HOTs in the Malaysian Classroom: A Teachers’ Perspective

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ABSTRACT
Attempts to teach thinking skills were noted in 1993 in the Malaysian classrooms as an effort to develop students’ rational, critical and creative thinking, to acquire knowledge, mastery of skills, and to use them in their daily lives. In 1994, elements of creative and critical thinking skills (CCTS) were included in conducting both pre- and in-service courses in teacher training colleges. This move was essential as to bring changes into the classrooms, teachers must be well equipped with the necessary skills or knowledge. Recently the Malaysian Ministry of Education (MOE) “step-up” the efforts in this direction by giving emphasis to Higher Order Thinking skills (HOTs) in the teaching-learning process. HOTs is tasked as the means to the ends – developing creative and critical thinkers in the Malaysian classroom, thus make possible effective problem solvers in the workforce. This study is an attempt to examine teachers’ perspective of HOTs and its implementation in two secondary schools. Teachers from different subjects were given questionnaires of their involvement in HOTs training and implementing in the classrooms. Three teachers were interviewed for closer examination of their beliefs and pedagogical practices in the classroom. Data was analysed qualitatively and quantitatively. Findings showed that HOTs activities were practised in the classes but differ in percentages in different subjects.

Keyword: Higher Order Thinking, teacher’s beliefs, pedagogical practice

Introduction

HOTs has been in the Malaysian Education system since the 1990s with the introduction of Creative and Critical and Thinking Skills in the secondary classrooms. In 1994, elements of creative and critical thinking skills (CCTS) were included in conducting both pre- and in-service courses in teacher training colleges. This concerted effort is to equip pre and in-service teachers to ingrain elements of
creativity and critical thinking amongst teachers and future teachers in the hope of extending these skills in the classrooms.

Recent development in the country’s education scenario shows an upsurge of interest in the area ostensibly due to the performance of Malaysian students in the Programme for International Student Assessment (PISA) 2012 indicated that the participating students were ranked 53th of 65 countries (OECD, 2014). Relatedly, in the Trends in Mathematics and Science Study (TIMSS) test for Science subject, Malaysia’s performance was equally low and ranked 30th out of 40 participating countries (Martin, Mullis, Foy & Stanco, 2011). Questions in this particular test focused on Higher Order Thinking skills (HOTs), where 65% of the questions focused on the thinking skills of applying reasoning, and the rest of the questions were based on lower order thinking skills of knowing (Martin et al, 2011). The other reason for the current interest in HOTs is the recent transformation of the education curriculum in the Malaysia Education Development Plan (PPPM) 2013-2025 which highlighted on the implementation of HOTs concept at all level in the system. Its intention is to produce knowledgeable students who are critical and creative and are comparable with the rest of the world. Thus before students can be taught to think about thinking teachers must be equipped pedagogically and trained to strategised and fully understand why HOTs is relevant in the classroom. This includes infusing elements of HOTs in everyday teaching and learning strategies as well as in their assessment practices.

**Background of Problem**

The interest for doing this study emerges when the authors were training secondary school teachers on infusing HOTs elements through effective questioning strategies in the classroom. Based on the sessions carried out, it was noted that most of the teachers were quite capable in constructing HOT questions or tasks for assessment purposes. However they expressed concern as to how to get their students ready for these tasks or questions. This discovery set the authors thinking if these teachers in particular, and generally teachers in Malaysia, needed help in strategies that would enhance HOTs in the classroom. In order to do that it is paramount to first find out the extent teachers in school are ready to embark on the challenge, what strategies have already been employed, and last but not least how extensive are these strategies utilized.

**Statement of the Problem**

The Malaysian school curriculum has always been committed to develop students holistically. Besides the content knowledge, emphasis is also given to
ensuring that all young Malaysians are equip with the necessary skills for success in life (Malaysia Education Blueprint, 2013). In Chapter 2 Vision and Aspiration of the blueprint, Thinking Skill is listed as one of the key element in preparing our students to be globally competitive in the 21st century. In this context, the agents to carry out this aspiration are none other than the teachers in schools. Thus, it is necessary to study the kind of support needed by these teachers to play their role well as agents of change in curriculum implementation. To do this a survey study is suitable to find out teachers’ perception of themselves in assuming the roles of agents of this change.

**Purpose of the Study**

This is a preliminary study to identify teachers’ readiness in utilizing HOTs activities and tasks in their classroom. It aims to find out, in working towards Malaysia 2013-2015 aspiration in generating a ‘thinking nation’ (Malaysia Education Blueprint, 2013), how confident and ready are the school teachers in embarking on this new challenge.

**Review of Literature**

The Malaysian Ministry of Education (MOE) concerns about the future generation has been consistent over the decades and of recent interest is in preparing the current generation of students to embrace the 21st century with confidence healthy competitiveness. Critical and creative thinking has been the focus of teaching practices from the last decade and has evolved its emphasis in Higher Order Thinking Skills (HOTs) which is deemed pertinent to prepare all students in preparation for the 21st century. Research holds that generally teachers are aware of the importance of infusing HOTs elements in the classroom however the degree of these practices are debatable ( ). Teachers need to thoroughly understand what HOTs is all about and its relevance to the future generation ( ).

**Towards a definition of HOTs**

Consequently, teachers are fully aware that to develop students HOTs ability the teaching ought to focus on developing four higher order skills which are applying, analysing, evaluating and creating, as explained in the Revised Bloom’s Taxonomy (Krathwold, 2002) These four domains entail students to develop their knowledge extended from the Lower Order Thinking skills, which are remembering and understanding, in a different condition (Dwiyer, Hogan & Stewart, 2014). The lower order thinking skills are equally important as a basis for teachers to develop thinking skills in progression to scaffold to a higher level ( ).
Brookhart (2010) defines higher order thinking skills as *i) those that define higher-order thinking skills in terms of transfer, ii) those that define it in terms of critical thinking, and those that define it in terms of problem solving* (2010, pg3).

Most teaching goals is to equip students in terms of enabling them to be able to think on their own but to be able transfer the classroom learning to the real life which Anderson and Krathwohl (2001) consider as “meaningful learning”. Transfer here means when students are able to relate their learning to other contexts beyond what was being taught, in other words when students are able to use what was taught in class in future experiences (Brookhart, 2010). The second definition of HOTs is in terms of critical thinking. According to Brookhart (2010) “Being able to think” also means to be able to reflect, reason and make sound decisions without the teachers’ assistance. The ability to be able to make critical judgement is one of the highest and relevant skill for students to maintain throughout their life. Wisdom is not at the end of the road of an education but something that should be instilled during the journey. Skills of reasoning, reflecting, making the right choice, analysing and evaluating occurs in all disciplines and various instances in life.

The third category of the definitions of teaching HOTs are those in terms of problem solving. Problem solving in general can be seen as strategising in reaching a goal (Niko & Brookhart, 2007). Which also means being able to identify the problem, define the problem, generate alternatives, evaluate and select alternatives and at the end being able to implement a solution ( ). In other words if teachers are thinking that teaching HOTs as problem solving then the goal of teaching would be preparing students to recognize and overcome difficulty academically and in their future life.

**HOTs in the educational context**

Collins (2014) proposed that teachers can use the revised categories of Blooms Taxonomy as a framework to scaffold teaching thinking skills in a structured and organised manner. He further made suggestions that teachers should “*specifically teach the language and concepts of higher order thinking and plan classroom questioning and discussion time to tap into particular higher order thinking skills*” (page10). By consciously telling students the concept and language from the taxonomy students are made aware of the level of thinking that are expected from them and this gradually will make them work to a higher level.

Research holds that giving assessment that uses Higher Order Thinking will increase students’ achievement (Brookhart, 2010). Brookhart also mentions that challenging “*students with assessment that require intellectual work and critical thinking increases students motivation as well as achievement*”. She claims that
students will be more engaged if given the challenge with higher order thinking questions because students prefer to have a “sense of control over ideas” (page 9).

There are numerous resources, in print or digital form, that proposed various ways in promoting and enhancing HOTs ideas, strategies and activities that teachers could access. A notable programme worth mentioning is Pogrow (2005) Higher Order Thinking Skills which was meant for educationally disadvantage students. The programme is based on four kinds of thinking skills: (1) metacognition, or the ability to think about thinking; (2) making inferences; (3) transfer, or generalising ideas across contexts; and (4) synthesising information. Some of the strategies used are Socratic dialogue, drama, and technology, and has been used in approximately 2,600 schools in 48 states. Pogrow (2009) believes that teaching should be dramatic and imaginative which could create an impact on the students and “fascinates them to learn any content more deeply” (p. 379).

Methodology

This section will explain the research design, provide a profile of the participants, the instruments used to collect data and how data will then be analysed. Last but not least the research questions that serve as a guide to this study

Research Design

This study is an attempt to examine teachers’ perspective of HOTs and its implementation in two secondary schools. Thus the study employs both quantitative and qualitative approach to answer the research questions. A questionnaire was used to understand what teachers perceived HOTs and its implementation, there is a need to triangulate the data gained from the questionnaire in the form of classroom observations and in-depth interviews.

Participants

The participants in this study are 99 teachers (27 males, 72 females) from two secondary schools. Both schools are in the district of Putrajaya, the centre of the Malaysian Government administration. A detailed profile of these teachers is presented in Table 1.
Table 1.  
Profile of Participants

<table>
<thead>
<tr>
<th>Gender</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>27</td>
<td>27.27</td>
</tr>
<tr>
<td>Female</td>
<td>72</td>
<td>72.73</td>
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<table>
<thead>
<tr>
<th>Teaching Experience</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 years</td>
<td>21</td>
<td>21.21</td>
</tr>
<tr>
<td>6-10 years</td>
<td>22</td>
<td>22.22</td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>17</td>
<td>17.17</td>
</tr>
<tr>
<td>&gt;15 years</td>
<td>39</td>
<td>39.39</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field of Expertise</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>27</td>
<td>27.27</td>
</tr>
<tr>
<td>Mathematics &amp; Science</td>
<td>30</td>
<td>30.30</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>28</td>
<td>28.28</td>
</tr>
<tr>
<td>Technical &amp; Vocational</td>
<td>14</td>
<td>14.14</td>
</tr>
</tbody>
</table>

From the profile, it is noted that the teachers have teaching experience ranges from 1-5 years to more than 15 years. They are also from different field of expertise: Language (English, Bahasa Melayu and Arabic); Mathematics and Science (Modern Mathematics, Science, Additional Mathematics, Physics, Chemistry and Biology); Social Sciences (history, geography, moral education, religious studies, civics and others) and Technical and Vocational (technical drawing, wood craft, economy, accounting, life skills and others).

From the pool of 99 participants three participants were identified, interviewed and later classroom observations were carried out. The three were P1, a teacher teaching Islamic Studies and Arabic, P2 a History teacher and P3 and English teacher.

Research Instruments

The main research instruments are questionnaire, interview and classroom observation. The questionnaire was adapted from Le (2013) Master’s Thesis in which the items of the questionnaire were tested and validated. The questionnaire consists of 30 items which aim to identify teachers’ readiness in using strategies to enhance HOTs in the classroom. An in depth interviews were carried out with three teachers teaching English as a second language, Geography and Islamic studies. Classroom observations were conducted with the same three teachers.

Data Analysis

Data collected from the questionnaire was analysed descriptively to obtain percentage of the Likert scale. The items in the questionnaire were then grouped thematically to explore further the strategies in which teachers used in their classroom.
The interviews were audio recorded then transcribed verbatim. The transcripts were then inductively analysed into themes. The lesson observation schedule act as a guide during the teaching and learning. These lessons were also recorded and transcribed verbatim. The analyses involved data reduction into categories and themes from the corpus of raw data (Strauss & Corbin, 1990).

Research Questions

This study attempts to answer three research questions (RQs).
RQ 1: What are teachers’ perception of utilizing HOTs activities in their teaching and learning in the classroom?
RQ 2: To what extent do teachers implement strategies that enhance HOTs in their classroom?
RQ 3: What are the strategies teachers used in infusing HOTs elements in their classroom?

Results

Results of the study reflected that the participants from both schools were quite comfortable in utilizing HOTs activities in their classroom. However the practice differ in percentages by subjects. A more detailed discussion will be presented below in reference to the research questions set.

Research Question 1

What are teachers’ perception of utilizing HOTs activities in their teaching and learning in the classroom?

When the data from the questionnaire was analysed descriptively (calculating the mean) it was found that the participants in this study were utilizing HOTs activities in their classroom. Their degree of confidence in carrying out teaching-learning activities that enhance HOTs varies from ‘very confident’ to ‘fairly confident’, with a very minimal number that said that they were ‘somewhat confident’ and none of the participants felt ‘not confident at all’.
Based on Figure 1 above, majority (55.51%) of the participants were fairly confident in utilizing HOTs activities in their classroom. They were able to plan, implement and guide teaching-learning activities that would build on their students’ HOTs. Another 44.44% of the participants felt that they were confident in conducting teaching-learning activities that enhances students’ HOTs. Only 4.04% of the participants felt that they were only ‘somewhat confident’ in exploring and encouraging HOTs among their students during teaching and learning. Last but not least one participant (constitute 1.01%) was very confident in ensuring that his/her classroom would always provide opportunities to develop students’ HOTs.

During the interview all the three participants claimed that they practised questioning HOTs questions and implement task that have elements of HOTs. The classroom observation revealed that most of the questions constructed by the teachers were Lower Order Thinking questions and only a few of the questions hit the Higher Order Thinking level. This means that the pool of questions that the teachers practised were mainly at knowledge and comprehension level. However the tasks given for groupwork employed HOTs in the activities. During the discussions students were engaged in activities which allow them to think on their own, make decisions, analyse and justify findings and later on present the findings in a presentation.

**Research Question 2**

*To what extend do teachers implement strategies that enhance HOTs in their classroom?*

Generally teachers in both schools claimed that they employed various teaching-learning strategies in their classroom to nurture students’ HOTs. This was seen in the
responses given in the questionnaire (Table 3). The mean score of each participant in utilizing the strategies listed was 3.91, which fell in the higher end of the range of ‘fairly confident’ to ‘confident’ in the Likert scale of the questionnaire. This was further reflected in the mean score for each item, a 4.08 which meant these teachers were quite confident in utilizing HOTs teaching-learning activities in their classroom.

Table 3.
Mean Score of Items and Participants

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>3.91</td>
<td>0.24</td>
</tr>
<tr>
<td>Items</td>
<td>4.08</td>
<td>0.49</td>
</tr>
</tbody>
</table>

Based on the small value of SD for both participants and items (0.24 and 0.49 respectively) the participants did not display a very diverse ability in utilizing activities that enhance students’ HOTs. In other words, participants in this study were generally quite readily employ strategies in their teaching and planning of teaching-learning tasks that would provide opportunities for students to develop their HOTs.

The classroom observations revealed HOTs activities were carried out as a final activity of the lesson; this would be staged at the end where students were fully engaged and usually displayed their findings as a closure to the lesson:

“I want you to discuss in your groups... what were the situations that have led you to quarrel among your siblings... think of the reasons of these quarrels. Then think again how you actually overcome or resolve the problem. What do you gain from this experience? Do you regret it? What could you have done instead?” (CO1)

P1 (Islamic Studies teacher) in the above extract asked the students to identify a problem amongst their siblings and analyse the problems. He later wanted them to think of ways to resolve this problem in another manner that could avoid the quarrel. On the other hand the History teacher (P2) asked her students to trace out the history of the economic development of a particular state in Malaysia (CO2). Prior to this the students were supposed to gather information from the internet, textbooks and other media and discuss the impact of these trades or agricultural activities on the current economic situation. Students discussed on why they choose a particular trade, for example “How spices infiltrate Sarawak’s agriculture activity”, then they traced the historical perspective of this development. In this activity students were engaged in finding evidence to their choice, analysing texts from the internet and textbook, summarising data, analysing and later create the journey of the spice trade.
P3’s lesson was focussed on cultural heritage and since this is a second language lesson the English teacher main contention was to encourage her students to speak and express themselves using the language (CO3). She allows them to communicate and interact as much as they could within the two periods of the lesson. The task that she asked the students to do was to analyse pictures of traditional dancers of various ethnic groups in Malaysia. In one picture there would be several dancing couple from different ethnic groups. Students were to analyse the dancers from their costumes, the colors, facial expression and actions. They need to compare differences or similarities and finally decide from which ethnic groups they belong to and on what occasion do they perform. They then displayed their findings on Mahjong papers and a gallery walk was carried out where they present their ideas, debate and convinced their friends about findings. All the activities constructed were well thought of and allow students to be engaged and think amongst themselves. Most of the time the groups are small and all students were required to participate actively.

Research Question 3
What are the strategies teachers used in infusing HOTs elements in their classroom?

As mentioned earlier, participants’ responses in the questionnaire reflected that they employed various strategies in enhancing HOTs in their classroom. And some strategies had higher preference comparatively to others.

Table 4.
Participants’ Strategies in Enhancing HOTs in the Classroom

<table>
<thead>
<tr>
<th>Mean score of items</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00 – 4.10</td>
<td>7, 12, 14, 6, 16, 9</td>
</tr>
<tr>
<td>3.75 – 3.97</td>
<td>3, 24, 27, 2, 8, 4, 26, 10, 13, 5, 25, 11, 19, 22, 15, 29, 28, 21, 30, 17, 23, 1, 20</td>
</tr>
</tbody>
</table>

Based on Table 4 above, six items (7, 12, 14, 6, 16, 9) obtained a mean score between 4.00 to 4.10, which denote that participants in this study were ‘confident’ in carrying out these activities. These activities consisted of, ‘apply information learnt’ (Item 7), ‘encourage students to question and reflect’ (Item 12), ‘use of “think, pair, share” strategies’ (Item 14), ‘use of multimedia’ (Item 6), ’strategized grouping’ (Item 16), and ‘opportunities to summarize’ (Item 9). All these reflected that the participants in this study were aware of higher order thinking such as synthesizing (Item 7 and 14), analyzing (Item 12), and creating (Item 6, 9 and 16). The remaining 23 items consisted of strategies that could be grouped under these categories: ‘teaching strategies’, ‘classroom management’, ‘alternative assessments’ and ‘students’ empowerment’. 
Table 5.
Variety in HOTs strategies (Mean=3.75 – 3.97)

<table>
<thead>
<tr>
<th>Categories</th>
<th>Items</th>
<th>Average (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching strategies</td>
<td>1, 2, 3, 4, 5, 9, 10, 12, 19, 21, 22, 28, 29, 30</td>
<td>58.33</td>
</tr>
<tr>
<td>Classroom management</td>
<td>11, 13</td>
<td>8.33</td>
</tr>
<tr>
<td>Alternative assessments</td>
<td>24, 25, 26, 27</td>
<td>16.67</td>
</tr>
<tr>
<td>Students’ empowerment</td>
<td>8, 17, 20, 23</td>
<td>16.67</td>
</tr>
</tbody>
</table>

Teaching Strategies

As agents of change in implementing the curriculum that emphasizes thinking skills, the teachers need to be able to utilize current and effective strategies that will make their classrooms motivating and enhancing for new ideas generation. Participants in this study used strategies that encouraged students to ‘think’, ‘reflect’ and ‘apply’ (Items 1-5), trained students to be ‘critical’ and ‘participate actively in class discussion’ (Items 9, 10, 12, 19), and through effective questioning ‘encourage students to utilize multimedia and other format’ to present discussion findings and ideas (Items 21, 22, 28, 29, 30). These teaching-learning strategies will provide opportunities for students to develop their thinking skills in respective subject areas.

Classroom Management

In order to provide an environment that enhance thinking skills in teaching and learning, the traditional classroom and management tactics no longer suffice (Saxena, 2013). Teachers now must ensure that their classrooms see active participation, and their roles must shift from that of an instructor to facilitator and promote use of information technologies for presentation and learning. Responses from the participants in this study reflected that they encouraged students ‘to set their own learning goals’ (Item 11); classroom tasks often required them to ‘collaborate with peers to apply knowledge learnt and compliment each other’ (Item 13).

Alternative Assessment

Formative instead of summative assessment would greatly improve participation of students in teaching-learning activities in the classroom. Saxena (2013) calls this ‘performance based assessment’. Participants in this study utilized various on-going assessment strategies in keeping track with students’ learning. Among these strategies are: ‘students’ research project’ (Item 26), ‘alternative format’ (Item 27) in presentation and ‘open ended questions’ (Item 25) that allowed students to express their opinions and give suggestion.
Students’ Empowerment

With a classroom that encourages active students’ participation it follows that students must take responsibility of their own learning. They must also know the rules, procedure, do’s and don’ts when working on their tasks. Participants in this study revealed that they confidently allowed students ‘to think aloud’ and ‘debate’ (Item 17) when making decision during assigned discussions, encouraged students to ‘decide and set their individual goal that align with the common learning goals’ (Item 8), frequently create ‘problem-based learning environment’ to allow students to take charge of their path to finding suitable solution (Item 20 and 23).

The interview and classroom observations disclosed the activities and strategies that the three teachers are comfortable with. This also depends on the learning outcomes that the teachers were planning for that particular lesson. P1 created a problem solving activity which allow students to discuss issues related to their own experiences, reconnect to why it happened, reflect how they overcame that issue, justify why they chose that path and then discuss the “if question”, if they were given a second chance what would they do to overcome the problem.

The History teacher (P2) chose a map for the students to create the journey of the economic activity of a particular state. This activity asked the students to find evidences from various sources, extricate important factors and information, and transfer all these information in a form of a map. They need to use their imagination from real facts to trace this historical journey. P3 on the other hand allow the students to do an analysis of a picture and based on the picture find evidences from the internet and do a decision making activity.

Discussion and Conclusion

Participants in this study perceived themselves as either ‘confident’ (55.51%) or ‘fairly confident’ (44.44%) in nurturing students’ higher order thinking (refer Figure 1) which conferred with the interviews and classroom observations. The teachers were confident to carry out HOTs activities however the questioning skills have to be further developed. Teachers need to not only give thoughts to the tasks that they construct but also to the questions involved in the lessons. All three participants go with the flow of the situations and the questions embedded within the stages sometimes did not reach the Higher Order thinking levels.

The ways and means of their confident level in the various aspects enquired in the questionnaire however differ (Table 5). Some were more comfortable with utilizing HOTs activities through innovative teaching-learning strategies and alternative assessment (58.33% and 16.67% respectively), others preferred flexibility
in classroom management (8.33%) that would empower students to take charge of their learning (16.67%).

These findings were indeed in line with the definition on teaching higher order thinking skills by Brookhart in his 2010 study. He believes that when students are challenged with assessment it will facilitate intellectual thinking and they will be motivated to explore and defend their arguments. This was seen in the present of ‘alternative assessment’ carried out by participants in this study in their classrooms. In addition it was found that these participants’ classroom also reflected characteristic associated with current practices that enhance development of thinking skills (Saxena, 2013; Brookhart, 2010; Niko & Brookhart, 2007). Among these characteristics are ‘student-centric’, ‘computing devices’, ‘active learning’, ‘adaptive learning’ and learners’ autonomy.

The findings from the interview and classroom observation supported that the teachers do strategised HOTs activities and the activities employed “transfer”, “critical thinking” and “problem solving” in line with Brookharts definition of HOTs. The activities also practiced Pogrow’s suggestions of a HOTs lesson which include making inferences, transfer, or generalising ideas across contexts; and synthesising information (Pogrow, 2005). The activities too relate to the students life and thus supported what Anderson and Krathwohl (2001) consider as “meaningful learning”.

Acknowledgements

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References


