' physical and mental action, activities and responses during teaching, which encourage thinking. This includes using sufficient wait time, asking several questions to clarify and extend a student's responses, prompt reconsideration, using precision in language and promoting precision of expression, requesting evidence, being open to "unusual" ideas expressed by students, using relevant information only in discussion and communication.¹⁶

Teacher Attitudes and Beliefs in Teaching Thinking

Not many studies have been conducted on teachers' perceptions and attitudes toward the teaching of thinking. Studies on teaching thinking should help to improve the practice of teaching thinking in schools.

Thus, one of the ways to achieve this goal is to examine the teachers' own perspectives and practices about teaching thinking. Onosko found that outstanding teachers had more positive beliefs and attitudes toward the teaching of thinking than the less outstanding ones.¹⁷ The former emphasized developing students' thinking using content as a vehicle rather than being concerned with the acquisition of the content itself. The latter viewed content acquisition as their primary goal. Outstanding teachers also gave a more detailed conception of thinking than the less outstanding teachers. In the issue of content coverage, the outstanding teachers preferred to explore ideas and issues with students in greater depth, while the less outstanding teachers preferred to expose students to ideas and issues.

Teachers' attitudes may also influence their practices. Yildirim found that teachers who were content oriented emphasized on the content of thinking while teachers who were skill oriented emphasized on the thinking skills.¹⁸ His study also showed that almost all teachers viewed the teaching of thinking as an essential responsibility both for schools and teachers. However, a majority of them perceived certain student-related constraints on the students' part rather than teacher-related barriers that hindered their efforts in teaching thinking. According to Yildirim, teachers displayed significant differences in their attitudes by school level and training in teaching thinking. There were significant differences in teachers' orientations toward teaching thinking based on subject area and gender. A clear skill orientation was more likely to be found among Mathematics, Science and General Elementary teachers while a clear content orientation was most common among English and Arts teachers. Almost all Social Studies teachers had a mixed orientation toward teaching thinking. Female teachers were more likely to be skill-oriented than male teachers. Howell found that lack of stated goal priority, absence of adequate training, socialization, and perceived bureaucratic constraints were the major inhibiting factors for the teaching of thinking.¹⁹

Teacher Practices in Teaching Thinking

Few studies have explored teacher practices in teaching thinking in the classroom. Howarth looked into the teaching of thinking skills in Physical Education in middle school through interviews and classroom observations.²⁰ The results indicated that thinking skills were taught

but with unequal emphasis. Problem-solving and decision-making skills received more emphasis than critical and creative thinking skills. Teachers did not consider at all meta-cognition in their views of the purposes of Physical Education. The findings revealed that context, including teachers' background, colleagues' values, and school culture interacted with teachers' decisions about, and commitment to, teaching thinking skills.

Jaworski conducted an ethnographic study that examined six teachers' classroom teaching of mathematics, associated beliefs, and motivation from a constructivist perspective.²¹ She found that teachers who could be seen to operate from a constructivist philosophy regularly made high level cognitive demands, which resulted in the incidence of high level mathematical processes and thinking skills in their pupils. Stuart also found that a change in classroom methods from teacher-centred to student-centred led to an increase in students' participation.²²

Jaworski and Stuart did not examine teachers' own daily teaching methods and activities that were conducive in developing students' thinking. They only investigated teachers' practices in the light of specific subjects those teachers taught such as Physical Education and Mathematics. Thus, these studies did not examine teachers' "own" teaching methods, but the methods that researchers are interested in and employed by teachers who taught specific subjects.

Gilbert examined teachers' own teaching methods and found that teachers' behaviours that stimulate thinking such as demonstrating inquisitiveness were frequently used, followed by direct teaching of thinking skills and lastly, the use of meta-cognition.²³ The lower levels of thinking were more frequently taught than the higher levels of thinking. There was a statistically significant difference between the number of thinking skills and the academic subjects that teachers taught. There were also statistically significant differences between the different academic subjects and the lower and higher levels of thinking. Reading, Science, and Social Studies have significantly higher means in teaching for thinking (direct teaching of thinking skills) than English. Science Studies have a significantly higher mean than Social Studies in teaching about thinking (meta-cognition and the thinking process). It was discovered that teachers with at least 4 hours of training in teaching thinking skills had significantly more positive practices in the teaching of thinking than did teachers with less than 4 hours of training. The

study found that the needs and interest level of students, the crowded curriculum, the demand of teaching for standardized tests, and the need for more training and materials on teaching thinking were among factors found to influence teachers' teaching of thinking skills.

In the case of Malaysia, a study of teachers in the state of Sarawak found that (a) majority of the teachers had minimal knowledge of basic skills and tasks emphasized in critical thinking; (b) attending at least a course on critical thinking improved teachers' skills and attitudes toward critical thinking; (c) the less experienced teachers infused more thinking skills in their lessons compared to the more experienced (more than 10 years) teachers; and (d) teachers with lesser teaching periods (less than 20 per week) showed more inclination to include practices that foster critical thinking in their instruction.²⁴

In another study involving history teachers, Kartini found that out of 20 critical thinking strategies only three were frequently used by one-third of the respondents, four of them were hardly used and the rest were moderately used.²⁵ There was a significant difference in seven strategies that were used with regard to teachers' teaching experience. Teachers who had longer teaching experience used most of the 20 strategies compared to teachers who taught less than 4 years.

Classroom observations showed that teaching activities were mainly teacher-centred. Several factors such as emphasis on students' examination, lack of time, lack of suitable teaching materials, the burden of other responsibilities such as administration and co-curricular activities, students' limited abilities, and weaknesses in language and reading had been identified as inhibiting teachers' teaching of thinking.

In a more recent study of English Language teachers, Rajendran discovered that teachers were not prepared to teach thinking through infusion in their own classrooms.²⁶ They also lacked the attributes to construct the pedagogical content knowledge. The number of years teachers had been teaching significantly influenced their perceptions of their knowledge and skills. Many factors such as teachers' own orientation towards teaching, curricular requirements, and myths about teaching thinking inhibit the teaching of higher order thinking skills. There is a dissonance between what teachers believed and what they practiced and the kind of teaching recommended by educational reformers. Their own orientations toward teaching were often not

changed by their pre-service and in-service training.

In summary, most research conducted outside Malaysia and reviewed in this study were concerned with evaluating the effectiveness of programmes that had been developed. Teachers' perceptions and practices were studied only with regard to a certain subject or a specific thinking skill. In Malaysia a few studies mentioned previously have been conducted which focused on teachers' perceptions and practices toward teaching thinking in history and English Language. It is necessary, however, that teachers' perceptions and practices regardless of the subjects they teach need to be examined to see if there are any correlations between them. In addition, none of the studies have really unveiled teachers' beliefs in their competency in teaching thinking, the value of teaching thinking to students, and their practices that could foster or discourage thinking in schools.

Sample

The sample for this study comprised 337 professionally certified secondary school teachers in the state of Selangor. They were randomly selected using a systematic sampling procedure from 32 schools that were chosen at random from all nine districts of Selangor. Four of these were state religious secondary schools. The schools, situated at both rural and urban areas, were quite representative of schools in Malaysia. Hence, the sample is quite representative of the population of teachers in Malaysia. An *a priori* power analysis employing Kraemer and Thiemann²⁷ showed that the sample had adequate size (at least 308) and power (0.01) to correctly reject the proposed hypothesis with a moderate effect size of 0.24 at $\alpha = 0.05$. This moderate effect size was chosen because of its practicality with respect to gathering the necessary sample.

With respect to demographic characteristics, 28.3% of the subjects were males and 71.7% were females. Approximately three-quarters (243) of the respondents were graduates who possessed the Bachelor's degree. The respondents were fairly represented from the different subject disciplines with almost a quarter each from the natural sciences group (26.4%), the social sciences group (21.9%) and the language group (26.7%). The other quarter is equally distributed between Islamic sciences group (13.7%) and the other subjects (11.2%) such as arts, accounting, commerce, economic, information technology and physical

education. Approximately, a quarter (28.2%) of the teachers had five years or less of teaching experience, another quarter (26.4%) between 6 to 10 years and the other half having more than 11 years of experience. Almost two-third of the teachers (67.1%) had been exposed to teaching thinking skills and processes through courses conducted by the Ministry of Education.

Instrument

The instrument employed for the survey comprised a self-constructed questionnaire that was developed by studying the literature and the design of a few instruments used in studies on teachers' perceptions and practices in teaching thinking. The instrument was divided into three parts: (a) teacher demography, (b) teacher beliefs and attitudes, and (c) teacher's report of their practices in teaching thinking. Teacher beliefs and attitudes are measured using two sub-scales: (a) their competence in teaching thinking (EFFICACY- 4 items) and (b) their attitudes toward the value of teaching thinking (VALUE - 4 items). Each item is in the form of a five-point Likert scale of "strongly disagree", "disagree", "undecided", "agree", and "strongly agree". An exploratory factor analysis was employed to construct-validate the two scales. The result of the analysis warranted the two sub-scales for beliefs since both were able to explain approximately 69 percent of the total variance while the four sub-scales for practices accounted for approximately 47 percent of the total variance (see Table 1).

Teacher practices of teaching thinking were not recorded through direct observation of their teaching in the classroom but were obtained as self-reports by means of the questionnaire. Teacher practices were measured by the following sub-scales: (a) lower order thinking skills (LOTS - 7 items), (b) higher order thinking skills (HOTS - 6 items), (c) strategies for teaching thinking (TSTRAT - 9 items), and (d) behaviours that model thinking disposition (TBEHAV - 9 items). The items were on a five-point Likert scale of "never", "rarely", "sometimes", "frequently" and "always." Factor analysis warranted these four scales when they together explained 48 percent of the total variance as shown in Table 1.

The questionnaire was later translated into the Malay language and a language expert through the use of backward translation checked it for accuracy. In addition, a pilot test was conducted to determine the

Table 1: Solution and statistics derived from Principal Component Analysis according to sub-scales of assessment of beliefs and practices

Measures	(1)	(2)	(3)	(4)	(5)
Efficacy		0.39- 0.65	0.37-0.81	0.60-0.90	
Value		0.67- 0.72	0.64-0.76	0.80-0.87	
LOTS		0.33-0.68	0.37-0.72	0.35-0.82	
HOTS		0.29-0.69	0.35-0.66	0.46-0.80	
T. Strategy		0.24-0.59	0.33-0.65	0.49-0.79	
T. Behaviour		0.13-0.56	0.31-0.59	-0.76-0.44	

Notes: (1) No. of factors (items); (2) Inter-items correlation; (3) Community; (4) Factor Loading; (5) Proportion of variance explained.

clarity of items in the instrument. The reliability of the instrument was established using the method of internal consistency and the Cronbach α registered 0.66 for overall teacher beliefs and attitudes, 0.83 for EFFICACY and 0.86 for VALUE. The Cronbach α registered 0.94 for overall teacher practices, 0.80, 0.84, 0.81 and 0.83 for LOTS, HOTS, TSTRAT and TBEHAV, respectively.

Procedure

The questionnaires were administered in schools by the researcher and 3 research assistants with the cooperation of 32 school principals. The school principals were informed of the purpose of the study, the anonymity of the participants and the confidentiality of the test. They helped in distributing the questionnaires to randomly selected teachers. The questionnaires were collected within one to four weeks of distribution. A total of 386 questionnaires was distributed of which 337 were returned, thus giving an encouraging return rate of about 87.3%. Two teachers and two school senior assistants were interviewed during the same period.

Teacher Beliefs and Practices

Table 2 shows a summary of the statistical means of the six sub-scales on teacher beliefs and their practices in the teaching of thinking. The mean for the VALUE sub-scale is the highest with a score of 4.23. This means that the subjects placed a high value on teaching thinking skills

to students for their personal development and work success. The means for all four sub-scales on perceived practices exceeded 3.50, with TBEHAV having the highest score of 3.85 and TSTRAT having the least score of 3.55. This finding indicates that teachers perceived that they sometimes or frequently performed practices that are inclined towards teaching critical thinking skills.

However, teachers' mean score of 3.07 for EFFICACY is lower than any of the means for perceived practices. We can interpret this to mean that the teachers were not too sure of their sense of competency in teaching critical thinking skills. Despite this uncertainty, teachers believed that they did equally teach and practice lower and higher thinking skills in their classrooms as evident from the means for LOTS and HOTS.

Further analysis of the teaching practices reveals that teachers seemed to teach lower order critical thinking skills (LOTS) in the following descending order of frequency as indicated by the means in parentheses: Finding reasons (4.10), sequencing (4.01), compare and contrast (3.92); categorization and classification (3.81); determining parts and whole relationship (3.73); definition of terms and concepts (3.71); and reasoning by analogy (3.39).

Table 2: Summary of mean of sub-scales on beliefs and practices

	N	Items	Min	Max	Sub-Scale Mean	Items Mean	SD	Var
Efficacy	37	4	4.00	20.00	12.29	3.07	2.99	8.98
Value	37	4	6.00	20.00	16.94	4.23	2.33	5.45
Lots	37	7	1.00	35.00	26.54	3.79	4.04	16.30
Hots	37	6	9.00	30.00	22.74	3.79	4.01	16.08
Tstrat	34	9	13.00	45.00	31.96	3.55	5.43	29.33
Tbehav	34	9	20.00	45.00	34.65	3.85	4.83	23.34

For higher order thinking skills (HOTS), the descending order of frequency as indicated by the means is as follows: making inferences based on available evidence and information (4.05); uncovering

assumption (3.91); making predictions (3.88); making generalization (3.78); reliability of sources (3.70); and using analogy figuratively through metaphors (3.52).

Teachers seemed to apply a wide range of teaching strategies (TSTRAT) for teaching thinking. The most frequently applied skills in descending order are: engaging students in writing for reflection (3.92); open-ended higher order questions (3.69), using mind mapping (3.68); discussing stories (3.66), structured questioning (3.65); variation of instruction (individual, group and class discussion) (3.60); forming small groups (3.51); and different levels of questioning (3.44). Teachers were not familiar with specialized graphic organizers (2.96) as indicated by the low mean.

It can be inferred from the mean of 3.89 for teacher behaviour that teachers exhibited behaviours that promote critical thinking skills in students. The most frequently applied behaviour (TBEHAV) in descending order is seeking for further explanation to clarify (4.20); being open-minded (4.14); questioning to clarify students' response (4.03); providing "thinking" time (3.90); allowing "wait" time (3.84); using only relevant information (3.71); accepting odd ideas (3.69); preciseness in language (3.61); and frequency in promptness in reconsidering students' responses (3.60).

Beliefs and Practices in Teaching Thinking

The finding indicates that there is a statistically significant moderate, positive correlation ($r = 0.46$) between the belief sub-scales (Efficacy and Value combined) and the practice sub-scale (LOTS, HOTS, TSTRAT and TBEHAV combined) at $\alpha = 0.05$. Thus, it can be inferred that the more positive the teacher beliefs are, the more positive would be their practices with respect to LOTS, HOTS, TSTRAT and TBEHAV. Specifically, Table 3 shows that the sub-scales competency in teaching thinking is statistically significant and positively correlated with all the four sub-scales on practice, particularly teaching strategies ($r = 0.37$). The sub-scale, the value of teaching thinking also correlates positively with all the four scales of practice, with the exception of HOTS, but the correlation is below the level of moderate relationship ($r = 0.3$). There is also a statistically significant moderate, positive correlation ($r = 0.59$) between the teaching strategies and teachers'

behaviour sub-scales.

Independent t-tests for differences of means in all six sub-scales were carried out for gender, course attendance and teaching period. The results indicated no statistically significant differences at $\alpha = 0.05$ for all sub-scales with the exception of teacher beliefs in his or her competency (EFFICACY). There were statistically significant differences in teachers' belief in teaching competency with respect to gender, course attendance, and teaching experience at $\alpha = 0.05$ (see Table 4). This implies that males tend to believe more in their competency than females. Likewise, those who attended courses and are more experienced tend to believe that they are more competent than those with less experience.

Table 3: Correlation matrix for all scales

	Efficacy	Value	Lots	Hots	Tstrat	Tbehav
Efficacy	1.00	.05	.19*	.21*	.37*	
Value		1.00	.14*	.08	.13*	.13*
Lots			1.00	.43*	.41*	
Hots				1.00	.35*	
Tstrat					1.00	.59*
Tbehav						1.00

*Correlation is significant at the 0.05 level (2-tailed).

Content Analysis of Open-Ended Questions

In general, most of the 69 respondents who voiced their opinions in writing, expressed agreement with the importance of the teaching of thinking in schools. They supported the indirect method. A teacher commented, "it should be infused in teaching and learning so that students will be more capable of thinking. If it is to be infused, then the text books should be revised to incorporate thinking skills." A couple of teachers felt that the teaching of thinking is effective for students who have a high level of cognitive skills and not for those who are weak or poor. According to a teacher, "the practice of creative and critical thinking skills is not appropriate for weak students because

they are lazy to think.” Another concurred in saying, “For the weak students, the practice of thinking skills is less effective because most often they lack ideas.”

One teacher felt that the teaching of thinking skills would be more effective if the class size is small, approximately between 20 to 30 students and the students are exposed to it consistently. The most frequent comment the teachers wrote pertain to teachers’ exposure to thinking skills. Among the comments are “teachers need to be exposed more deeply to thinking skills,” “teachers need to be adequately exposed,” “teachers need to be exposed to formal theory on thinking,” and “teachers need to attend appropriate courses before they can teach thinking skills.”

Table 4: T-Tests for differences of means of teachers’ belief in teaching competency and selected independent variables

Variables		N	<u>M</u>	SD	<u>M</u> Diff	df	t	Sig (2-t)	95% Con Interval
Gender	Male	93	13.02	3.05	1.01	327	2.76	0.01	0.33-1.77
	Female	236	12.01	2.96					
Course Attendance	Yes	221	12.59	2.88	0.89	329	2.57	0.01	0.26-1.6
	No	110	11.70	3.18					
Teaching Experience	less	182	11.96	2.97	-0.75	331	-2.27	0.02	-1.36-0.76
	more	151	12.71	3.00					

Interviews

Two teachers and two senior assistants were interviewed to find out their views on CT. The teachers taught Islamic Education and Living Skills. The Islamic Education teacher felt that the subject has gone through a lot of transformation from the way it used to be taught. She felt that Islamic Education teachers should be more thinking skills oriented because “from this year onwards the PMR examinations will have 100 percent emphasis on thinking skills.” She was not exposed

to teaching thinking courses during pre-service training but had attended thinking skills workshop lasting a couple of days, organized by the District Education Department. She felt very confident that “there were a lot of thinking skills that could be taught through my subject. I don’t agree that you cannot emphasise the teaching of thinking in Islamic Education.”

The second teacher also had gone through a course in teaching thinking skills a few years back. “I don’t think what is being proposed is something new. I had been doing all those things they talked about in my teaching. I think the purpose of the Ministry is just to raise awareness amongst teachers who are not aware of the importance of teaching thinking.” She felt that the course offered were more to formalize explicitly that teachers do inculcate thinking in their lessons because “now we are taught to write down the thinking skill we will be teaching implicitly in class in our lesson plans.” She felt that a separate subject on teaching thinking skills was not necessary and preferred the infusion or indirect approach. She felt that one could teach thinking skills depending on the topic being covered. “I believe we are teaching thinking skills but only when the topics permit it.” Sometimes, because of the constraint of time, the teacher feels that “I cannot wait too long before the student answers my questions.”

The senior assistant of one school was a bit skeptical on the possibility of teaching thinking skills to her students. She claimed that because of the nature of her school which has a lot of non-Malay students in remove classes, that is, the one year transitional stage to acquire proficiency in the national language for second language speakers, “it is not easy to teach these students to think if they cannot even understand conversation and express themselves in class in the National Language.” She asserted that, “teaching of thinking skills would be easier on the brighter students who already have a good command of the language.” Another senior assistant from a rural school shared her point of view. Both felt that, “because of the emphasis on good examinations results which affects a school’s reputation, everybody is preoccupied with preparing students for examinations.” Thus, the change in format of examinations will have an impact in the emphasis and ways students will be taught in school.

Discussion

This study found that Malaysian teachers in general had a high level of agreement and a positive attitude on the value of teaching thinking for their students' personal development and work success. Hence, it can be surmised that teachers were aware of the importance of critical thinking skills for learning and independence. However, despite the keen awareness of the value of critical thinking, teachers only moderately agreed on their competency in teaching thinking. This could probably be due to inadequate knowledge, experience and the skills that go along with the experience.

The result of the t-test indicates that there is a statistically significant difference in means between teachers who had attended thinking skills courses and those who had not with respect to their beliefs in their teaching competency. Thus, in a sense, the course was useful in giving self-confidence to the teachers in teaching thinking. This psychological help is evident when the study also indicates through ANOVA that there is no adequate evidence to reject equality of means between the five groups for the different course duration (less than a month, one to three months, four to six months, seven to nine months and more than nine months). Hence, it can be inferred here that it makes no difference in a teacher's belief of his or her competency whether he or she attends a long or a short course. The difference is in just attending a course itself.

The study also found that in general Malaysian teachers "sometimes" or "frequently" ($M=3.50$) exhibited practices that foster thinking, in all four sub-scales: lower order thinking skills (LOTS), higher order thinking skills (HOTS), teaching strategies (TSTRAT), and teachers' behaviours (TBEHAV). In fact, the study shows that teachers almost frequently employ teaching behaviours that encourage students to think through giving "wait" or "thinking" time, being open-minded and always tending to seek clarification from students. In practice these teachers did frequently attempt to apply lower and higher order thinking skills besides employing appropriate teaching strategies. However, employment of the teaching strategies (TSTRAT) for developing students' critical thinking skills was not as frequent as the other practices. Teachers were either not adept with the teaching strategies or they were deterred from employing them due to the constraint of time and the nature of the examination-oriented system

as expressed in their comments in the interviews. They were also probably hindered by the passivity of some of their students who were weak or have a poor command of the national language, or the large class size. That the language factor and the examination-oriented system might have acted as hindrances in teaching thinking concur with the findings of Kartini in an earlier Malaysian study among History teachers.

This study has been able to provide evidence of a statistically significant moderate, positive relationship ($r = 0.45$) between Malaysian teachers' beliefs as measured by their beliefs in their teaching competency and the value of critical thinking for their students, and their teaching practices. However, it is better to be wary that this correlation is not causal. There is also a statistically significant, moderate positive correlation ($r = 0.37$) between the EFFICACY and TSTRAT scales. This would mean that the stronger the agreement for feeling of competency, the more frequent is the utilization of teaching strategies that lend itself to thinking. Hence, improving teacher beliefs in their teaching competency, whether through courses or exposure through books, microteaching, presentation, video or in-house seminar could bring an improvement in practice.

The results of the t-tests indicated that in general there were statistically significant differences in all the six sub-scales of beliefs and practice with respect to gender, course attendance and teaching experience, with teacher beliefs in their teaching competency. Hence, we can conclude that these variables are important factors in determining beliefs and practices in teaching thinking. This finding seems to contradict the finding of Asmah that the more experienced teachers tend to include critical thinking in their lessons indirectly.²⁸ Gender seems to be a contributing factor for teacher beliefs in their competency in teaching critical thinking skills with the male teachers scoring a higher mean than female teachers. This finding agrees with the finding of Yildirim.²⁹ From the fact that course attendance is not an important variable for teaching practices, we can conclude that the courses offered are not effective and, therefore, have not contributed to the improvement of skills, strategies and behaviours in teaching thinking.

Implication for Teacher Education and the Schools

This study has provided evidence for the relationship between teacher beliefs in two aspects - value of thinking and their competency in teaching thinking - with their practices. It also provided evidence that teacher beliefs could be improved with attending courses on teaching thinking skills and its processes. Thus, any teacher preparation programme in Malaysia should consider the provision of a course on the concept of thinking and the teaching for thinking, the necessary skills and its processes within their curriculum.

More importantly, this study found that the creative and critical thinking course that has been offered during pre-service and in-service training thus far has not been effective. Consequently, it is very important for all teacher colleges and faculties of education to review their creative and critical thinking courses. These teacher preparation programmes should re-examine the courses to see whether they are teaching *about*, *of* or *for* thinking. Teacher trainees should be taught not only the theory of thinking (teaching *about* thinking), but more importantly the methodology and strategies of teaching *for* thinking, which should encourage *doing* thinking. In addition to this, they ought to be evaluated for their ability to elicit thinking skills in the practical teaching of whatever subject methodology they specialized in. For effectiveness, they ought to be able to watch model teachers teaching thinking indirectly in a particular subject whether live or on video-tape. In addition, in-service courses on teaching thinking skills and processes using the infusion approach should be given by experts in the particular school subject for the subject teachers. This proposal is in line with Nickerson, Perkins & Smith's suggestion, for an effective programme in teaching thinking, to provide teachers with the materials and also the training on how to teach the subject effectively by the expert.

The above suggestions focused on exposing in-service or pre-service teachers to the technique of the broad categories of thinking skills. For the enhancement of critical thinking, it is also necessary to make philosophy of education compulsory for Malaysian teachers. Philosophy should enhance thinking and produce more reflective teachers. According to Annis and Annis, the logic course had a consistent impact on certain aspects of critical thinking.³⁰ Philosophy of education is more meaningful because education involves values

and teachers are also made to examine students' and society's values in their discussion for the purpose of clarity, context and consciousness. It will examine underlying assumptions and fallacies in arguments. More importantly, the philosophy of education course should encourage students' weekly writing in the form of a journal to examine their ability to argue for a thesis that they believe in. In addition, these students should be encouraged to make short class presentations and be prepared to defend their points. It is only in this manner that the thinking disposition is implicitly fostered and becomes a habit.

In addition, the school syllabi should be revised and trimmed slightly to allow some time for the development of students' thinking skills. To develop thinking skills would require a lot of questioning, conversation and dialogues between students and teachers. This would require time. The school syllabi should also provide avenues to encourage students to read beyond their school textbooks. Reading new materials will always raise questions and encourage students to think, be creative or critical. The school curriculum and instructional materials should be improved to assist teachers in teaching thinking skills using the infusion approach. Textbooks should be revised because it is the most important instructional material and most accessible to students and teachers. Teachers should also change the kind of evaluation to give room to students' creativity, problem solving and critical thinking skills to be exercised. Examination questions should change from regurgitation to a more reflective or creative nature.

Finally, pilot studies on several of the well known approaches that have been used in other countries such as de Bono's Lateral Thinking and Lipman's Philosophy for Children Programme should be conducted using experimental methods, to see if there is any improvement in students' achievement in reading, reasoning, and thinking for the treated groups.

Notes

1. The verse reads: "And indeed We have honoured the children of Adam, and We have carried them on land and sea, and have provided them with *al-ṭayyibāt* (lawful good things), ... (17:70).
2. "Read in the Name of your Lord Who has created (all that exists) (96:1).

3. And surely, We have created many of the jinn and mankind for Hell. They have hearts wherewith they understand not, and they have eyes wherewith they see not, and they have ears wherewith they hear not (the truth). They are like cattle, nay even more astray; those! They are the heedless ones”(7:179).
4. See Rosnani Hashim, *Educational Dualism in Malaysia: Problems and Promises* (Kuala Lumpur: Oxford University Press, 1996), 79.
5. See M. Lipman, *Philosophy Goes to School* (Philadelphia: Temple University Press, 1988); Lipman, M., *Thinking in Education* (Cambridge: Cambridge University Press, 1991); Sternberg, R.J. and Swerling, L., *Teaching for Thinking* (Washington, D.C.: American Psychological Association, 1996).
6. R.J. Swartz and D.N. Perkins, *Teaching Thinking: Issues and Approaches* (Pacific Grove, Ca.: Midwest Publications, 1990), 19.
7. *Ibid.*, 24.
8. E.L. Barbieri, “A Unified Series of Essays and Articles on the Teaching of Thinking” (Ph.D. diss., The Union for Experimenting Colleges and Universities, 1989); L.M. Valerie, “Teaching Thinking in the Curriculum: A Study of Definition and Placement (thinking skills)” (Ph. D. Diss., University of Connecticut, 1991).
9. R.S. Nickerson, D. Perkins, & E.E. Smith, *The Teaching of Thinking* (Hillsdale NJ: Lawrence Elbaum Associates, 1985).
10. J.L. Hugo, “A qualitative evaluation study of a thinking skills program for teachers and students” (Ph.D. diss., University of Denver, 1990); M.F Ferron, “Creating a community of thinkers: a case study of the implementation of a program to teach critical thinking,’ Ph. D. diss., University of Connecticut, 1995.
11. See A. Costa, “Teaching for, of, and about Thinking” in *Developing Minds* ed. Costa, (Alexandria, Va.: Association for Supervision and Curriculum Development, 1985). See also, R. Brandt, Editorial, *Educational Leadership*, 41, 1984 cited in Swartz and Perkins, R.J. Swartz, and D.N. Perkins, *Teaching Thinking: Issues and Approaches*, 166-68.
12. Swartz and Perkins, *Teaching Thinking: Issues and Approaches*, 51. See also Som Hj. Nor & M. Dahalan M. Ramli, *Kemahiran Berfikir Secara Kritis dan Kreatif (KBKK)* [Critical and Creative Thinking Skills (CCTS)] (Petaling Jaya: Longman, 1998).
13. R.J. Swartz, & Sandra Parks, *Infusing the Teaching of Critical and Creative Thinking into Content Instruction* (Ca: Critical Thinking Books & Software, 1994).
14. A. Bandura, cited in P. Ashton, and R.B. Webb, *Making a difference: Teachers’*

sense of efficacy and student achievement (New York: Longman, 1986), 3.

15. See R.J. Swartz, & Sandra Parks, *Infusing the Teaching of Critical and Creative Thinking into Content Instruction*, 1994.

16. Ibid.

17. See J. Onosko, "Comparing Teachers' Thinking about Promoting Students' Thinking," *Theory and Research in Social Education*, 17, no. 3, 1989, 134 - 145.

18. See A. Yildirim, "Promoting Student Thinking from the Practitioners' Point of View: Teachers' Conceptions, Attitudes and Activities (Thinking Skills)" (Ed.D. diss., Columbia University Teachers' College, 1994) and "Teachers' Theoretical Orientations toward Teaching Thinking," *Journal of Educational Research*, 88, no.1 (Sept/Oct 1994): 28-35.

19. R.L. Howell, "Teachers' Perceptions of Constraints in the Social Structure of Elementary Schools which Discourage Opportunity for Critical Thinking, Dialogue and Action in Relation to Social Issues" (Ed.D. diss., Columbia University, Teachers' College, 1987).

20. K. Howarth, "Qualitative Study of the Teaching of Thinking Skills in Physical Education" (Ph.D. dissertation, Temple University, 1996).

21. B. Jaworski, "Interpretations of a Constructivist Philosophy in Mathematics Teaching (Thinking Skills)" (Ph.D. dissertation., Open University, U.K., 1992).

22. J.S. Stuart, "Developing Development Studies Through Action Research: a Study of Collaborative and Reflective Classroom Practice in Lesotho" (Ph.D. dissertation, University of Sussex, 1987).

23. C.W.C. Gilbert, "A Descriptive Study of Current Practices in Teaching Thinking, Critical Thinking Skills of Teachers, and the Factors which Affect the Teaching of Thinking" (Ed.D. dissertation, Memphis State University, 1994).

24. O. Asmah, "Critical Thinking Skills Across the Curriculum: a Survey of Teachers' Knowledge, Skills and Attitudes in Secondary Schools in Kuching, Sarawak" (M.Ed. dissertation, University of Houston, 1994).

25. B. Kartini, "Critical Thinking Skills, Dispositions and Classroom Practices of History Teachers in Malaysian Secondary Schools" (Ph.D. dissertation, University of Manchester, 1998).

26. N. Rajendran, "Teaching Higher Order Thinking Skills in Language Classrooms: the Need for Transformation of Teaching Practice" (Ph.D. dissertation, Michigan State University, 1999).

27. H.C. Kraemer and S. Thiemann, *How Many Subjects: Statistical Power Analysis in Research* (London: Sage Publications, 1987).
28. O. Asmah, "Critical Thinking Skills Across the Curriculum: a Survey of Teachers' Knowledge, Skills and Attitudes in Secondary Schools in Kuching, Sarawak."
29. See A. Yildirim, "Promoting Student Thinking from the Practitioners' Point of View: Teachers' Conceptions, Attitudes and Activities (Thinking Skills)."
30. See L.F. Annis and D.B. Annis, "The Impact of Philosophy on Students' Critical Thinking Ability," *Contemporary Educational Psychology*, 4, no. 3 (July 1979): 219-26.