

Education in Malaysia: A Review

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Abstract

HOTS can be defined as a concept based on learning Taxonomies Bloom that concerned on analysis, evaluation and synthesis (creation of new knowledge) that required different learning and teaching methods than learning of facts and concept. In other words, HOTS concept concentrate on student understanding in learning process based on their own methods, and able to train students to think creatively, critic and innovative. Due to advantages of HOTS concept, the Malaysian Education System is transforming from 'chalk and talk' to 'students' centroid'; and yet the concept is continuously changing into Higher Order Thinking Skills (HOTS) that applied into students' mindset today. Although there is various issues and problems exist among teachers, between-teacher-and-students, and among students on the acceptance of HOTS concept, however, continuous research study is required to increase the effective of implementation on HOTS concept into the mindset which will increase the quality of education system in Malaysia.

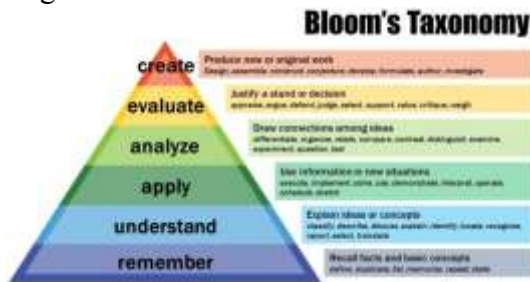
Keywords: HOTS, Taxonomies Bloom, implementation, quality education system.

Introduction

In transforming the education, various policy has been develop to improve the education's quality in Malaysia as the same with developed country, particularly in terms of Higher Order Thinking Skills (HOTS). According to Tomei (2005), HOTS concept involve with higher cognitive skills with analyse, synthesize, evaluate, and produce new idea. Thinking skills is a process of using the mind to understand, analyze, and solve problems. It can be categorized into two level, namely Low Order Thinking Skills (LOTS) and High Order Thinking Skill (HOTS). Before mastering the HOTS, students are required

to dominate LOTS concept which constitute three lowest levels in the pyramid of Bloom's Taxonomy such as remember, understand, and apply. Analyzing, evaluating and creating are in the top three levels of pyramid is called HOTS. Students will use HOTS such as analyzes, comparative difference, interpret, evaluate and generate ideas when given a task to be completed (Quellmalz, 1985). Therefore, the ministry of Education are much encourages teachers to provide various questions involve with HOTS to produce young generation capable of facig the challenges in the 21st century (Malaysian Education Development Plan, 2012).

Figure 1: The level of HOTS and LOTS



Source: Bloom (1956)

Discussion

Nevertheless, majority students in the country is having difficulty in solving the HOTS questions or tasks due to not understanding the questions need. HOTS concept will fail to solve problems when there are failure to understand the needed of questions that being ask (Poo, 2014). Hence, researchers had proposed using decode in helping the students through finding keywords, which can be used in outlining the important clues in the questions. These methods are able to reduce misinterpretation on the questions, especially among the students that have poor performance. As a proved, this method had given positive impact where student's results indicated an increasing in the mean differences between pre-test and post test (Ping and Hua, 2016 & 2015). In additional, based on the interviews and participants observation are resulted in positive impact. Nevertheless, concentrates and focuses only toward the keywords in question may develop another issues where majority students will ignore the need to read, understand, and analyze the requirements of the questions in overall. Indirectly, this action will cause difficulty for teachers to train accurate HOTS concept into students, although the students already

able to solve HOTS questions with lacking of high level thinking skills.

Moreover, result provided using qualitative approach with small samples size is possible to represent the findings of HOTS questions, but the choosen of respondents is more likely toward the teachers and not the students. Taking an example, if the total students are 15 with each 5 respondents are from good, moderate and weak classes respectively, then the result provided will be bias and not represent as whole classes. On the other hands, quantitative approach is consider as more eligible to apply in HOTS questions with students are involve to present as respondents. The minimum sample size will be 300 students, where results providing are more reliable (Krejcie and Morgan, 1970). According to Krejcie and Morgan (1970), the sample size of 159 respondents represent the population of 270 people, and this show the level of reliability of findings for the study are vety low because the number of selected samples may not be representative of the population that being tested. Present review study highlighted that researchers suggest purposive sampling can be applied in HOTS concept, where samples are determined according to the level of Mathematical archievement test results and divided into three group namely good class, moderate class, and weak class. By using this method, researchers can evaluate either the decode method is suitable for all levels of students, especially to poor classes. The sample selection is very important to know either the method use is effective or *vice versa*.

Continuously, a study conducted by Yip (2014) indicate that selected respondents are excellent students will be

given a task by evaluating on the use of sakamoto in helping students to solve non-routine problems that can increase HOTS concept. Probably the evaluation is to define weaknesses exist in apply sakamoto method solving HOTS question, but the finding will be contribute in advancing the sakamoto method and not solving the HOTS concept. In other words, the selection of respondents is bias and lack focusing on weak students, which contribute the research in not overall. Selection of sample of population should be avoid for bias, where the result provided from research study are more accurate (Cohen, 1977). Additionally, researchers agree that non-routine questions should be introduced daily to develop HOTS concept among students and not only depend on the textbooks. However, activity for exposure to non-routine question are considered as limited due to teachers that are dislike to seek challenges for the students. Indirectly, this action had lead to Malaysia's performance in Trends in International Mathematics and Science Study (TIMSS) and Programme for International Student Assessment (PISA) decreased. As a proof, Malaydia rank among the lowest and are among the lower than international average and Organisation for Economic Co-operation and Development (OECD).

The condition become worst when teachers are overvalue on routine problem solving skills involving with basic calculation (e.g. algorithms) and have neglected the cognitive development in Mathematics (Poo, 2014). Yip (2014) also stated that students are not able to translate and integrate the information due to less skilled of strategies to solve problems. However, this issues and problems are not being elaborate further. Possibly, the main factors to cause these issues and problems

are involve with excercises provided by the Ministry of Education (MOE) which is less non-routine problems. In other words, too depend on textbook are encouraging the routine questions into students mindset. This situation will led to fewer students exposed to non-routine questions and apply HOTS concept as a whole. Indirectly, the MOE desire to train HOTS into students are hardly to be achieve. Second factor is the teacher itself that are not exposed to non-routine question and not having advanced skill in HOTS concept (Caroline and Ambotong, 2014). Therefore, majority teacher are tend to teach the student based on the textbook and its limited the scope on routine questions.

Caroline and Ambotong (2014) noted several number of facors and issues related with HOTS concept in novice teachers. As stated, novice teachers is new teacher who served less than 3 years and having very less expereince, especially involve with knowledge management, teaching management, and HOTS concept. Therefore, the researchers stated that implementation of HOTS in teaching in classroom will face difficulty due to lack of disclosure of knowledge and skills in the field among novice teachers. Apart from that, the study also stated that unwillingness of novice teachers in shouldering the task of educating young students thinking skills explicitly also be a factor in failure the disciples of the country to solve the HOTS questions. This is because every students will have different learning style, and the teachers need to plan wisely oriented activities of HOTS question based on the students learning styles especially towards the solving on-the-spot for HOTS questions. By this way, novice teachers will be able to manage knowledge systematically and

implementation on teaching HOTS concept in school effectively.

The study shows that novice teachers play an important role in ensuring HOTS concept can be done well in school. A case study can be conducted through pilot study by using questionnaire to test on the effectiveness of HOTS question applied by teachers and students' acceptance on the HOTS concept. The pilot study is required to be conducted before carrying out the data collection, in ensuring the reliability test of questionnaire is accurate and not biased. Additionally, total sample size are 400 novice teachers that carry out in Sabah state. The researchers using random sampling according to zone in Sabah. The study is important to explore weaknesses and deficiency in learning process between novice teachers with students that apply HOTS concepts. After the factors are detected, more research study can be carried out to define solution towards the issues and problems, so that the HOTS concept can be implemented successfully into students' mind.

In contrast to a study conducted by Abdullah and Mohamed (2007), which the research stated that focuses on learning aids (BBB) such as computer could encourage the use of thinking skills in students. Researchers compare the development of education from the early 60s up to today had using various different approaches. The development of education did change with time, where previously more focused on teacher-centered approach, but has now changed to a student-centered. Students should explore their own knowledge presented by the teacher and the teacher will act as supervisor. By this approach, it may encourage students to think in a more meaningful way. Indirectly, this approach

can train students for high-level thinking that are intended by the government and in line with the national education philosophy. Apart from changes in terms of approach, the curriculum content is also changing where it is more focused on solving problems that emphasizes critical thinking skills and creative (CCTS) and the use of information technology (ICT) for the use of technology can change the way student learning and developing skills think the students to a higher level when students are given a task to be completed (Ibrahim et al., 2005).

Researchers do agree with Yip (2014), where majority teachers are likely to issues or highlighted the same concept that being taught in textbook to the students. This occurs due to some teachers are not interested in using the facilities provided using technology and believes the traditional method is still relevant to the examination system. Although traditional methods are still relevant to the current assessment system, but it's less efficient because the teacher-centered concept will cause students to not think critically and creatively. If the students are able to think scientifically, the issues and problems involve with HOTS concept can be resolved. Based on this result finding that using ICT can encourage students to use HOTS in learning sessions. The study involves a qualitative approach with concentrated only 3 students. The instruments used were software modules KDE Interactive Geometry (KIG) developed by the researcher himself, where students are required to discuss with teachers in connection with the module and interviews with students to identify the thinking skills used. Interviews found that students using HOTS to analyze every question asked by the researcher and capable of making

conclusions based on analysis and correlation features that are on the circle. The findings of this study can be concluded that hand-on activities using ICT to encourage students to think at higher levels. However, the teacher as a facilitator should play an important role in encouraging students to think through the questions submitted.

In a study conducted by Haron, Badusah, and Mahamod, (2016) noted the importance of HOTS in helping students to generate ideas in essay writing and edutainment methods included to help students unearth creative ideas when writing essays. Although different subjects that being used in the research, but from the journal stated that it can be assessed on the importance of HOTS concept in helping students to master certain. The researcher uses experimental study to measure the effectiveness of the elements of song and poetry to help students write a good essay. Post-test results showed there were improvements in the experimental group compared to the control group where the level of pre-test result showed that both groups had similar results. Apart from the method used to play a role in increasing HOTS in students, teachers also play an important role as disclosed by Caroline and Ambotong (2014). Teachers need to be creative and innovative in generating ideas and capable of creating a difference by using the resources available to encourage students to think at a higher level. The researcher also said most teachers focus on questioning challenged too low (Salleh, 2005) and it was very popular to be used where concentrated to remind words literally (Abu et al., 2002). This is consistent with a study conducted by Yip (2014) which states Mathematics teachers less produce non-

routine problems to the students and teachers themselves have no control of HOTS (Caroline and Ambotong, 2014). This study is the lack of sampling in which respondents were not balanced between the experimental and control groups can not be chosen at random as bound by the rules set by the school. Researchers can expand the number of sampling by selecting a number of schools in zones such as that carried out by Caroline and Ambotong (2014) for the study of higher reliability.

Saad et al (2011) conducted a research survey to assess the perceptions of teachers and teaching thinking skills in mathematics teaching and learning in the classroom. Questionnaires were distributed to obtain feedback from teachers and the findings showed that teachers positive outlook on teaching thinking skills in the classroom and there was no difference in perception between male and female teachers as well as experienced and less experienced teachers. The findings also showed that the relationship between perceptions of teachers and teaching thinking skills. This study is vulnerable to bias because when groups of respondents were aware that they were being investigated would be possible that a change in their normal behavior (Idris, 2010). Researchers do agree with Idris (2010) because the surveyed respondents do realize or have some idea about it, and the respondents might change their answers, whether knowing it correctly or not, and this may led to researchers to get a good and positive feedback about the respondents. However, when research surveys complete, it can precisely represent a view in the population studied. Thus, a total of 144 mathematics teachers from 22 secondary schools in Muar district were selected for

this study is that the findings could provide insight and recommendations to guide the implementation of teaching thinking skills in the teaching and learning of mathematics in Muar. Similarly, a study conducted by Muniyandy and Narayanasamy (2015), 200 secondary school teachers have been sampled. This study aimed to identify the level of knowledge of teachers in the HOTS. To facilitate the process of data acquisition, questionnaire used in this study. However, this study shows that 100% of the samples not be exposed to the HOTS. Muniyandy and Narayanasamy (2015) finding contrasts with the findings of a study conducted by Saad et al. (2011) found teachers positive outlook on teaching practices HOTS. In my opinion, this is due to samples taken in both of these studies are in two different areas. Muniyandy and Narayanasamy (2015) samples can only be representative of the population in Subang and Kota Damansara while samples Saad et al (2012) can represent the population in Muar only.

In addition to research surveys, qualitative research such as interviews are also used extensively for collecting data on phenomena that can not be observed directly, like attitudes, beliefs, intentions, opinions, experiences, values held, interests and so on. Bakry and Firdaus (2013) and Kassim and Zakaria (2015) conducted a study HOTS with the interview. In the study Bakry and Firdaus (2013), 10 mathematics teachers from secondary schools have been selected as a sample while only 4 mathematics teachers involved in the sample under investigation Kassim and Zakaria (2015). Is the appropriate sample size in qualitative research? In qualitative research there are no set rules for sample size. The sample size depends on the purpose of research, the objectives and the research

findings are used to measure how well the resources available to it, including time. In other words, the appropriateness of the research sample size should be evaluated in the context of the investigation itself. Using interviews, the problems encountered and the needs of teachers can be identified such as difficulty building HOTS questions and difficulties students understand the question (Kassim and Zakaria, 2015). HOTS courses in mathematics and the supply of modules or materials of sufficient resources is also one of the causes of these problems occur. Researcher agree with the findings of this study as one of the teachers at the school, where majority teachers are lacking of disclosure about the teaching and learning of mathematics HOTS. By then, the MoE has also played an important role in ensuring the implementation of HOTS smooth as expected in the Blueprint 2013-2025 (MOE, 2012) as HOTS organize courses to teachers in school.

In a study conducted by Salma (2010) found that HOTS can be enhanced through problem-based learning. These findings together with the fact that the problem-based learning (PBL) is an effective method to promote HOTS. Based on the definition of the beginning of PBL in Model Classic by Barrow and Tamblyn (1980) set out in writing and mojar Baden and Major (2004), PBL is a real problem that complex situation and not have the answer right or wrong. Students will gain new information through self-directed learning and the teachers only as a guide. Researcher do agree with these findings because the PBL is a student-centered teaching method in which students need to make the analysis and synthesis of the given problem and evaluate or create solutions that matter most suited at the end of the

assignment. PBL has provided opportunities for students to apply HOTS. However, on the same time, researcher are disagree with Salma (2010), who wrote in a research objective reality that is too open, which can be applied to identify the extent HOTS through PBL. Researcher are highly propose that the objectives are written as identify the HOTS through PBL.

Conclusion

As conclusion, either qualitative approach or quantitative approach are apply in research framework, the sample size and sampling area, and methods used to analysis data have to be clearly stated, so that the research study can be further continue for better finding and increasingly the quality in education (Hua, 2016). On the other hands, the teaching of higher-order thinking skills is an element that must be implemented by teachers as was contained in the syllabus and the syllabus of high school mathematics in order to produce young people who excel and be competitive in a world of increasingly advanced.

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