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An Analysis of Higher-Order Thinking Skills (HOTS) in Malaysian University English Test Report Writing

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Abstract

Thinking skills plays an important role in tertiary education. In the 21st century, students are required to master these skills so that they can deal with the various situations that they come across in the university and later at the workplace. This paper analyses students report writing based on a given set of data written in exam conditions to investigate their reasoning skills especially analyses and synthesis which are the 2 highest levels in the Bloom's Taxonomy cognitive domain. A total of 30 humanities and 30 science students' reports were analysed using the Malaysian University English Test (MUET) marking scheme. The preliminary findings indicate that good writers managed to demonstrate analysing and synthesising in their writing while the weak ones failed to integrate both the skills to a certain extent. On one hand, the middle-graded writers could only manage to show one of the skills. The science students managed to incorporate both skills at a better level as compared to the humanities students as they are more exposed to logical thinking in their major courses. For pedagogical intervention, it is suggested that HOT writing lessons must facilitate students' writing ability and interest and should be clearly instilled in the teaching and learning of writing activities in ESL writing classrooms. Students also need to be taught explicitly how to use the HOTS (higher-order thinking skills) not only in the language course but in all other courses in the university.

Keywords: Higher-Order Thinking Skills, Bloom's Taxonomy, Malaysian University English Test (MUET)

Introduction

The rapid changing and thought-provoking world these days need students to go above and beyond in their insight understanding and have to advance towards higher-order thinking skills that are planned for "building up the psychological part of the individual student" (Ismail and Hassan, 2009). This is in accordance with the National Education Philosophy which plans to deliver composed students who are knowledgeable, profound, and

truly adjusted to meet the challenges of the modern world. The higher-order thinking skills (HOTs) incorporate basic reasoning, dynamic analysis and critical thinking (Barak, Ben-Chaim and Zoller, 2007). All these are vital devices for students so that they can manage the different circumstances that they face in their daily lives. Furthermore, they should think judgmentally, logically, fundamentally and diagnostically and be able to contend, address and examine the information, and ideals and have the option to see new thoughts and find new solutions (Govier, 1997).

Along these lines, the higher-order thinking skills move beyond the essential perception of realities and knowledge. These are what we expect when we need our students to be evaluative, inventive and imaginative. By changing, we must show our students the need for cognitive aptitudes, particularly basic reasoning abilities. Basic reasoning aptitudes are vital for students to manage in a wide range of circumstances that they face in their daily lives as well as it provides leadership development (McKnown, 1997).

It needs to be educated in a higher-level cognitive skill which is noteworthy due to a need of the fundamental capacity of students to perform basics and problem-solving errands to meet present day proficient requests and completely take part in society (Idol & Jones, 1991). Concurring to Ramlan (2007), there is a lack of investigation that completely investigates college students' basic capacities. Therefore, the objective of this study is to examine the nonappearance or appearance or the absence or presence of higher-order thinking considering aptitudes within the planning for the MUET course. This study centres specifically on the syllabus with the reading material as a cross reference and teaching-learning procedures. Although MUET could be an obligatory college entrance exam actualised by the Malaysian Examinations Council, no preliminary reading material is characterized. Be that as it may, the reading material chosen for the preliminary English language course included the Viable Home MUET, that was distributed by Oxford Fajar Sdn. Bhd.

Higher-Order Thinking Skills

Higher order thinking skills (HOTS) is distinguished by basic speculation abilities from low-order learning, that refers to those achieved by methodically remembering. HOTS incorporate qualities of orchestrating, examining, thinking, fathoming, application, and assessment. HOTS are reflected by the main three levels in Bloom's Taxonomy: examination, blend, and assessment. In this way, HOTS has been incorporated into Malaysia's Education Blueprint 2013-2025 that enable students to think fundamentally and inventively. HOTS skills are the devices students use to move their insight into genuine use. Brookhart (2010) contends that if instructors consider higher order thinking as critical thinking, they can set exercise objectives to show students how to distinguish and take care of issues at school and throughout everyday life. This, Brookhart (2010) says, includes not just resolving the issues set by the teacher but also taking care of new issues that 'they characterise themselves, making something new as the solution' (Brookhart, 2010, p.33).

The first skill in HOTS is 'application' which involves problem solving and experimenting. For a language lesson, this may involve experimenting with rhyming and syntax in poetry writing, solving a mystery using clues and carrying out role plays. Next is 'analysis' and this comprises identifying patterns and organising ideas. Students are often encouraged to do this through a teaching method called 'guided discovery'. This is where students identify language structures in a text in order to work out the rules for it, without the teacher simply presenting it. Students should also be encouraged to keep well organised notes using brainstorms, colour-coding etc., making it easier to review work before exams. The third skill 'synthesis'

involves students to engage in imagination and the ability to predict or infer. This is useful when reading in another language. Students should be able to predict the end of stories before they read them and try to infer the hidden meanings behind the author's words and imagining other stories that are happening in the same fantasy world. 'Evaluation' covers the skills of assessing, comparing, and judging merit. For this ability, students should participate in discussions and debates, rating study strategies and assessing their own work. All these activities are not only language based, but higher order thinking skills are involved and allows students to immediately use the language in either a practical or creative way. For students going in for university level studies, these skills are not only helpful, but essential to their success.

The teaching and learning of HOTS require specific methods such as proper instructional materials (Chingos & Whitehurst, 2012), collaborative learning (Johansson, 2017) and other processes like engagement, exploration, explanation, elaboration and evaluation (Mutrofin et al., 2016). The teaching and learning of this particular language, English component generally aim to develop students' abilities to understand, analyse and synthesize factual information given in various types of reading materials. This, however, cannot be achieved without proper planning and understanding of the basic concepts among teachers and examiners.

Bloom's Taxonomy

Bloom's Taxonomy was recognised in 1956 to classify the intricacy of substances as indicated by certain cognitive aptitudes and capacity. The fundamental objective behind this theory is to use to the different cognitive stages in the development of test papers. The taxonomy is made of three sections; cognitive, effective and psychomotor. Bloom, Engelhart and Furst (1956) suggested that the most significant area of the three would be the cognitive domain that includes the way toward moving data into information. The present study, therefore, focuses only on the cognitive domain since it is very much relevant to the reading comprehension skills and assessment.

Bloom 's Taxonomy is the most broadly acknowledged arrangement of this sort in training and it tends to be viewed as a scope of reasoning abilities beginning with lower knowledge-level thinking to the evaluation-level of thinking. The taxonomy classification has a lot of reasoning abilities that come together. For instance, before a student attains the examination level, he/she needs to gain the lower levels of information, understanding and application.

Bloom 's taxonomy categorization assists in directing instructors in planning students exercises as per their intellectual capacities (Narayanan et al., 2015). It assists educators to contextualize the degree of reasoning aptitudes associated with classroom lessons or activities and evaluation. Students need to comprehend and secure their abilities before they can be evaluated. Using various pedagogy methods to encourage student with the support of LOTS and HOTS, they can begin to execute the application, analysis, synthesis and evaluation of new information. Cognitive domain includes the procedure of data just as the improvement of reasoning aptitudes and capacities. It additionally incorporates the acknowledgment of explicit confirmations and ideas that help to build one's scholarly capacities and abilities.

Cognitive domain consists of six levels which starts from the lowest level that involves the retention of information and the ability to recall knowledge and ends at the highest level of thinking such as critical thinking and the ability to synthesize and evaluate. The first three

levels, namely knowledge, comprehension and application are known as the LOTS while analysis, synthesis and evaluation are categorized as HOTS. Higher-order thinking operates at the highest levels of cognitive processing as can be seen in Figure 1.

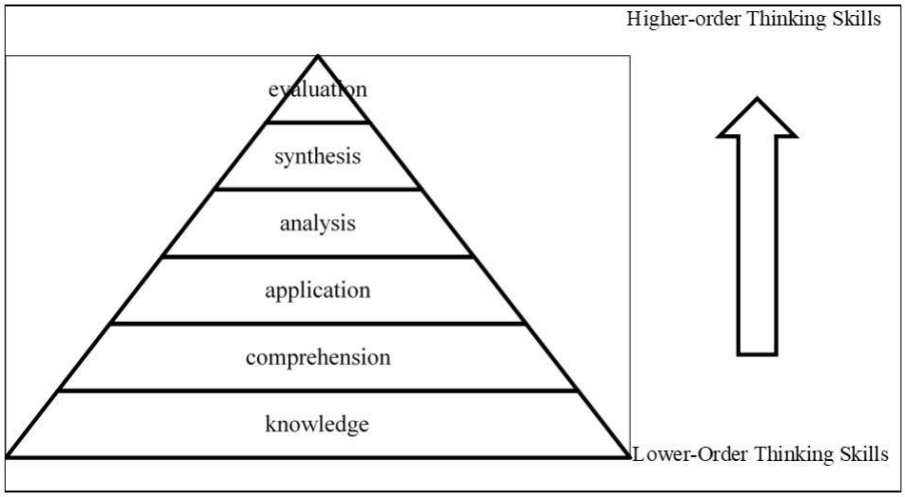

Fig. 1. Lower to Higher-order Thinking Skills' levels

In view of Figure 1, in the instruction of the English language, the process of teaching exercises dependent on Bloom's taxonomy which is integrated with different viewpoints, for example, numerous insights, sensible reasoning, solving issue aptitudes and language proficiency. The classification and development of this process should start from lower to higher-order thinking skills. This development begins with the information at the perception level before attaining the most significant level known as assessment. The course of action of inquiries ought to be made by their degree of understanding. In particular, great test questions are intended to test and measure students' numerous aptitudes and levels of comprehension (Hiu, Ngo and Jbyamahla, 2006).

Malaysian University English Test (MUET)

There have been many attempts by the Ministry of Education (Malaysia) to enhance the standard of English among the pre-university secondary students who intend to pursue their studies in local universities. In fact, the Malaysian University English Test (MUET) was first launched in 1999 and administered by the Malaysian Examinations Council. MUET is designed to measure students' English language proficiency. It consists of four components, namely, listening, speaking, reading and writing. This course assists students in enhancing their listening skills, developing effective communication skills, improving critical reading of academic texts, and building essay writing skills, as well as interpreting information from non-linear sources.

This test is held three times a year, namely in March, June and November. Test results are based on an aggregate score ranging from zero to three hundred (0 to300). Scores are then banded into six levels of achievement (Bands 1 to 6), Band 1 being the lowest and Band 6 the highest.

Language Policy in Malaysia

Since 1957, Malaysia has ceaselessly been locked in with dialect technique changes. Within the early period of the pre-freedom days, the discussions within the dialect

approaches were vital to chart the inevitable destiny of the nation. These movements were considered to be central in building up Malaysia as a multi-ethnic and multicultural nation. The Razak Committee Report (1956) recommended the establishment of a national course of action of preparing worthy to the people of the organisation by and large which can satisfy the development of the social, financial and political advancement as a nation, having regard to the desire of making Bahasa Malaysia the national dialect of the country whereas defending and proceeding the improvement of the dialect and culture of diverse systems living within the country. This proposition was accepted totally into Segment 3 of the Instruction Statute 1957, which came into force on June 15, 1957.

English language was ' assigned ' to the status of a second language. The utilization of the English language diminished to the point that affected that standard of English among Malaysians. Since the over-reliance of a singular dialect, Malaysians could not face the world changes. Along these lines, in mid 1990s, the council under the guidance of Tun Dr Mahathir Mohamad decided that Malaysians would be left and numerous would not be able to face the challenges of globalization if they were not able to speak in English. In accepting that the English language was key for the future way forward of Malaysia, the council realised that a remarkable alter in dialect procedure was unavoidable.

The administration's course of action to alter the direction to use English within the teaching of Science and Mathematics was to begin in 1995. The new method resulted in resistance from all quarters, particularly from the Malays and the Chinese. They stood firm with their choices. At that point, on 19 July 2002, the Cabinet decided that the teaching of Science and Mathematics in English (PPSMI) would be actualized in all government schools beginning from January 2003.

Despite the reality. this decision was not well accepted by various organizations, the methodology to teach Mathematics and Science in English began in Standard 1, and Lower Form 6. In any case, PPSMI kept going for 10 long years in 2011, the government chose to suspend PPSMI and supplant it with another course of action called 'Memartabatkan Bahasa Malaysia dan Memperkukuhkan Penguasaan Bahasa Inggeris' (MBMMBI) or in English it is known as 'To Maintain Bahasa Malaysia and to Fortify the English Language'. The government realised that the strategy within the teaching of Science and Mathematics can be in Bahasa Malaysia and fortify the use of English language and lift students' capacity in developing Science and Arithmetic which are basic for the country's future.

Methodology

The present study employed a qualitative approach in order to identify students' reasoning skills especially analysis and synthesis in MUET Question 1 (report writing). Writing component was chosen as it requires individual to apply critical thinking and problem solving, and so can respond to a more sophisticated definition of writing (White, 2014). MUET Question 1 paper requires students to interpret information from non-linear texts in no less than 150 words hence they need to apply their reasoning skills through analysis and synthesis which are the 2 highest levels in the Bloom's Taxonomy cognitive domain. The rhetorical style of the paper is analytical in nature thus fulfils the objective of this study which to examine students' usage of HOTS in their writing skills.

For this study, the formulas used to determine students' ability to present the analyses and syntheses were taken from Choo Wan Yat et al., 2018:

Analysis : Key Feature + Data + Trend + (Comparison) + (Time Frame)
Synthesis : 2 Key Features + 2 Time Frames + 2 or 4 pieces of data + Comparison Trend

A total of 60 report writings (30 humanities and 30 science students' from Universiti Teknologi MARA Melaka branch) were analysed using the MUET band description ranging from Band 1 (Very Limited User) to Band 6 (Highly Proficient User). Students who successfully present the analysis and synthesis in their writing are awarded with Band 4 and above. Meanwhile, students who analysed and synthesized less successfully are awarded with Band 3 and below.

Findings

From the study, good writers from the two groups of students managed to demonstrate the two cognitive domains (analysis and synthesis) in their report writing while the weak ones failed to integrate both skills to a certain extent. Some samples of students' writing that displayed the Higher Order Thinking Skills are presented in Table 1.

Table 1. Samples of Students' Writing Displaying HOTS (Analysis) in MUET Report Writing

Cognitive Domain	**Analysis**	**Synthesis**
MUET Band Descriptors	*Presence of 1 KF + 1 Data + 1 Trend + (Comparison) + (Time Frame)*	*Presence of 2 Key Features + 2 Time Frames + 2 or 4 pieces of data + Comparison Trend*
Satisfactory User – Highly Proficient User Band 4 – Band 6	*The number of visitors to Nature's Pets increased from 300 000 in 2011 to 590 000 in 2015.* *Four Legged Farm maintained its number of visitors from 2011 to 2015 with 470 000 and only had a 10 000 extra visitors in 2012.* *Nature's Pets recorded the highest number of visitors (590 000) among the three zoos in 2015.* *Animal town displayed the lowest number of visitors in 2015 with only 180 000 people.* *Nature's Pets saw an increase from 300 000 visitors in 2011 to 590 000 visitors in 2015.*	*Animal Town had the lowest number of visitors (180 000) in 2015 although it had three promotional activities ('discount for senior citizens', 'special activities every month', and 'tea session with the chimpanzees').* *… it shows that Nature's Pets have done many activities ('discount for senior citizens', 'special activities every month', and 'tea session with the chimpanzees') that lead to the increased in the number of visitors from 2011 (300 000) to 2015 (590 000).* *The three activities carried out by Nature's Pets ('live animal performances', 'free rides around the zoo', and 'weekend with celebrities') attracted the most number of visitors (590 000) which was the highest among the three zoos in 2015.*

	Animal Town recorded a decreased number of visitors from 350 000 in 2011 to 180 000 in 2015.	
	Analysis	**Synthesis**
	Absence in any of the components: 1 KF + 1 Data + 1 Trend + (Comparison) + (Time Frame)	*Absence in any of the components: 2 Key Features + 2 Time Frames + 2 or 4 pieces of data + Comparison Trend*
Very Limited User – Modest User Band 1 – Band 3	*For Animal Town, the pattern is decreasing starting from 2011 to 2015.* (No Data). *Four Legged Farm remain steady with slightly increasing of number of visitors in 2012.* (No Data). *The zoo recorded the highest visitor in 2015.* (No specific Key Feature and Data). *… Nature's Pets had more visitors in 2015.* (No Data). *Second, the Nature's Pets had more visitors and increased from 300 000 to 590 000 visitors.* (No Time Frame).	*Natures Pets has the most number of visitors among the other two zoos and this is due to the promotional activities they have carried out.* *The three activities carried out by Nature's Pets attracted the most number of visitors (590 000).* *Nature's Pets 'weekend with celebrities' most likely attracted more visitors (590 000) than Four Legged Farm's 'lucky draw (470 000).*

Table 1. Samples of Students' Writing Displaying HOTS (Analysis) in MUET Report Writing

The findings of this study indicate that science students managed to incorporate both analysis and synthesis at a better level (Proficient User) as compared to the humanities students (Satisfactory User). They also managed to link their analyses and synthesis thus making them fall into the category of Proficient User. Samples of students' writing incorporating both analysis and synthesis (Proficient User) are as follow:

Student #S24:

… Animal Town had the lowest number of visitors (180 000) in 2015 although it had three promotional activities ('discount for senior citizens', 'special activities every month', and 'tea session with the chimpanzees').

Student #S27:

… Table 1 shows that Nature's Pets have done many activities ('discount for senior citizens', 'special activities every month', and 'tea session with the chimpanzees') that lead to the increased in the number of visitors from 2011 (300 000) to 2015 (590 000).

Student #S18:

… Nature's Pets 'weekend with celebrities' most likely attracted more visitors (590 000) than

Four Legged Farm's 'lucky draw' (470 000) although both zoos had the same two activities ('live animal performances' and 'free rides around the zoo') in 2015.

Meanwhile, students from the humanities group managed to incorporate both cognitive domains however, there are absence of some features in their writings. Their writings are as follow:

Student #H5

… Natures Pets has the most number of visitors among the other two zoos and this is due to the promotional activities they have carried out. (absence of data and time frame)

Student #H13

… Nature's Pets 'weekend with celebrities' most likely attracted more visitors (590 000) than Four Legged Farm's 'lucky draw (470 000). (absence of time frame)

Student #H9

… The three activities carried out by Nature's Pets attracted the most number of visitors (590 000). (absence of time frame and key feature)

When analysing and synthesizing the data, students need to describe movements or trends in the graphic stimulus and from the findings, they failed to link the two non-linear text thus their synthesis is incomplete (Modest User).

Discussion and Conclusion

The findings revealed that students with analytical background (science) did better in integrating the two cognitive domains in the Bloom's Taxonomy (analysis and synthesis) in their writings as they are more exposed to logical thinking in their major courses. This is supported in Moon and Siew's (2004) study where they looked at the factors that could affect academic performance of Computer Science students at a local university. In their study, they reported that academic attainment may be influenced by students' level of intelligence, teaching and learning approach.

However, the humanities students with an inclination towards arts had low synthesising skill while the middle- graded group of students managed to use only one of the skills. It was found that the students' lacked vocabulary in their writing and they were also not sure of the writing techniques. Tan et al (2011) in his study revealed that students who had a low proficiency could not comprehend the reading texts in the MUET and as the students could not read or comprehend the texts independently. They also could not extract and process the information effectively to apply in their writing. Similar to Omar et al (2013) study, it is showed that a majority of students in tertiary institutions have not mastered the writing skills required of them in MUET. Therefore, there is an urgent need for teachers to help students to improve their writing proficiency for MUET so that they can pass with a good band to apply for a place in the local universities. Thus, the findings of this study suggest that HOT writing lessons must facilitate students' writing ability and interest and should be clearly instilled in the teaching and learning of writing activities in ESL writing classrooms. As the two cognitive domains in

the Bloom's Taxonomy (analysis and synthesis) are important skills in writing (Langan, 2005), students should be able to generate ideas and be a critical and creative thinker to help them in their future undertakings. It cannot be denied that the student's proficiency level could have contributed towards the high order thinking skills between the groups of students. However, what is more important, this study has shown that with exposure to analytical and logical thinking, the students were able to demonstrate higher order thinking skills. This may have a significant implication on any intervention programmes that can be provided to the students. We may want to consider including the analytical and logical thinking skills in the syllabus in order to enhance their high order thinking skills.

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