

# Development of Higher Order Thinking Skills Module in Science Primary School: Needs Analysis

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## Abstract

Teaching Higher Order Thinking Skills (HOTS) has its own challenges and need to be emphasized in the curriculum as it is one of the skills of the 21st century. HOTS is among six main characteristics of students who aspire Ministry of Education to succeed globally. The purpose of this study is to determine the need and willingness of teachers to develop HOTS in the teaching of science in primary schools. The initial analysis is carried out based on the protocol requirements interview involving 6 science teachers in six primary schools. The results showed that the willingness of teachers in the implementation and knowledge is not enough. Teachers are also not mastered the skills to integrate elements of higher order thinking skills in science teaching. Difficulty students understand the questions and the difficulty level teachers build high-level questions are identified problems faced by teachers. The interview data also shows teachers need guidance material or HOTS module is easy to use for teaching and learning in the classroom.

*Keywords: Higher order thinking skills, needs analysis, primary science, module development*

## 1.0 Introduction

21st century skills are learning skills that require students to have higher thinking skills to remain competitive at the level of the new millennium. The national education system requires strategic efforts that seek to improve the capacity and ability of practice to a higher level and quality to be able to deal with the challenges of the 21st century. Ministry of Education launched the Malaysia Education Blueprint (MEB) 2013-2025 which emphasizes the concept of higher order thinking skills (HOTS) through three main aspects, namely the written curriculum, curriculum and assessment thinking curriculum.

Generally Malaysia's achievements in international tests is very disappointing. International studies have shown declining performance of Malaysian students compared with students in other countries. According to TIMMS report (2007), approximately 20 per cent of

Malaysian students failed to meet the minimum benchmarks in math and science compared with just 5 per cent and 7 per cent in science in mathematics in 2003 (MOE, 2013 ). TIMMS more items to the solution of such problems requires KBAT analyze, evaluate and synthesize rather than applications (Rosnani, 2012).

## **2.0 Background Research**

Changes in the Malaysian education system requires teachers willing and mastery in higher-order thinking skills. The success of a new curriculum drafted requires cooperation from everyone, especially teachers play an important role for the success of teaching and learning objectives that are effective in fostering higher order thinking skills in students a. However, there are several other factors that led to the teaching of higher-order thinking skills are emphasized. Some teachers argue that students need to first find out all the facts and concepts of a subject before they can be encouraged to think (Sukiman et al., 2012).

In terms of implementation, as stated by Najeemah (2007), the application of science in cognitive taxonomy levels do not apply. In the context of integrating HOTS in subjects in schools in Malaysia, which trained teachers should have the basic things such as knowledge about the subject, skills to teach those skills and attitudes appropriate. In addition, the willingness of teachers to handle teaching and learning demanded by an innovation is one of the key variables that determine the success or failure of these innovations (Rajendran, 2001). There are a number of previous studies that assess the readiness of teachers in the teaching and learning that integrate HOTS. The major problems faced by teachers is the unwillingness of teachers to implement this agenda is because knowledge and skills (Rosnani & Suhailah, 2003).

## **3.0 Literature**

Possession HOTS is a requirement for students to learn science. Thus, when teachers implement instructional containing pedagogy helps students develop higher order thinking skills (HOTS), directly teachers strive to improve student achievement (Boaler & Staples, 2008). Thinking skills can be applied in all disciplines by providing thought-provoking questions to the students (Pither & Sodan, 2000). The main goal of science education is to help students improve higher-order thinking skills to help them face the challenges in their daily lives by improving cognitive skills such as critical thinking, reasoning, reflective thinking and science process skills (Zachariades et al.,2013). The main goal of education is to foster higher order thinking skills among students of all ages.

To create an environment that has a class who think, teachers and students get together to encourage and support each other in their efforts to involve themselves in an environment that trigger thinking (Beyer, 1997). Thus, the teaching-learning strategies to develop thinking skills to be considered for developing the skills and competencies mastered the knowledge, in particular the concepts in the curriculum subjects (Abd. Rahim, 1997).

## **4.0 Research Objectives**

1. Identify readiness and needs of teachers in the teaching of higher-order thinking skills in science school rendah.

2. Determine problems faced by teachers in the process of compounding higher-order thinking skills in science teaching and learning in primary schools

### **5.0 Methodology**

This study is a qualitative research through structured individual interviews with science teachers involved as respondents. They consist of 6 primary school teachers from six primary schools. The sample selection was done for samples (purposive sampling) because this study only involves science teachers which their experiences from five to ten years services. The sample consisted of 4 males and 2 females. Structured interviews were constructed based on the research objectives. Interviews were confirmed by two experts. This study aims to identify the readiness and needs of teachers in the teaching of higher order thinking skills in science subjects for primary school and identify the problems faced by teachers in the process of infusion of higher order thinking skills in science teaching and learning in primary schools.

### **6.0 Findings**

The findings show that the course provided less effective in focusing teachers on the importance of teaching higher-order thinking skills in science subjects. The findings also showed that the teachers do not understand and do not remember about the levels of Bloom's taxonomy, which is used as the basis for higher order thinking skills. Some teachers can not mention all the levels in Bloom's taxonomy. The study also found that teachers hard to give examples of the questions that are high levels. The results showed that the willingness of teachers in the implementation and knowledge is not enough. Teachers are also not mastered the skills to integrate elements of higher order thinking skills in science teaching. Difficulty students understand the questions and the difficulty level teachers build high-level questions are identified problems faced by teachers.

The study also found that teachers are not sure what the appropriate strategies and methods used in applying thinking skills in the process of teaching and learning. No disclosure of the specifics of strategies or methods that should be used to apply HOTS in the process of teaching and learning. Interviews also revealed that all teachers said they need a set of guidelines or appropriate modules that can be used as a guideline for them to carry out the compounding process HOTS in teaching and learning. Also teachers need effective pedagogical guide to help implement HOTS in primary science teaching. Rajendaran (2001) suggested that teachers be given support to implement innovation in the classroom. This support system includes aspects such as reference materials, material resources to conduct teaching and learning through HOTS. Choirapanthiyil (2007) states that the source material is the major constraint for HOTS teaching in the classroom. Lack of material resources and stimulating environment is an obstacle to the students to think in the classroom.

### **7.0 Conclusion**

This study is a study that focuses on the needs analysis is limited to 6 teachers and science teachers in six primary schools experienced teaching 5 to 10 years. Nevertheless, the findings can give input about readiness, problems and needs of teachers in integrating KBAT in science

teaching and learning in primary schools. These findings can be used as a backup to study in the future to develop appropriate pedagogical tools needed by teachers of primary science in integrating HOTS in teaching and learning.

As a result of the findings of interviews that have been conducted, generally researchers found that teachers require guidance or module that contains the appropriate teaching pedagogy to apply HOTS in primary science teaching. The main problem faced by teachers is the lack of modules that can be used as a guide during the process of teaching and learning because teachers do not attend courses or workshops dealing specifically with how to integrate KBAT pedagogy in teaching. Therefore, it is proposed to develop HOTS modules in science subjects in primary schools.

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