Investigating Teachers' Implementation and Strategies on Higher Order Thinking Skills in School Based Assessment Instruments

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ABSTRACT

Higher Order Thinking Skills (HOTS) among students is crucial to be developed in the education system as to prepare students to face the 21st century situations as well as to develop students to reach their full potential. In Malaysia, the integration of HOTS in the new School Based Assessment is a move towards realizing the government's aspiration of achieving a quality education system. The study seeks to investigate teachers' challenges and their strategies on integrating Higher Order Thinking Skills (HOTS) in School Based Assessment (SBA). This study was conducted at three Secondary schools in Tawau, Sabah, Malaysia. This study has been conducted using the descriptive quantitative research design. The instrument used is questionnaire and 68 teachers who are teaching Form One, Form Two and Form Three students at the schools participated in this study. Data is analysed using descriptive statistic and frequency, percentage, mean and standard deviation are analysed by using SPSS package (version 22). The results of the finding outlined several challenges faced by the respondents during the integration of HOTS in SBA instruments. The findings in this study also highlight the strategies employed by teachers to integrate HOTS in SBA.

Keywords: Challenges, Higher Order Thinking Skills (HOTS), School Based Assessment (SBA), and Strategies

INTRODUCTION

BACKGROUND OF THE STUDY

Education has been a vital predictor of the successful development for any country. In today's challenging world, the successful development of a country relies on the knowledge, skills and expertise of its citizen. Education in Malaysia plays a vital role for the country to achieve its aspiration to be a successful and developed country that is able to provide better life for its people. The need for rapid development of excellent education is crucial to the economic, social, and political well being of developing nations (Braun, Kanjee, Bettinger & Kremer, 2006). With the realization that education plays a vital role in achieving the country's aspiration, Malaysia had decided to transform its education system to provide quality education for the human capital of the country.

In 2011, Malaysian Ministry of Education (MOE) has launched a comprehensive review of its education system by developing a new National Education Blueprint 2013-2025. The new National Education Blueprint is an initiative taken by the Malaysian government to transform its education system to have quality standards recognised internationally. School Based Assessment (SBA) is a part of the educational transformation with the objective to enhance the effectiveness of the education system in assessing students' academic progress and personal development (Che Noraini, Adlina, &

Nurhidayah, 2013). SBA is a formative and a continuous assessment in which teacher can assess students based on various forms of assessment such as observation, quizzes or tests, students' presentation, project works or experiments in everyday classrooms. SBA allows teachers to collect samples of students' performance over a period of time and then finalize the best results for students' achievement record. Besides, SBA also allows teachers to gather information for the purpose of reflective and improvement of their instructions.

In the 21st century, students are required to master thinking skills in order to deal with many situations that arise in the real world. Onosko & Newmann (1994) as cited in Noraini & Khairul (2014) defines Higher Order Thinking Skills (HOTS) as "the use of the potential of the mind to cope with new challenges. This requires someone to understand HOTS, translate, analyze, and manipulate information". The realization of the importance of developing students' HOTS has become one of the objectives of Malaysia educational policy to be transformed and it is reflected in the SBA. Students' HOTS can be developed through teaching and learning as well as assessment. Basically, our previous National Education System which is examination-oriented had driven students to learn and memorize information to pass examinations (Norazilawati, Noorzeliana, Mohd Sahandri, & Saniah, 2015) until the society forgot the main purpose of assessments. The traditional standardized assessment whereby memorization or rote learning is emphasized is rigid and has caused lack in practicing the Higher Order Thinking Skills (HOTS) among the students. Therefore, the assessment design of SBA will lessen teachers' and student's tendency to predict what topics and questions will come out or implement rote learning. The assessment transformation from summative to a more comprehensive assessment of both summative and formative under SBA leads students to think critically and apply their knowledge in different settings (Malaysia Education Blueprint 2013 – 2025, 2012).

The understanding of HOTS and SBA are very important because teachers are the reliable person to assess students' performance and to understand the framework of the subject area (Azlin, Ong, Mohamad, Rose, & Nurhayati, 2013). Teachers need to be capable of deciding assessment methods and constructing assessment tasks that appropriately assess the intended learning outcomes to be assessed. However, Malaysian school teachers do not succeed in this intention. They assessed what they can assess and what had been covered in the class (Mohamad, 2006; Salbiah, 1995 as cited in Lim, Wun, & Chew, 2014). In order for a system to be successfully implemented, the consideration of its implementers' knowledge and skill on how to execute it successfully is important. Misinterpretation may lead to wrong instructions and actions in which it would seriously have negative consequences not only on the students but also everyone involved (Nor Hasnida, 2015). Hence, it is important to understand teachers' understanding on HOTS instruments integrated in the SBA, the challenges that teachers faced on integrating HOTS in SBA instruments and the strategies they have implemented to integrate HOTS elements in SBA instruments.

STATEMENT OF THE PROBLEM

This study is conducted because of several issues that arose in the area of teachers' competencies providing effective and quality assessment. Researchers have found that teachers' competencies in constructing and implementing SBA becomes a concern for the stakeholders. One of the main concerns is in the area of teachers' assessment literacy (Lim, Wun, & Chew, 2014). "Researchers have revealed that many teachers are ill-prepared to develop various methods of assessment and to create assessment tasks, especially authentic assessment" (Bol, Stephenson, O'Connell, & Nunnery, 1998; Stiggins & Conklin, 1992; Wiggins, 1989 as cited in Lim, Wun, & Chew, 2014). This reflects the weakness in assessing students especially in the SBA which is deemed to be an effective assessment for students' learning.

Apart from that, another issue arose that leads to the study to be conducted is due to the problem of teachers' competencies in integrating HOTS in SBA instruments. Teachers who are less skilled and less prepared in constructing assessment tasks, perceive these to be more challenging and difficult than constructing traditional paper-and-pencil tests (Lim, Wun, & Chew, 2014). This indicates that teachers still face challenges in constructing various assessments methods in assessing the students' learning outcomes despite being the main agent that assess and develops students learning experience. In

addition, findings of a study done by Sivapakkiam, Fadzilah, Habsah, Umi & Rozita (2016) reveals that teachers' knowledge on HOTS is still at a medium level. This becomes a main concern for the stakeholders as HOTS is being emphasized in the development of students' cognitive skill as well as the aspiration that the country holds to achieve excellence in the education system in this 21st century.

While studies done by Lim, Wun & Chew (2014) and Sivapakkiam et al. (2016) have reported on the lack of competencies of Malaysian teachers' assessment literacy, it is also notable to identify the challenges that teachers faced in constructing quality assessment. As reported by Wirawani & Wirawahida (2016), teachers admitted that the assessment tools provided in the SBA are not sufficient to develop students' HOTS. Focus should also be on the teaching and learning events in the classroom instead of just having a method to test the students. If the assessment tools are not sufficiently provided to guide teachers to construct HOTS instruments, it would be difficult for teachers to be clear on strategies to construct HOTS instruments in SBA. Moreover, it was also found that lack of references such as the experts and assessment materials are the major problems for teachers to implement HOTS integration in SBA instruments effectively (Sivapakkiam et al., 2016).

Besides, it is important to find out the strategies that teachers adapt or adopt in the integration of HOTS in SBA instruments. The identification of the strategies adapted or adopted by the teachers should be analyzed and they provide important information for the stakeholders' future reference to better the system. In addition, as there is lack of studies have been done to investigate teachers' challenges and strategies on integrating HOTS in SBA instruments, this study seeks to provide significant knowledge about teachers' everyday situations in preparing quality and effective assessment. Hence, this study aims to answer the following questions:

1. What are teachers' perspectives on the importance of HOTS in SBA?
2. What are the challenges that teachers faced on integrating HOTS in SBA instruments?
3. What are the strategies used by teachers to integrate HOTS element in SBA instruments?

REVIEW OF LITERATURE

THE CONCEPTS OF HIGHER ORDER THINKING SKILLS (HOTS)

Bloom's Taxonomy was developed by an educational psychologist Dr. Benjamin Bloom in 1956. Bloom's taxonomy consists of three domains of learning. They are cognitive, affective and psychomotor domains. "In each of Bloom’s three taxonomies (cognitive, affective, and psychomotor), lower levels provide a base for higher levels of learning" (Bloom, 1956; Kauchak & Eggen, 1998; King, Goodson, & Rohani). Bloom’s Taxonomy is a multi-tiered model of classifying thinking according to six cognitive levels of complexity. The lowest three levels are knowledge, comprehension, and application. Meanwhile the highest three levels are analysis, synthesis and evaluation and the highest level is known as the Higher Order Thinking Skills (HOTS). The taxonomy is hierarchical in nature. A former student of Bloom, Lorin Anderson, revisited the cognitive domain in the Bloom's Taxonomy and made some changes. The revised version of Bloom’s Taxonomy includes Bloom’s six major categories which were changed from noun to verb forms.

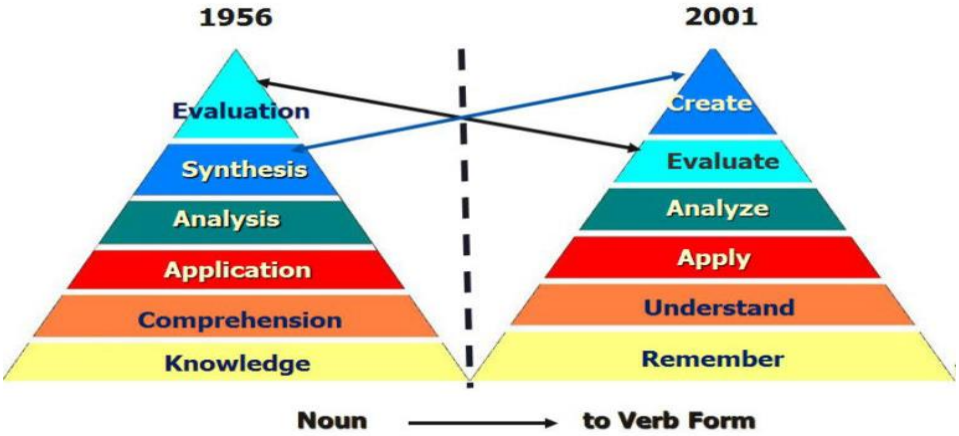

Figure 1: Bloom's, Anderson and Krathwohl's Taxonomy

The development of critical thinking skills within individuals is essential especially to face more challenges and competitiveness in the 21st century. As stated by Marshall & Horton (2011), Higher Order Thinking Skills (HOTS) which comprises logical thinking, critical thinking and reasoning skills are the basic skills for daily life, apart from the academic achievements in the schools (Nor'ain & Mohan, 2017). According to Rajendran and Idris (2008), HOTS is the expanded use of the mind to meet new challenges (Chinedu & Kamin, 2015). They viewed HOTS as a thinking function of the mind's ability to solving challenging situations (Chinedu & Kamin, 2015). HOTS is essentially generated when individual facing problems which are very critical and cannot be simply solved by direct application of previous knowledge. Rather such problems can be solved when the individual engage in critical and creative thinking also inferring from prior knowledge (R. Thomas, 1992 as cited in Chinedu & Kamin, 2015).

SCHOOL BASED ASSESSMENT (SBA) IMPLEMENTATION

In October 2011, the Ministry of Education in Malaysia decided to transform its educational system and launched a new National Education Blueprint 2013-2025. "The decision was made in the context of rising international education standards, the government's aspiration of better preparing Malaysian children for the needs of the 21st century, and increased public and parental expectations of education policy" (Preliminary report- Executive summary Malaysia Education Blueprint 2013-2025, 2012, p. 1). Assessment system is one of the Malaysian educational transformations to achieve the NEP objective. Previous Malaysian education system which focuses on summative assessment in the form of standardized tests and examinations proved to hinder the development of holistic individuals as reflected in the NEP. Realizing the decline in quality of education in Malaysia based on the Programme for International Students Assessment (PISA) and Trends in International Mathematics and Science Study (TIMMS) results in 2009 and 2007 respectively, the ministry acted on the transformation of its assessment system to emphasize more on formative and less on summative assessment.

"SBA consists of four components, which are the academic part, the school assessment and centre assessment and the non-academic part, the physical activity, sports and co- curriculum assessment and psychometric assessment" (Lembaga Peperiksaan Malaysia, 2009, as cited in Che Noraini, Adlina, & Nurhidayah, 2013, p. 771). This highlights that SBA enables teachers to assess students' development holistically which emphasize on students' intellectual, spiritual, emotional and physical development. The students are assessed based on bands, from Band one which indicates poor performance to an outstanding performance of Band six (Nanson, Elenggovan, Singh, & Hashmi, 2014). Besides, SBA is not a rigid system where it also complements other forms of assessment such as the summative assessment which is usually implemented to assess students at the end of an instructional process.

THE INTEGRATION OF HIGHER ORDER THINKING SKILLS (HOTS) IN SCHOOL BASED ASSESSMENT (SBA) INSTRUMENTS

HOTS is one of a fundamental components in a quality and effective assessment. In the assessment, students are not only asked to recall information they learnt but they also need to use the knowledge they have, apply the knowledge into new situations, synthesize and create new solutions or knowledge. HOTS is integrated in SBA instruments in various forms such as quizzes, tests, role play, hands on tasks or problem solving activities. Hence, HOTS can be integrated in paper and pencil tests as well as performance-based assessment.

HOTS integration in SBA also allows more cooperation between the students to complete assigned tasks. This is consistent with the 21st Century of learning styles and environment where cooperation is emphasized. "Evidence shows that cooperative learning and group discussion promote increased use of higher order skills and higher reasoning strategies" (Chiam, Hong, Flora Ning, & Tay, 2014). The integration of HOTS in SBA foster an effective learning in which students are not only participate in the use of their HOTS in completing the tasks but they also learn about the imparted knowledge in a meaningful way. Learning meaningfully has been the aim for every classroom's learning outcomes. Therefore, the integration of HOTS in SBA instruments should be effectively developed by teachers to achieve its positive outcomes in students.

THE CHALLENGES FACED BY TEACHERS TO INTEGRATE HOTS IN SBA INSTRUMENTS

One of the challenges that teachers faced on integrating HOTS in SBA instruments is the lack of knowledge and skill in implementing SBA and consequently affecting the teachers' level of confidence in assessing their students (Chun, 2006; Arsaythamby, Rosidah & Rozalina, 2016). The inadequate knowledge on the SBA system will affect on teachers' assessment implementation and this includes the integration of HOTS elements in the assessment.

Also, teachers were found to have difficulties in constructing the assessment instrument (Suah & Ong, 2012; Arsaythamby, Ramli & Khalid, 2016). Teachers do not construct assessment items by their own utilizing their competencies and knowledge but instead they adopt directly from the reference books (Arsaythamby, Rosidah & Rozalina, 2016).

Besides that, teachers did not seem to understand the requirement needed to cultivate critical thinking among students. Although teachers perceive that they are encouraging critical thinking in the classroom, they are merely focusing on the comprehension of the subject matter (Choy and Cheah, 2009; Nooraini & Khairul, 2014). Arsaythamby, Rosidah & Rozalina (2016) stated that teachers consider themselves to have the competencies in the assessment but at the same time they are not ready to conduct classroom assessment which involves formative assessment regularly. Since SBA is implemented mostly in formative assessment, teachers' challenges which involve mainly their assessment literacy and skills need to be further investigated.

STRATEGIES IMPLEMENTED BY TEACHERS TO INTEGRATE HOTS IN SBA INSTRUMENTS

The identification of challenges faced by the teachers on integrating HOTS in SBA instruments has provided significant information and insight on how the teachers actually deal with the system in everyday basis. According to Arsaythamby et al. (2016), "Test of Specification Table (TST) is an important tool in the construction of classroom assessment because it ensures validity of a measurement tool." It was observable that teachers need to prepare a TST before constructing an assessment instrument. The use of TST will guide the teachers on what items to be assessed and ensure that the items prepared are valid which assess what it is supposed to assess. Therefore, preparing a TST to integrate HOTS in the SBA is one of the teachers' strategies for an effective implementation of the assessment.

Besides, another strategy that teachers apply on integrating HOTS in the SBA instruments is through a close reference to the available reference books. As justified by Arsythamby et al. (2016), teachers chose test items from the reference books. The strategy of referring to the reference books is adapted

by most of the teachers as it saves teachers' time to construct items. As teachers are bound to other responsibilities other than teaching, teachers need to strategise their time management. As a result, constructing quality assessment items has been ignored and reference books are treated as a solution.

Arsythamby et al. (2016) also reported that the teachers apply various methods of assessing in giving scores and bands on the students' HOTS. Since the assessment of HOTS is based on the performance of students, therefore various types of assessment such as students' oral presentation, group work and discussion should be implemented. As HOTS assessment is subjective and difficult to decide on a score according to the band system of SBA, teachers need to have the skill and expertise to assess students' HOTS.

METHODOLOGY

RESEARCH DESIGN

The study was conducted using a descriptive quantitative design which adopts a survey design. "Descriptive research involves gathering data that describe events and then organizes, tabulates, depicts, and describes the data collection" (Glass & Hopkins, 1984 as cited in What is Descriptive Research?, 2001). A descriptive quantitative research design was selected in reference to the aims of the study which are to identify the challenges and strategies that teachers have on integrating HOTS in SBA instruments. Survey instrument which is questionnaire was distributed to the respondents to collect quantitative data.

PARTICIPANTS

The population of the study is Malaysian secondary school teachers who are involved in the implementation of the School Based Assessment (SBA). The samples of the study are teachers from three secondary schools in Tawau, Sabah and they teach form one, form two and form three students. Lower secondary teachers from the three schools are selected based on the characteristics that the teachers have to assist in providing data to answer the research questions. In Malaysia, SBA is implemented in the secondary school and only form one, two and three students will take the assessment. As justified in Arsaythamby & Ali (2016) study, SBA was fully administered on lower secondary (form one to form three) students since 2012. The sample was selected using purposive sampling method. A purposive sample "is a non-probability sample that is selected based on characteristics of a population and the objective of the study" (Crossman, 2017). Initially, the researcher aimed to collect data from 80 respondents. However, only 68 teachers participated in the study and in some cases not all distributed questionnaires were returned to the researcher.

INSTRUMENTS

The instrument used for this study is questionnaire. Questionnaire is used to provide quantitative data to answer the three research questions which are to examine teachers' perspectives on the importance of HOTS in SBA, to identify teachers' challenges on integrating HOTS in SBA instruments and to identify teachers' strategies on integrating HOTS in SBA instruments. The questionnaire was developed by adapting items from three studies which are Higher Order Thinking Skills: Teachers' Perceptions by Leslie Marlow, Duane Inman (1992), Assessment Practices among English Teachers in Malaysian Secondary Schools by Arsaythamby, Rosidah & Rozalina (2016) and Teachers' Levels of Knowledge and Interest on Higher Order Thinking Skills (HOTS) According to the Field Taught and Category of Schools by Sivapakkiam, Fadzilah, Habsah, Kalthom, & Rozita (2016).

The questionnaire consisted of four sections which are Section A, Section B, Section C, and Section D. In Section A, 9 items were constructed to obtain demographic data of the respondents. In Section B, 11 four point Likert Scale items were developed which focuses on teachers' perspectives on the importance of HOTS in SBA. In Section C, 8 four point Likert Scale items were developed to focus on collecting data for responses on the challenges that teachers faced on integrating HOTS in SBA instruments. The last part of the questionnaire is Section D which focuses on the strategies that the teachers implemented

to integrate HOTS in SBA instruments and it comprises of 12 four point Likert scale items. Four-point Likert Scale items were developed to examine respondents' degree of agreement on the provided statements. The responses were analyzed by numeration toward each Likert-scaled response (1= Strongly disagree, 2= Disagree, 3= Agree, 4= Strongly Agree).

Before the instrument was implemented, a pilot study was conducted to examine the reliability of the statement items in the questionnaire as well as to seek responses on the validity of statement items to answer the research questions. "A pilot test of the questionnaire can reveal ambiguities, poorly worded questions, questions that are not understood, and unclear choices" (Fraenkel, Wallen, & Hyun, 2016). The questionnaire has been reviewed and content validated by two senior lecturers. Questionnaires for the pilot study was distributed in a Secondary school in Kunak, Sabah and the samples were 30 teachers who teach form one, form two and form three students. After data was collected for the pilot test, reliability was measured by using Cronbach's Alpha test on the data analysis software, SPSS package (version 22). The first dimension which is section B obtained Cronbach's Alpha of 0.693, the second dimension which is section C obtained Cronbach's Alpha of 0.838, and dimension three which is section D obtained Cronbach's Apha value of 0.899. From the Cronbach's Alpha result on the three dimensions, it can be analyzed that the three dimensions are reliable.

DATA COLLECTION

Letters for approval from the Educational Planning and Research Division (EPRD) of Malaysia Ministry of Education (MOE), Jabatan Pendidikan Negeri Sabah (JPNS) and Pejabat Pendidikan Daerah (PPD) Tawau were obtained to conduct the study in the public schools. Seeking permission and scheduling appointment with the Principals of the three schools in Tawau were also arranged before the distribution of the questionnaires. The researcher went to the three selected Secondary Schools on the scheduled date and distributed the questionnaires to the teachers who teach Form One, Form Two and Form Three. Data was collected by direct distribution to the respondents in which the researcher has access to all of the lower form teachers in the teachers' office. The questionnaires were administered personally and collected all the responded questionnaires.

DATA ANALYSIS

Quantitative data was analysed using descriptive statistics by using Statistical Package for the Social Sciences (SPSS version 22). Descriptive analysis was done to identify the frequency of responses for each item. Mean and standard deviation were also being analysed.

RESULTS AND DISCUSSION

Table 4.1 provides the information on the mean scores for teachers' perspectives on the importance of Higher Order Thinking Skills (HOTS) in School Based Assessment (SBA).

Table 4.1
Teachers' perspectives on the importance of Higher Order Thinking Skills (HOTS) in School Based Assessment (SBA)

	Mean	Std. Deviation
I understand what HOTS is.	3.50	.504
I am interested to implement HOTS through my lesson.	3.41	.525
I emphasize HOTS as a key to element in writing my lesson planning.	3.35	.593
It is important to integrate HOTS into SBA instruments.	3.43	.498
I know how to integrate HOTS in SBA instruments for my subject.	3.40	.522
I understand that integrating HOTS in SBA instruments foster the objective of assessment for learning.	3.41	.525

I believe that integrating HOTS in SBA instruments help to develop students' creativity, critical evaluation and problem solving skill.	3.44	.529
I believe that the integration of HOTS element in SBA instruments will help students to learn effectively.	3.41	.525
It will not make any difference toward students' learning when HOTS items integrated in the SBA instruments.	2.78	.912
I am interested to attend courses and workshops related to HOTS.	3.46	.584
My aim is to produce HOTS modules related to my subject.	3.34	.686

(Scale: 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree)

All of the items had the mean scores between the ranges of two to three. It was deduced that the average level of teachers' perspectives on the importance of HOTS in SBA were in the range of 'Agree' and 'Almost Agree'. Items which gained higher mean scores in the teachers' perspectives on HOTS importance dimension were identified as 'I understand what HOTS is' (M=3.50, SD= 0.504), 'I am interested to attend courses and workshops related to HOTS' (M=3.46, SD= 0.584), 'I believe that integrating HOTS in SBA instruments help to develop students' creativity, critical evaluation and problem solving skill' (M=3.44, SD= 0.529), 'It is important to integrate HOTS into SBA instruments' (M=3.43, SD= 0.498), 'I am interested to implement HOTS through my lesson.' (M=3.41, SD= 0.525), 'I understand that integrating HOTS in SBA instruments foster the objective of assessment for learning' (M=3.41, SD= 0.525), 'I believe that the integration of HOTS element in SBA instruments will help students to learn effectively.' (M=3.41, SD= 0.525), 'I know how to integrate HOTS in SBA instruments for my subject' (M=3.40, SD= 0.522), 'I emphasize HOTS as a key to element in writing my lesson planning' (M=3.35, SD= 0.593), and 'My aim is to produce HOTS modules related to my subject.' (M=3.34, SD= 0.686).

The result presented on Table 4.1 indicates that general findings for teachers' perspectives on the importance of HOTS in SBA are positive with the mean scores between 2.78 to 3.50 of agree and strongly agree. It is imperative to analyse teachers' perspectives of their understanding on HOTS in order to find out their challenges and strategies on integrating HOTS in SBA instruments. Based on the findings on Table 4.1, majority of teachers which is represented by 50% agreed and another 50% teachers strongly agreed that they understand what HOTS is and the mean score stood at 3.50. This shows that the teachers have knowledge on HOTS and it is believed they can implement HOTS according to the objectives of lessons. This is consistent with the finding in Sivapakkiam, Fadzilah, Habsah, Umi & Rozita (2016) study which found that 90% of the teachers understand what HOTS imply.

Based on the findings, it is found that 57.4% teachers agreed and 42.6% teachers strongly agreed that HOTS implementation into SBA instruments is important. The mean score for the agreement stood at 3.43. Also, 55.9% teachers agreed and 42.6% teachers strongly agreed that they understand that integrating HOTS in SBA instruments foster the objectives of assessment for learning. The mean score for the statement stood at 3.41. Based on the analysis of the two constructs, teachers were found to have positive belief that HOTS integration does benefit the students in the assessment for learning and that having HOTS implemented in the SBA system is important. These results contradict to the result found in a study done by Rashidah (2004) where teachers' understanding on assessment for learning is too narrow (Lim, Wun & Chew, 2014). As findings presented in this study supports that teachers understand on assessment for learning (AFL) and that HOTS is the element that will foster the assessment for learning objectives. This is true as said by Sadler (1989) that a prime focus of AFL is do the judgments on the quality of students' responses which involves HOTS, which can be used to develop students' potential and skills (Lim, Wun & Chew, 2014).

Teachers' overall positive perspective towards the importance of HOTS can further be seen in their agreement of the construct which indicates their interests to implement HOTS in their lesson with majority of the teachers (55.9%) agreed to it and 42.6% teachers strongly agreed to it with a mean score obtained is 3.41. This result is contradict to a study done by Sivapakkiam, Fadzilah, Habsah, Umi, & Rozita (2016) which found that the levels of knowledge and interest of teachers on HOTS is at moderate level. The comparison of result found in this study and a previous study provides a perspective that teachers' interest level might differ due to several indications such as the difference in physical geographical area, the exposure of HOTS knowledge and teachers' belief. As stated by Ramassamy et al. (2016), the levels of knowledge among teachers justifies a positive relationship with the level of interest in HOTS. In this study, it is clear that the respondents are interested to implement HOTS in such a way that they see the importance of HOTS for students' development.

Table 4.2 provides the information on the mean scores for challenges that teachers faced on integrating Higher Order Thinking Skills (HOTS) in School Based Assessment (SBA) instruments.

Table 4.2
Challenges teachers faced on integrating HOTS in SBA instruments

	Mean	Std. Deviation
There is a lack of opportunity for HOTS in the present SBA instrument.	2.96	.854
I face difficulties in integrating HOTS elements in the assessment for my subject.	2.87	.862
Guidance for construction and integration of HOTS in SBA was not provided in the professional development courses.	2.79	.907
I rely too much on reference books to integrate HOTS items in SBA instrument.	3.12	.856
I do not understand how to score my students for HOTS items under the band system of SBA.	2.71	.931
There is no specific rubric on scoring students on HOTS items.	3.03	.828
I have problem in constructing HOTS instruments to assess my students under SBA.	2.99	.819
I have limited knowledge and skills in administering HOTS items as SBA instrument.	3.00	.846

(Scale: 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree)

All of the items have the mean scores between the ranges of two to three. It was deduced that the average level of teachers' challenges of integrating HOTS in SBA instruments were ‘Agree’ and 'Almost Agree'. Items which gained higher mean scores in the challenges teachers faced integrating HOTS in SBA instruments dimension were identified as ‘I rely too much on reference books to integrate HOTS items in SBA instrument.’ (M=3.12, SD= 0.856), 'There is no specific rubric on scoring students on HOTS items' (M=3.03, SD=0.828), 'I have limited knowledge and skills in administering HOTS items as SBA instrument.’ (M=3.00, SD= 0.846).

From the results, construct "I rely too much on the reference books to integrate HOTS items in SBA instrument" scored the highest mean (M= 3.12) among all the constructs under the domain. Majority of 39.7% of teachers agreed and 38.2% teachers strongly agreed to the statement. Majority of the respondents agreed to the statement reflects the weakness in the teachers' assessment skills on HOTS in SBA. The situation is agreed by Arsaythamby, Rosidah & Rozalina (2016) in which teachers hardly construct the assessment using their competencies and knowledge however they adopt HOTS questions or instruments from the reference books. However, teachers' incompetence in preparing HOTS instruments in SBA can be relatable with teachers' role in the school as a whole. Teachers in today's situation do not only teach but they are burdened with other responsibilities such as the administrative tasks. The workload that teachers have hindered them from taking the initiatives to prepare HOTS items

using their competence and skills. This is clarified by Norsamsinar, Premila, Jessnor, Hariyati & Norasibah (2014) which state that teachers are burdened with unrelated workloads to teaching and learning such as extra-curricular activities, attending meetings, conducting student programs, and managerial duties. Hence the solution to them is to adopt directly from the reference books. As teachers rely on the reference books to develop HOTS items in the SBA instruments, it arises a critical judgment on the quality of the assessment.

Item "I have limited knowledge and skills in administering HOTS items as SBA instrument" recorded a balance distribution of level of agreement between disagreement and agreement. It was recorded that 33.8% of teachers agreed while another 33.8% teachers strongly agreed to the statement. Meanwhile 30.9% teachers disagreed with the statement. The mean for the item stood at 3.00. This shows that half of the total respondents agreed while another half disagreed with the statement. For item "I have problem in constructing HOTS instruments to assess my students under SBA." recorded a majority of 38.2% teachers agreed and 30.9% teachers strongly agreed to it with a mean of 2.99. Based on the findings, it shows that teachers still face challenges in constructing and administering HOTS in SBA system. This finding is consistent with Arsaythamby et al. (2016) claim in which teachers consider themselves to have the competencies in the assessment but at the same time they are not ready to conduct classroom assessment which involves formative assessment regularly. As assessment of HOTS is subjective and it requires a critical non-bias judgment of the implementers, it is understandable that teachers face challenges in constructing and administering HOTS items in a formative or performance-based assessment.

Several studies found that teachers claimed the lack of resources impact teachers to integrate HOTS through formative assessment in SBA (Sivapakkiam et. al., 2016; Hashim, 2004). Resources in this case refer to the materials, expert personnel and ineffective teachers training. Teachers claimed that they "have not been able to use and produce various sources of HOTS that fits their field" (Sivapakkiam et. al., 2016). In contrast to the results presented on the aforementioned studies, it is found that majority 39.7% teachers disagreed with the statement "guidance for construction and integration of HOTS in SBA was not provided in the professional development courses" with a mean stood at 2.79. Also, another half of the respondents (27.9% teachers strongly agreed and 27.9% teachers agreed) in this study however agreed to the statement that they do not receive guidance for the construction and integration of HOTS in SBA. Since half of the majority responded with their disagreement and another half responded with their agreement towards the statement, it is fair to consider that the respondents are teaching in three different schools in which the administration is different and the professional development content or delivery method could be vary too. The situation is reported in Hashim (2004) study which stated that “the biggest problem with the teaching of critical and creative thinking is teachers’ lack of understanding and knowledge and the accompanying skills on thinking. No proper education and training on thinking have been offered to all teachers, especially in-service teachers whereas the Ministry and subject teachers prefer to adopt the infusion approach in teaching thinking”.

Table 4.3 provides the information on the mean scores for teachers' strategies to integrate Higher Order Thinking Skills (HOTS) in School Based Assessment (SBA) instruments.

Table 4.5.1
Teachers' strategies to integrate HOTS in SBA instruments

	Mean	Std. Deviation
I know how to prepare questions to HOTS.	3.15	.675
I am able to apply level of thinking according to the topics taught.	3.28	.595
I know how to evaluate HOTS elements in my students' answers.	3.26	.563
I know the theories or models related to HOTS.	3.28	.598
I use Test Specification Table to construct questions for SBA.	3.16	.730
I attended the course on HOTS related to the subject I teach.	3.07	.804
I rely on the reference books to integrate HOTS items in the SBA instrument.	3.25	.655

I have various collections of reference materials related to HOTS.	3.13	.710
I apply various methods of scoring HOTS through group works, individual tasks and hands-on activities.	3.18	.597
I construct HOTS items in SBA instruments myself.	2.97	.791
I love to explore diverse methods on implementing HOTS.	3.34	.536
I use my free time to explore various resources on HOTS for SBA instrument construction.	3.09	.707

(Scale: 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree)

All of the items have the mean scores in the range of three. It was deduced that the average level of teachers' strategies to integrating HOTS in SBA instruments were in the range of 'Agree' and were identified as 'I love to explore diverse methods on implementing HOTS' (M=3.34, SD= 0.536), 'I am able to apply level of thinking according to the topics taught' (M=3.28, SD= 0.595), 'I know the theories or models related to HOTS' (M=3.28, SD= 0.598), 'I know how to evaluate HOTS elements in my students' answers. (M=3.26, SD= 0.563), 'I rely on the reference books to integrate HOTS items in the SBA instrument' (M=3.25, SD= 0.655), 'I apply various methods of scoring HOTS through group works, individual tasks and hands-on activities.' (M=3.18, SD= 0.597), 'I use Test Specification Table to construct questions for SBA' (M=3.16, SD= 0.730), 'I know how to prepare questions to HOTS' (M=3.15, SD= 0.675), 'I have various collections of reference materials related to HOTS.' (M=3.13, SD= 0.710), 'I use my free time to explore various resources on HOTS for SBA instrument construction' (M=3.09, SD= 0.707), 'I attended the course on HOTS related to the subject I teach.' (M=3.07, SD= 0.804), and 'I construct HOTS items in SBA instruments by myself' (M=2.97, SD= 0.791).

The results presented on Table 4.3 show that majority of the teachers (57.4%) are able to apply level of thinking according to the topics taught and obtained the mean score of 3.28. Also, majority of the teachers (48.5%) use Test Specification Table (TST) to construct questions for HOTS and the mean score stood at 3.16. Based on the results, it can be deduced that teachers have knowledge on the application of level of thinking in assisting them to construct or develop HOTS items and this is considered as their strategy to integrate HOTS in the SBA. Furthermore, the use of TST is crucial when developing any types of assessment as it guides the assessors to create and conduct a valid and reliable assessment instruments. As described by Arsaythamby et al. (2016), "TST is an important tool in the construction of classroom assessment because it ensures validity of a measurement tool."

Besides, it was also found that the teachers' strategies to integrate HOTS in SBA instruments is through referring, adapting or adopting the instruments available on the reference books. Majority of 51.5% of teachers agreed and 36.8% teachers strongly agreed that they rely on the reference books to integrate HOTS in SBA instrument. The mean score for the item is 3.25. Besides, a large number of teachers (51.5%) also agreed that they have various collections of reference materials related to HOTS with a mean score of 3.13. The results indicate that teachers choose to depend on the reference books to develop and administer HOTS items as in SBA instrument due to several limitations that they experienced as discussed on the challenges of integrating HOTS in SBA domain. This finding is consistent with the result obtained from Arsythamby et al. (2016) study which outlined that teachers chose test items from the reference books as SBA items gained the highest mean score of 3.82. The result is further justified by an interview conducted with one of the teachers in which "constructing the items ourselves is more effective but due to time constraint I adopt directly from the reference books' were recorded.

Besides that, teachers from this study also reported that they applied various methods of scoring HOTS through group works, individual tasks and hands-on activities in which a large number of the teachers (61.8%) agreed with the statement with a mean score of 3.18. The finding in this study aligns with the finding in Arsythamby et al. (2016) study which reported that the teachers apply various methods of assessing in giving scores and bands on the students' HOTS. In addition, majority 60.3% of the teachers in this study also agreed that they love to explore diverse methods on implementing HOTS in the formative assessment. This indicates that the teachers are interested to explore more on the strategies to

implement HOTS in SBA instruments effectively as they are eager to learn more about it. As stated by Sivapakkiam et al. (2016), teachers will find alternatives such as exploring resources through various media to intersperse the implementation if they are interested in HOTS. As noted by Lim (2014), it is highly importance to vary assessment methods so that there will be no discrimination on the same students as they are not proficient in certain methods of assessment such as the paper and pencil tests which had been overused by the teacher.

CONCLUSION AND IMPLICATIONS

The development of Higher Order Thinking Skills (HOTS) is put into highly importance in the education system in the 21st century world. The integration of HOTS in the School Based Assessment (SBA) system is crucial as SBA is an effective assessment to measure students' development and achievement holistically. The study has revealed that teachers experienced challenges on integrating HOTS in SBA instruments. Also, some of the strategies employed by teachers to integrate HOTS in SBA instruments in their real life situations were revealed.

The implications of this study are directed to the three educational organizations in Malaysia namely Ministry of Education (MOE), Jabatan Pendidikan Negeri Sabah (JPNS), Pejabat Pendidikan Daerah Tawau (PPD Tawau), teaching institutions, curriculum leaders in schools and teachers. Firstly, the authorities should evaluate and monitor the teachers' implementation of SBA assessment especially when it involves HOTS. Consistent monitoring on teachers' implementation will help to provide relevant information on teachers' struggles and strategies while implementing the system. Gathered information will provide significant move towards designing an approachable, effective and efficient methods for teachers to deliver a quality assessment. Besides, a more proactive and effective professional development to help teachers acquire the desired competence on HOTS assessment in SBA should be employed. Secondly, at the school level, principals, senior assistants and senior subject coordinators should work together to ensure that they guide the teachers to deliver an effective and quality assessment on the students. Professional Learning Community (PLC) should be practiced in the school culture so that all teachers can work together in helping each other by providing ideas, assistance, and supports to deliver a quality assessment.

Lastly, it is hoped that this study would provide insights on a wider scale so that more proactive actions to improve the system and enhance the effectiveness of the assessment on HOTS in SBA will be carried out by the relevant authorities. It is important that consistent and frequent reviews should be invested on the development of HOTS in SBA in Malaysian education system for the fruitful outcome in the near future.

REFERENCES

Arsaythamby, V., Rosidah, R., & Rozalina, K. (2016). Assessment Practices among English Teachers in Malaysian Secondary Schools. *International Journal for Infonomics (IJI), 9*(4), 1220-1227.

Arsaythamby, V., Ruzlan, M. A. (2016) Physical Education Teachers Challenges in Implementing School Based Assessment. *International Review of Management and Marketing, 6* (8S). pp. 48-53. ISSN 2146-4405

Azlin, N. M., Ong, H. L., Mohamad, S. R., Rose, A. R., & Nurhayati, Y. (2013). The benefits of School-Based Assessment. *Asian Social Science 9(8), 9*(8), 1911-2025.

Braun, H., Kanjee, A., Bettinger, E., & Kremer, M. (2006). Improving Education Through Assessment , Innovation , and Evaluation. *American Academy of Arts and Sciences*.

Che Noraini, H., Adlina, A., & Nurhidayah, M. H. (2013). Ideal Vs Reality: Evidences from Senior Teachers' Experiences on The Malaysian School-Based Assessment System (SBA). *Seminar Kebangsaan kali ke IV Majlis Dekan Pendidikan IPTA*, 742-782.

Chiam, C. L., Hong, H., Ning, F., & Tay, W. Y. (2014). Creative and Critical Thinking in Singapore Schools. 1-48.

Chinedu, C., & Kamin, Y. (2015). Strategies for Improving Higher Order Thinking Skills in Teaching and Learning of Design and Technology Education. *Journal of Technical Education and Training (JTET), 7*(2), 35-43.

Crossman, A. (2017, March 2017). *Understanding Purposive Sampling*. Retrieved from Thoughtco: https://www.thoughtco.com/purposive-sampling-3026727

Fraenkel, J. r., Wallen, N. E., & Hyun, H. H. (2016). *How to Design and Evaluate Reseaarch in Education.* New York: Mc Graw Hill.

Hashim, R. (2004). Investigation on the Teaching of Critical and Creative Thinking in Malaysia. *Jurnal Pendidikan Islam, 10*(1)

King, F., Goodson, L., & Rohani, F. (n.d.). Higher OrderThinking Skills. *Center for Advancement of Learning and Assessment*.

Lim, H. L., Wun, T. Y., & Chew, C. M. (2014). Enhancing Malaysian Teachers' Assessment Literacy. *International Education Studies, 7*(10), 74-81.

Malaysia Education Blueprint 2013-2025. (n.d.). Malaysia: Ministry of Education.

Marlow, L., & Inman, D. (1992). Higher Order Thinking Skills: Teachers' Perceptions. *EBSCO*.

Nanson, G. E., Elenggovan, P. A., Singh, D. S., & Hashmi, W. A. (2014). Malaysian Teachers' Perception of the Implementation of Oral Test in Pentaksiran Tingkatan 3 (PT3) and Penilaian Menengah Rendah (PMR) Examination. *The International Journal of Humanities & Social Studies, 2*(12), 281-284.

Nooraini, O., & Khairul, A. M. (2014). Thinking Skill Education and Transformational Progress in Malaysia. *International Education Studies, 7*(4), 27-32.

Nor Hasnida, C. M. (2015). An evaluation of the implementation of the School-Based Assessment in Malaysia. *University of Southampton research repository*.

Nor'ain, M. T., & Mohan, C. (2016). The Link between Higher Order Thinking Skills, Representation and Concepts in Enhancing TIMSS Tasks. *International Journal of Instruction, 9*(2), 199-214.

Norazilawati, A., Noorzeliana, I., Mohd Sahandri, G. H., & Saniah, S. (2015). Planning and implementation Of School-Based Assessment (SBA) among teachers. *Procedia - Social and Behavioral Sciences, 211*, 247-254.

Preliminary report- Executive summary Malaysia Education Blueprint 2013-2025. (2012). 0-48.

Sivapakkiam, R., Fadzilah, A. R., Habsah, I., Umi, K. A. M., & Rozita, R. S. (2016). Teachers' Levels of Knowledge and Interest on Higher Order Thinking Skills (HOTS) According to the Field Taught and Category of Schools. *Journal of Modern Education Review, 6*(9), 611-621.

What is Descriptive Research? (2001, August 3). Retrieved from The Handbook of Research forEducational Communications and Technology: http://members.aect.org/edtech/ed1/41/41-01.html

Wirawani, K., & Wirawahida, K. (2016). The Promotion of Critical Thinking Skills in School-Based Assessment (SBA). *IPSR (Institute of Postgraduate Research) Colloquium in Universiti Tunku Abdul Rahman (UTAR)*, 2-11.

FIGURES

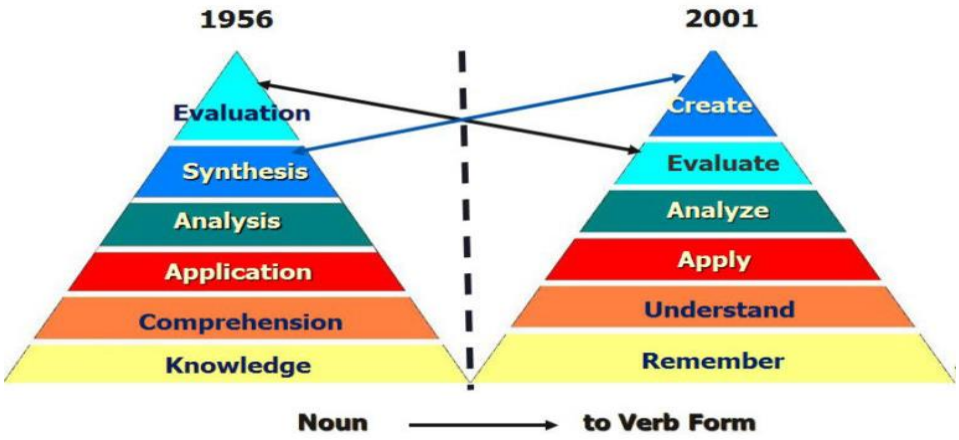

Figure 1: Bloom's, Anderson and Krathwohl's Taxonomy

TABLES

Table 4.1.
Teachers' perspectives on the importance of Higher Order Thinking Skills (HOTS) in School Based Assessment (SBA)

	Mean	Std. Deviation
I understand what HOTS is.	3.50	.504
I am interested to implement HOTS through my lesson.	3.41	.525
I emphasize HOTS as a key to element in writing my lesson planning.	3.35	.593
It is important to integrate HOTS into SBA instruments.	3.43	.498
I know how to integrate HOTS in SBA instruments for my subject.	3.40	.522
I understand that integrating HOTS in SBA instruments foster the objective of assessment for learning.	3.41	.525
I believe that integrating HOTS in SBA instruments help to develop students' creativity, critical evaluation and problem solving skill.	3.44	.529
I believe that the integration of HOTS element in SBA instruments will help students to learn effectively.	3.41	.525
It will not make any difference toward students' learning when HOTS items integrated in the SBA instruments.	2.78	.912
I am interested to attend courses and workshops related to HOTS.	3.46	.584
My aim is to produce HOTS modules related to my subject.	3.34	.686

(Scale: 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree)

Table 4.2.
Challenges teachers faced on integrating HOTS in SBA instruments

	Mean	Std. Deviation
There is a lack of opportunity for HOTS in the present SBA instrument.	2.96	.854
I face difficulties in integrating HOTS elements in the assessment for my subject.	2.87	.862
Guidance for construction and integration of HOTS in SBA was not provided in the professional development courses.	2.79	.907
I rely too much on reference books to integrate HOTS items in SBA instrument.	3.12	.856
I do not understand how to score my students for HOTS items under the band system of SBA.	2.71	.931
There is no specific rubric on scoring students on HOTS items.	3.03	.828
I have problem in constructing HOTS instruments to assess my students under SBA.	2.99	.819
I have limited knowledge and skills in administering HOTS items as SBA instrument.	3.00	.846

(Scale: 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree)

Table 4.5.1
Teachers' strategies to integrate HOTS in SBA instruments

	Mean	Std. Deviation
I know how to prepare questions to HOTS.	3.15	.675
I am able to apply level of thinking according to the topics taught.	3.28	.595
I know how to evaluate HOTS elements in my students' answers.	3.26	.563
I know the theories or models related to HOTS.	3.28	.598
I use Test Specification Table to construct questions for SBA.	3.16	.730
I attended the course on HOTS related to the subject I teach.	3.07	.804
I rely on the reference books to integrate HOTS items in the SBA instrument.	3.25	.655
I have various collections of reference materials related to HOTS.	3.13	.710
I apply various methods of scoring HOTS through group works, individual tasks and hands-on activities.	3.18	.597
I construct HOTS items in SBA instruments myself.	2.97	.791
I love to explore diverse methods on implementing HOTS.	3.34	.536
I use my free time to explore various resources on HOTS for SBA instrument construction.	3.09	.707

(Scale: 1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree)