

The Implementation of Higher Order Thinking Skills for Teaching and Learning

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Abstract

This paper reviews the implementation of higher order thinking skills for teaching and learning in Malaysia. Several recent studies have found that there are issues with the implementation of higher order thinking skills from aspects such as lack of knowledge on the educators' part, inadequate understanding of the strategies to inculcate HOTS amongst teachers, insufficient materials and references to teach HOTS and improper environmental settings to instil the learning of HOTS in the education classrooms. Teachers lack the appropriate pedagogical knowledge to teach HOTS (Fisher, 1999; Zohar, 1999; Zohar and Schwartz, 2005). This paper analyses further the implementation of higher order thinking skills for the teaching and learning of HOTS which is of paramount importance in order to address these rife matters.

Keywords: Higher order thinking skills; Teachers' knowledge; Implementation; Teaching and learning.



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1. Introduction

An important outcome of the educational process in Malaysia is the teaching and learning of higher order thinking skills. However, several researches indicate that the teaching and learning of higher order thinking skills do not follow a clear pathway. Studies by Zohar (2013) report that policy documents from all over the world highlight the need to teach 21st century skills. One major educational goal is developing and enhancing students' HOT (Tan and Halili, 2015).

Producing knowledgeable students who are critical and creative in their thinking and are able to compete at the international level are some of the main focus of the transformation of the education curriculum in the Malaysia Education Development Plan (PPPM) 2013-2025 (Soo *et al.*, 2015). Teachers' teaching practices are hoped to change or at least be adapted and adopted to fulfil what has been outlined in the Malaysia Education Blueprint 2013-2025, the National Higher Education Strategic Plans 2007-2020 documents and the Malaysia Education Blueprint Higher Education 2013-2025 (Ministry of Education Malaysia, 2013). Along with the principles of the National Philosophy of Education Malaysia, reform efforts by the government in the 1990s concentrated on the requirements of the Vision 2020. Among the stated efforts one main attempt was the restructuring of the education system in the country which brought about many outcomes. The introduction of a significant and explicit attempt to teach higher order thinking skills in schools was given importance. In order to promote the implementation of teaching higher order thinking skills (HOTS) in the Malaysian classrooms, the government structured a revised curriculum and resource materials for its educators. Various short courses and workshops were conducted to help educate teachers and teacher educators on the implementation of teaching HOTS (Nagappan, 2001).

Higher order thinking skills are grounded in lower order skills such as discriminations, simple application and analysis, and cognitive strategies and are linked to prior knowledge of subject matter content. Appropriate teaching strategies and learning environments facilitate their growth as do student persistence, self-monitoring, and open-minded, flexible attitudes. Therefore, these skills are the ultimatum in the field of education particularly amid student teachers in the TESL programme as it is these student teachers who will eventually take the role of English language teachers in the English language classroom in schools.

This study is guided by one research question:

01. How are higher order thinking skills implemented for teaching and learning?

The purpose of this study is based on a good number of previous studies in recent years which have highlighted various crucial concerns on the implementation of higher order thinking skills for teaching and learning. These concerns are categorized according to three main categories for the purpose of this study that can be the grounds for further research and suggestions on how these concerns on the implementation of higher order thinking skills can be resolved.

2. Material and Method

This paper provides information on the concerns associated to the implementation of higher order thinking skills for teaching and learning based on past studies by other scholars. The document analysis technique was used to gather information related with the concerns discussed. The findings of this paper based on the past recent studies have been categorized according to three categories which are teachers' lack of knowledge, insufficient materials and resources and finally teaching approaches and strategies.

References	Research Title	Concerns/Findings
TEACHERS' LACK OF KNOWLEDGE		
(Aziz @ahmad <i>et al.</i> , 2017)	Investigating the Implementation of Higher Order Thinking Skills in Malaysian Classrooms: Insights from L2 Teaching Practices	the implementation of higher order thinking skills in Malaysian L2 classrooms is very minimal and hindered by various factors, particularly those related to students, pedagogical and institutional factors implies the need for a more holistic and integrated approach involving L2 teachers, students and administrators in ensuring the successful implementation of HOTS in the L2 classrooms
(Dewitt <i>et al.</i> , 2016)	Problem Solving Strategies of Malaysian Secondary School Teachers	teachers prefer teaching facts and asking students to listen to the teachers' explanation the dominant problem-solving strategy teachers use is making analogies to similar problems teachers had problems in inculcating higher order thinking for teaching problem solving as more often teachers focus on surface level understanding of the subject matter and do not specifically teach higher order thinking or problem solving
(Balakrishnan <i>et al.</i> , 2016)	Enhancement of Higher Order Thinking Skills among Teacher Trainers by Fun Game Learning approach	important for teachers to be knowledgeable and skilful in their subject matter so that they will be able to equip students with the skills they need for future success fun game-learning approach enhances teacher trainers' higher order thinking skills teachers should equip themselves with skills and approaches on how to incorporate higher order thinking skill into their teaching and learning process teachers should encourage learning as it enhances the thinking skill of the students and is applicable in problem solving
(Latief <i>et al.</i> , 2018)	The Implementation of Higher Order Thinking Skills at Universitas Teknologi Yogyakarta in Indonesia: Opportunities and Challenges	HOTs is not easy to implement in the classroom as it requires more work, time, deeper practical understanding, a number of strategies and practices in the different contexts and situation it is very important to apply higher order thinking in the classroom as it benefits both the students and the lecturers as it develops their problem-solving skills and enables them to think critically
(Row <i>et al.</i> , 2016)	When students say "I just couldn't think": Challenges in Teaching Skilful Thinking	teachers lack knowledge in promoting metacognitive thinking among their students teachers lacked knowledge on skilful thinking and therefore were unable to implement and infuse skilful thinking elements into their daily classroom practices classroom management
(Tan and Halili, 2015)	Effective Teaching of Higher-Order Thinking (HOT) in Education	the importance of teaching HOT effectively as a matter of fulfilling a national aspiration in education is upon the shoulders of teachers teachers need to realize that the effectiveness of teaching HOT will materialize only when the traditional view of transmitting information becomes secondary to a more constructivist view which affords students active learning that harnesses meaning-making in the learning process
(Krishnan, 2014)	The Acceptance and Problems Faced by Teachers in Conducting Higher Order Thinking Skills	train teachers on aspects of critical thinking in real life as well as in their respective subject matters. If we want to teach our students to be skilful in critical and creative thinking through instructional materials, the need of teachers who can infuse these thinking skills into is essential teachers should be able to relate thinking skills to correspond to the knowledge content that they are trying to impart
(Hashim <i>et al.</i> , 2015)	Teachers' Perception on Higher Order Thinking Skills	that teachers play a crucial role in utilizing and institutionalizing changes that promote students'

	as an Innovation and its Implementation in History Teaching	cognitive and intellectual growth in implementing HOTs, the overall findings indicated that two-thirds of the teachers (66.6%) were still low-level users of HOTs in teaching educational change depends on what teachers 'do' and 'think'
(Hashim <i>et al.</i> , 2015)	Teachers' Perception on Higher Order Thinking Skills as an Innovation and its Implementation in History Teaching	teachers had positive perceptions towards the use of HOTS in language teaching most of them still believed that they needed to undergo more courses and trainings on the teaching of higher order thinking skills to enhance their knowledge on the implementation of higher order thinking skills
(Harrison, 2013)	Using the interactive whiteboard to scaffold a metalanguage: Teaching higher order thinking skills in preservice teacher education	preservice teachers did not have clear explanations of their thinking and actions when they used higher level thinking skills preservice teachers often experience difficulty in designing HOT activities for any classroom situation
Insufficient Materials And Resources		
(Ramasamy <i>et al.</i> , 2016)	Teachers' Levels of Knowledge and Interest on Higher Order Thinking Skills (HOTs) According to the Field Taught and Category of Schools	teachers' levels of knowledge and interest on higher order thinking skills (HOTs) according to the field taught and category of schools found the lack of references to be the major problems for teachers in implementing HOTs more effectively the lack of resources impacts the interest of teachers to promote the lesson towards HOTs the lack of resources for teachers show that teachers were demotivated to build their own blog to upload relevant HOTs materials teachers wished to build their own blog related to HOTs as there were insufficient materials related to the teaching of higher order thinking skills
(Budsankom <i>et al.</i> , 2015)	Factors Affecting Higher Order Thinking Skills of Students: A Meta-Analytic Structural Equation Modelling Study	factors that affect the higher order thinking skills of students indicate that besides the psychological characteristics and intellectual characteristics of students, classroom environment is a factor that hinders the implementation of higher order thinking in the language classroom
(Jhee <i>et al.</i> , 2012)	Developing Open Educational Resources (OER) For Malaysian Classrooms: The Hots Experience	although the teaching of thinking skills has been emphasized in many ways in the Malaysian education system and efforts have been done to assist the teachers to teach HOTS, the impact to change students learning is minimal one of the major reasons identified is the availability of resources based on Malaysian context
(Row <i>et al.</i> , 2016)	When students say "I just couldn't think": Challenges in Teaching Skilful Thinking	besides classroom management and mixed ability students, the lack of resources hindered teachers from implementing skilful thinking successfully in their classrooms implications for science teacher education and in-service professional development with the lack of educative teaching resources stated that the gap between the selected teachers' knowledge and implementation can perhaps be reduced by the support of educative materials for teachers to teach skilful thinking
(Fauzan and Mat, 2015)	Creative Thinking Among Preschool Children	creative thinking among pre-school children state that external resources are critical factors for the development of higher order thinking learning materials that the teachers used in the preschool teachers used a lot of learning material with various colours and shapes as they found that their students were very engaged using these materials while learning and this helped to develop their students creative thinking skills
(Hassan <i>et al.</i> , 2017)	Development of Higher Order Thinking Skills Module in Science Primary School: Needs Analysis	the development of higher order thinking skills module in science primary school found that teachers stated in their interviews that they required teaching materials to develop the higher order thinking skills of their students

		the lack of teaching materials to support the teaching and learning of HOTS is a major constraint in their classrooms
(Alhassora <i>et al.</i> , 2017)	Inculcating higher-order thinking skills in mathematics: Why is it so hard?	a problem that teachers faced in inculcating higher-order thinking skills in students is the lack of resources, such as teaching aids and poor internet access that poor internet access and a lack of teaching aids are factors that prevent the teachers from making the teaching and learning process more interesting in accordance with the aim of the Ministry of Education to integrate the higher-order thinking skills in the classroom
Teaching Approaches And Strategies		
(Sukla and Dungsungneon, 2016)	Students Perceived Level and Teachers Teaching Strategies of Higher Order Thinking Skills; A Study on Higher Educational Institutions in Thailand	students have shown a medium level of higher order thinking skills with the teachers using more knowledge development and application strategies only the more application of meta-cognitive and self-system teaching strategies so that along with gaining knowledge and application ability student may show meta- cognitive strength and self-system awareness
(Othman and Mohamad, 2014)	Thinking Skill Education and Transformational Progress in Malaysia	teachers did not seem to understand the requirements needed to cultivate critical thinking among students because although teachers perceived that they are encouraging critical thinking in the classroom they are merely focusing on the comprehension of the subject matter it is not enough for teachers to promote creativity and innovation to their students creativity and innovation must be reflected in the teachers themselves such as in their teaching methods and their approach to delivering knowledge
(Ganapathy <i>et al.</i> , 2017)	Promoting Higher Order Thinking Skills via Teaching Practices	present and future English major lecturers have better ideas to implement more effective teaching methods for their classes however, there is still room for improvement and improvisation for other similar degree programmes to implement higher order thinking skills in lectures through the effective use of ICT tools to promote better learning the use of ICT is an effective strategy to implement higher order thinking skills for teaching and learning any subject or course educators are encouraged to utilize ICT and higher-order thinking strategies in a supportive environment
(Seman <i>et al.</i> , 2017)	Teachers Challenges in Teaching and Learning for Higher Order Thinking Skills (HOTS) in Primary School	teachers need to master the knowledge and skills in the field of comprehensive planning, especially in integrating thinking skills in all subjects lesson planning must focus on certain aspects need more focus to plan the lessons in selecting and defining approaches, techniques and activities that correspond with the skills teachers must plan and prepare early, if not...the objectives and goals of teaching thinking skills and curriculum are difficult to achieve
(Sulaiman <i>et al.</i> , 2017)	Implementation of Higher Order Thinking Skills in Teaching of Science: A Case Study in Malaysia	the implementation of higher order thinking skills in teaching of science participated by three science teachers who teach in a government school, a private school and a private tuition center respectively, indicated that the teachers are aware, and they are applying HOTS in their teaching knowledge and competence are central to necessitate the quality of the implementation of HOTS
(Tajudin and Chinnappan,	The Link between Higher Order Thinking Skills, Representation and	Mathematics teachers need guidance in their lesson planning that articulate a clear

2016)	Concepts in Enhancing TIMSS Tasks	understanding of what constitute HOTS instruction, and how to implement them in regular classrooms teachers need to have knowledge on the right approaches and strategies to inculcate higher order thinking skills in their lessons in order to develop their students critical and creative thinking skills
Allen and Wern (2017)	Involvement of Higher Order Thinking Skills Within a Preparatory Course for the Malaysian University English Test	do teachers frequently emphasize the teaching of creative thinking skills through their syllabus in their lessons

3. Results

Teachers and students both in colleges and schools see critical thinking and higher order thinking skills as vital for the development of cognitive skills. However, several concerns have been seen interfering with the successful teaching and learning of HOTS among learners. Among those concerns are some at the core of the problem. Educators and researchers (Fahim and Masouleh, 2012; Yang and Gamble, 2013) have emphasized the value of the teaching of thinking. In practice, higher-order thinking is an essential tool used to compete in the global job market. In addition, developing students' higher cognition has become a critical component of educational curriculum and a desirable goal in higher education in numerous countries, including Malaysia.

This paper states that concerns regarding the implementation of higher order thinking for teaching and learning can be categorized into three themes. The themes are teachers' lack of knowledge, insufficient materials and resources and finally teaching approaches and strategies. The importance of teaching higher order thinking skills effectively as a matter of fulfilling a national aspiration in education is upon the shoulders of teachers. However, findings showed that two-thirds of teachers are still low-level users of HOTS for teaching and learning in their classrooms.

3.1. Teachers' Lack of Knowledge

The implementation of higher order thinking skills in Malaysian L2 classrooms are minimal and hindered by various factors particularly those related to teachers' pedagogical instructions. Studies indicated that teachers lack knowledge on what is HOTS and skills on how to teach HOTS. Teachers are unaware on promoting metacognitive thinking among their students. Teachers need to realize that the effectiveness of teaching HOTS will materialize only when the traditional view of transmitting information becomes secondary to a more constructivist view which affords students active learning that harnesses meaning-making in the learning process. Teachers must equip themselves with skills and approaches on how to incorporate higher order thinking skill into their teaching and learning process. Teachers prefer teaching facts and frequently stated having problems in inculcating higher order thinking for teaching problem solving which develops their critical and creative thinking skills. This is because more often teachers focus on surface level understanding of the subject matter. Teachers feel that HOTS is not easy to implement in the classroom as it requires more work, time, deeper practical understanding, a number of strategies and practices in the different contexts and situation.

On the other hand, preservice teachers did not have clear explanations of their thinking and actions when they used higher level thinking skills. They often experience difficulty in designing HOTS activities for any classroom situation. These teachers need to be trained on aspects of critical thinking in real life as well as in their respective subject matters. If we want to teach our students to be skillful in critical and creative thinking through instructional materials, the need of teachers who can infuse these thinking skills is essential. Teachers play a crucial role in utilizing and institutionalizing changes that promote students' cognitive and intellectual growth. Most of teachers still believed that they needed to undergo more courses and trainings on the teaching of higher order thinking skills to enhance their knowledge on the implementation of higher order thinking skills.

3.2. Insufficient Materials and Resources

Although the teaching of thinking skills has been emphasized in many ways in the Malaysian education system and efforts have been done to assist the teachers to teach HOTS, the impact to change students learning is minimal. One of the major reasons identified is the availability of resources based on Malaysian context which could be of great concern for the implementation of higher order thinking skills for teaching and learning. The lack of references and resources is a major problem for most teachers as it impacts the interest of teachers to promote the lessons that inculcate the teaching and learning of higher order thinking skills. A study indicated that science teacher education and in-service professional development with the lack of educative teaching resources stated that the gap between the selected teachers' knowledge and implementation can perhaps be reduced by the support of educative materials for teachers to teach skillful thinking. Some other teachers stated that when teachers wished to build their own blog related to HOTS as there were insufficient materials related to the teaching of higher order thinking skills they were demotivated to build their own blog to upload relevant HOTS materials.

In a recent study on critical thinking among pre-school children, a clear indication is that learning materials that the teachers used in the preschool are of great support for the teachers in the implementation of higher order thinking skills for teaching and learning. This is because the pre-school students themselves found various uses for the materials made available in the classrooms. Teachers claimed that when they used a lot of learning material with

various colors and shapes, they found that their students were very engaged using these materials while learning and this helped to develop their students creative thinking skills. Thus, it was clear that external resources are critical factors for the development of higher order thinking skills.

3.3. Teaching Approaches and Strategies

It is not enough for teachers to promote creativity and innovation to their students as creativity and innovation must be reflected in the teachers themselves such as in their teaching methods and their approach to delivering knowledge for the teaching and learning of higher order thinking skills. Teachers need to have knowledge on the right approaches and strategies to inculcate higher order thinking skills in their lessons in order to develop their students critical and creative thinking skills. Knowledge and competence on strategies and approaches are central to necessitate the quality of the implementation of higher order thinking skills for teaching and learning. Studies indicate that students have shown a medium level of higher order thinking skills with the teachers using more knowledge development and application strategies as application of meta-cognitive and self-system teaching strategies have developed students higher order thinking skills. The use of ICT is an effective strategy to implement higher order thinking skills for teaching and learning of any subject or course and educators are encouraged to utilize ICT and higher-order thinking strategies in a supportive environment.

Teachers need to focus on planning the lessons while selecting and defining approaches, techniques and activities that correspond with the implementation of higher order thinking skills for teaching and learning according to their subjects so that the objectives and goals can be achieved.

4. Discussion

A fundamental part of teaching and learning particularly at the higher education level is higher order thinking skills. If it is necessary for students to think and resolve problems independently and cooperatively as well as creatively, then thinking skills lessons must be not only a part of the curriculum but a larger part of practice in the classroom. Teachers need to be well informed and equipped well with their knowledge on what is higher order thinking skills and what does teaching these skills require. Besides this, teachers have to be well aware of all the pertinent techniques and strategies needed in teaching higher order thinking skills. A detailed analysis of literature indicates that teachers are faced with the problem of how to prepare and teach higher order thinking skills in education. Higher order thinking essentially means experiences that involve cognitive processes of combining ideas and information to hypothesize, generalize, synthesize, explain and arrive at interpretations or conclusions that can lead to the discovery of new meanings (Baron and Sternberg, 1987; Nagappan, 2010; Pogrow, 2005). The complexities of thought processes engage an array of cognitive construct from baseline knowledge structure of recalling facts and ideas, and information processing to one that can develop the potential to take up higher order of thinking to critical review of situation, synthesizing information and solve problems (Alghafri and Ismail, 2014). It involves complex thinking that requires effort and produces valued outcomes.

Currently, traditional pedagogical approaches are still being practiced in the teacher education environment in Malaysia. Lecturers are expected to provide teaching materials and conduct assessments as required in every syllabus. Not only do educators need to learn how to teach thinking skills, but they have to train themselves to think as well, so that they can choose the appropriate material according to the level of students (Krishnan, 2014). A major dynamic impacting the teaching of critical thinking skills to pre service teachers appears to be that these attempts are filtered through their already-held beliefs concerning critical thinking (Joram *et al.*, 1998). Beliefs are the unconscious schemas people develop through their experiences and the interpretation of those experiences (Borg, 2003).

5. Conclusion

One of the major advantages of acquiring high order thinking skills is the fact that it helps an individual to enhance their self-assessment skills as well as develop their ability to think critically and creatively. The teaching of Higher-order Thinking (HOT) has its own concerns and these concerns warrant attention. In the 21st century, one critical aspect in discussing effective teaching and learning is examining the effectiveness of teachers in developing students' capability to think while ensuring content mastery at the same time. The aim to develop and enhance students' HOTs has been a major educational goal. As a matter of fulfilling a national aspiration in education, the role of teachers in inculcating HOTs is considered as a very important and crucial aspect of teaching HOT effectively. Thus, teachers and pre-service teachers, should be well equipped with the skills to teach HOTs, in order to play their roles to decrease the emergences of students who are passive learners and lacking problem-solving skills which at present is elevated as a remarkable concern amongst various stakeholders.

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