WHAT STUDENTS REALLY NEED: INSTRUCTIONAL STRATEGIES THAT ENHANCE HIGHER ORDER THINKING SKILLS (HOTS) AMONG UNIMAS UNDERGRADUATES

Collin Jerome♣
Universiti Malaysia Sarawak

Julia Ai-Cheng Lee
Universiti Malaysia Sarawak

Su-Hie Ting
Universiti Malaysia Sarawak

ABSTRACT

The present paper aims to examine one of the challenges in the teaching of HOTS at undergraduate level, that is, the instructional strategies undergraduates genuinely need to enhance HOTS. To achieve this, the paper discusses findings from a study that investigated HOTS among undergraduates at Universiti Malaysia Sarawak (UNIMAS). Self-reported survey and interviews were used to gather the views of 120 undergraduates on HOTS and the teaching of HOTS in tertiary context. The views were then used to develop instructional strategies that could enhance HOTS among UNIMAS undergraduates. The findings show that UNIMAS undergraduates viewed HOTS as those that include critical, logical, reflective, metacognitive, and creative thinking skills. The undergraduates reported that the use of problem-based learning, case-based scenarios, demonstrations, lectures, and discussions were some of the instructional strategies used by their lecturers to enhance HOTS. The findings also show the subject taught, the learning tasks, and the approach(es) taken by the lecturers are some of the factors that may affect the types of instructional strategies that undergraduates really need to enhance their HOTS.

Keywords: Employability; Higher Order Thinking Skill; Instructional Strategy; Tertiary Education.

1. INTRODUCTION

The recent reform of our education system has witnessed, among others, the incorporation of higher order thinking skills (hereafter cited as HOTS) into the curriculum at all educational levels. However, the implementation of this curriculum has been sorrounded by various challenges and issues. For instance, despite the implementation of the School Based Assessment Programme that aims to test students' HOTS, the overall performance has been unsatisfactory because of the new and unfamiliar format that challenges students' *conventional* way of thinking and learning (Othman, 2014, para. 4). Furthermore, studies show that depite the revamping of the tertiary education system, a majority of undergraduate students in Malaysian universities still lack critical thinking skills required by the industry. One contributing factor is the fact that many of these

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♣Corresponding author: Faculty of Language and Communication, Universiti Malaysia Sarawak, 94300 UNIMAS Kota Samarahan, Sarawak, Malaysia. Email: jcollin@unimas.my. Tel: +6082-581752.

students are cognitive misers who have little motivation to think and develp cognitive skills that allow them to be more creative and analytical (Dunn, Halonen, & Smith, 2009). This does not bode well with the aim of the Malaysian Education Blueprint (2015-2025) that seeks to produce graduates who are expected to possess high quality thinking skills, which include the ability to apply one's knowledge and skills for problem-solving and decision-making, and to be more innovative and creative (The HOTS Syllabus is still hot, 2015, para.5).

Another contributing factor is the challenges of incorporating HOTS into teaching and student learning. Teaching HOTS at all levels of education may not be as easy as one thinks because of the present lack of knowledge, awareness, and readiness among students, teachers and administrators. Although many studies have examined the level of HOTS among students at various educational levels (Mahyuddin, Lope Pihie, Elias, & Konting, 2004; Mohd Suhadi et al., 2015; Yee, Yunos, Hassan, Othman, & Tee, 2011), there is a need to examine this alongside students' knowledge, awareness and readiness that are molded by a variety of factors including their social cultural background where critical thinking, as opposed to respecting rules and abiding by the law, may not always encouraged or promoted. This is a gap in research that should be addressed, given that previous and recent studies in the field have yet to examine the above mentioned realities, as well as the challenges and circumstances surrounding the teaching of HOTS. Furthermore, the current level of HOTS among undergraduate students in Malaysia (i.e., awareness, knowledge, attitudes) is an area worthy of investigation, given that they must be equipped with these vital skills and be able to use them effectively in today's challenging world. With this aim in mind, the present paper aims to examine HOTS among undergraduates. It is drawn from a larger ongoing research project that seeks to examine HOTS among undergraduates in Universiti Malaysia Sarawak (UNIMAS) and develop instructional strategies that can help enhance those skills. The research project specifically examines 1) the current level of higher order thinking skills; 2) the instructional strategies that have been/are currently used to enhance higher order thinking skills; and 3) develop instructional strategies that can help enhance higher order thinking skills.

2.   LITERATURE REVIEW

HOTS have been widely studied in various fields of study such as humanities, sciences, and business. The key findings of these studies show that there are 1) *various definitions* of HOTS and how these definitions vary among scholars, practitioners, learners, and educators (Anderson & Krathwohl, 2001; Bloom & Krathwohl, 1956; Marzano, 2000; Wiggins & McTighe, 2005); 2) *various instructional strategies* used to enhance HOTS among students and how these strategies are not only used by educators to enhance HOTS among their students, but are also employed by student themselves for the same purpose (Chinedu, Kamin, & Olabiyi, 2015; Miri, Ben-Chaim, & Uri, 2007); and 3) *various factors* that affect HOTS among students such as demographics, motivation, the classroom environment, psychological and intellectual characteristics (Budsankom, Tatsirin, Sawangboon, Damrongpanit, & CHuensirimongkol, 2015). The key findings of the studies in the fields also show that HOTS are often discussed in relation to *critical thinking* (Norris & Ennis, 1989), *academic achievement and development* (Beachboard & Beachboard, 2010), *graduate attributes* (Thomas, 2011), *ICT in education* (McMahon, 2009), and how demographics and other factors *may or may not* affect HOTS and the types of instructional strategies used to enhance them among students (Budsankom et al., 2015).

As mentioned earlier, many studies have examined the level of HOTS among students at various educational levels in Malaysia (Mahyuddin et al., 2004; Mohd Suhadi et al., 2015; Yee et al., 2011). Mahuyddin et al. (2004), for instance, found that critical thinking skills, creative thinking skills as well as convergent/divergent thinking skills were incorporated in teaching and student learning of various subjects in all seven secondary schools under study. Yee et al. (2011), on the other hand, found that technical education students from a local public university possessed both moderate and low levels of HOTS: the former include investigation, experimental inquiry, comparing, deducing, constructing support, inducing and invention skills, while the latter include decision making, problem solving, error analysing, abstracting, analyzing perspectives and classifying skills. They also found that factors such as gender, academic achievement and socio-economic status had no significant impact on students' level of HOTS. While acknowledging the wealth of inquiry in HOTS at the local/national level, there is a need to examine the realities and challenges of teaching HOTS, particularly to undergraduates who must be equipped with these vital skills so that they are able to use them effectively in today's challenging world. The present research project aims to carry out this task by examining students' and lecturers' views on the types instructional strategies used to enhance HOTS thus far and the challenges in using them.

3. RESEARCH METHOD

The present research project employs both quantitative and qualitative approaches to data analysis. Selected SOTL principles and frameworks (e.g., Gibbs' and Schön's reflective practices, Biggs' constructive alignment (1982, 2003)) are used to construct the main investigative instruments, namely, survey, interview, and reflection. A total of 500 randomly selected UNIMAS undergraduates are targeted to participate in a survey and series of interviews to elicit their responses on their current level of HOTS. The survey, which is adapted from Bahr (2010) and Savi, Collins and Alexander (2011), consists of 5 sections: 1) Demographics, 2) Views on Instructional Strategies, 3) Views on Instructional Technologies, 4) Views on Assessment Techniques and 5) Final Thoughts on HOTS. Another set of survey is administered to elicit responses from 100 randonly selected lecturers on their current use of instructional strategies that incorporate HOTS. The survey includes a section for their reflection on the instructional strategies they use in enhancing HOTS among their students. Interviews are conducted with selected students and lecturers to explore further their responses. The findings are then used to develop instructional strategies for enhancing HOTS, which are formulated through SOTL principles but refined with input from UNIMAS undergraduate students and lecturers. For the purpose of this paper, the findings from Section 2 of the student survey are presented and discussed.

4. FINDINGS AND DISCUSSION

The findings are presented and discussed in the following order: 1) students' views on the instructional strategies used during instruction, and 2) the types of instructional strategies that (they think) help enhance their HOTS. It should be mentioned that Section 2 of the student survey begins with a glossary of instructional strategies (see Appendix 1). Students are given the definition of Instructional Strategies (i.e. approaches, methods, or techniques that a lecturer may take or use to engage students in the learning process) and a list of strategies and their respective definitions. They include Case-based scenarios, Concept mapping, Cooperative learning groups, Debates, Demonstration, Discussion, Journal writing, Lecture, Meta-cognition, Problem-based Learning,

Reflection, Scaffolding and Simulations. Students are first asked to rank the strategies by frequency of use during instruction. They are then asked to rank the strategies used by their lecturers that they think help enhance HOTS, followed by a short explanation of their choices using one specific course taught by their respective lecturers as an example. It should also be mentioned that the findings were gathered from 120 students (77.7% female and 22.3% male) who completed the survey so far. The majority of them (44.2%) were in their third year of study, followed by those in their first year of study (28.3%). A great majority were students from the Faculty of Language and Communication (38.9%), followed by students from the Faculty of Cognitive Sciences and Human Development (36.3%).

Figure 1: Students' Views on the Instructional Strategies used during Instruction
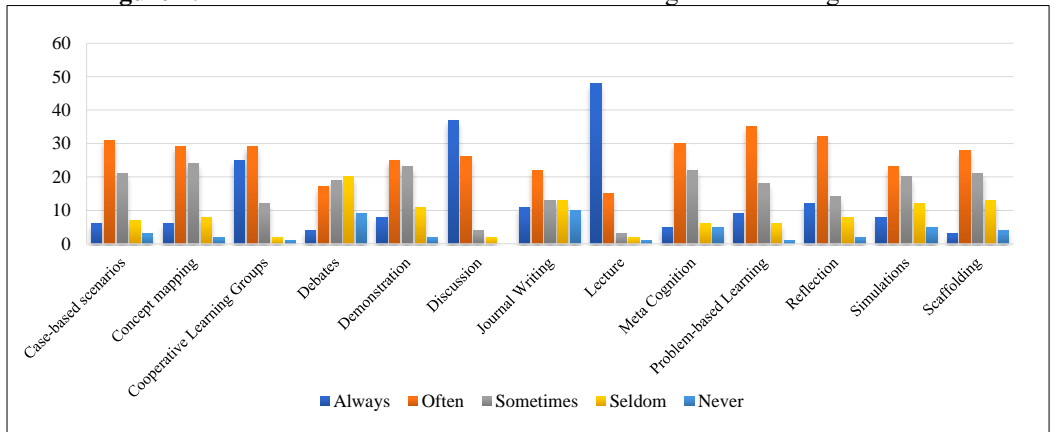

Figure 2: Students's Views on the Instructional Strategies that they think help enhance their HOTS
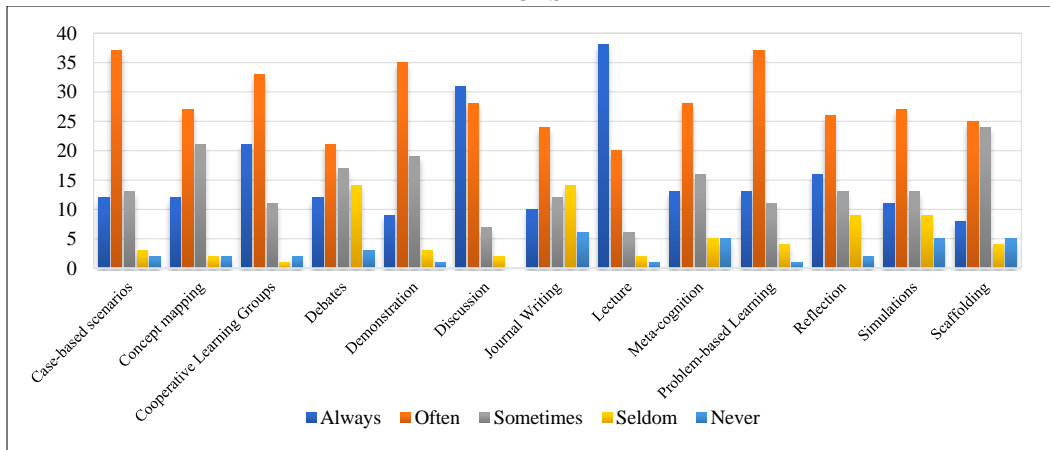

Figure 1 shows that Lecture (40%) and Discussion (30.8%) are always used during instruction. This is followed by other instructional strategies that are often used during instruction such as Problem-Based Learning (29.1%), Reflection (26.6%), Scaffolding (26.6%), Case-based Scenarios (25.8%), Metacognition (25%), Cooperative Learning (24.1%), and Concept Mapping (24.1%),

Demonstration (20.8%), Simulations (19.1%). Figure 2, on the other hand, shows that students are consistent in their responses when they agree that Lecture (30.8%) and Discussion (25%) are always used by their lecturers to enhance HOTS. This is followed by other instructional strategies such as Problem Based Learning (30.8%), Case-based Scenarios (30.8%), Demonstration (29.1%), Cooperative Learning (27.5%), Metacognition (23.3%), Concept Mapping (22.5%), Simulations (22.5%), Reflection (21.6%), and Scaffolding (20.8%). The students provide various answers to explain or elaborate upon their choices. For instance, students who attend the *Borneo-Kalimantan Literature* course find that their lecturer uses a variety of instructional strategies to enhance HOTS.

On the other hand, students who attend the *Knowledge Based System* course identify specific types of instructional strategies such as Problem-based Learning, Case-based Scenarios, and Cooperative Learning that they believe help enhance HOTS. As students 1 explains: "Problem Based Learning, Knowledge Based System class. It helps to have a clearer look on what is going on and what are the possible solutions can be applied to solve the issue. It can allow the students to think, as they have a problem and all they have to do is to think of the solution which allows them to think critically". There are also students who identify other instructional strategies that they think help enhance HOTS without specifying the course(s) taught by their lecturers, as in the case of student 2: "I still remember when I was attending my ICS class 3 years ago, we were debating among our classmates of which comes first the egg or the hen. This situation encourages students to have HOTS to find reasons for their answers".

All the above responses reveal a plethora of instructional strategies are used not only during instruction, but are employed by lecturers to help enhance HOTS among their students. This corresponds with Amushigamo's (2017) study that shows teachers utilize a variety of methods to ensure effective teaching and learning, especially in learner-centered classrooms. This involves the teacher "[selecting] appropriate teaching strategies that promote student learning, conversation, discussion, inquiry, critical thinking and build a strong knowledge of students" (p. 152). Furthermore, a majority of students claim that these instructional strategies are not only important, but are the ones they truly need to survive and succeed in the university. The above responses show that students understand what the instructional strategies entail in regard to enhancing HOTS and acknowledge their lecturers' intention to use those strategies to achieve this purpose, that is, to help them learn the subject taught (e.g. Student 8's response: "Introduction to Linguistics as an example. Both the lecturers have been keen into asking us to think, discuss about the topics and questions. They would also give some tasks for us to deal with"). This key finding reinforces the link between lecturers' intention and the strategies they use during instruction. As Martin, Prosser, Trigwell, Ramsden, & Benjamin (2012) contend, "the way teachers approach their teaching is directly related to what it is teachers want their students to know" (p. 125). The above responses show that while there is a wide range of instructional strategies that students believe help enhance HOTS, the use of these strategies may be dependent on a variety of factors such as "the subject that [lecturers] teach" (Gisneros-Cohernour, 2011, p. 59) (e.g. "The Borneo Kalimantan" and "Knowldge Based System"), "the approach [a lecturer] follows" (Selvan, 2010, p. 86) (e.g. "lecturer uses plenty of methods", "my lecturer always emphasize case based scenarios"), and "the type of learning task targeted" (Cerqua, Gauthier, & Dembélé, 2014, p. 252) as evident in Student 9's response: "For example, in Computational Linguistics, students get into groups to discuss on different topics and then share the knowledge with the other students." Such factors, which are yet to be discovered through interviews with students and lecturers, will be considered in the creation of instructional strategies that help enhance HOTS among UNIMAS undergraduates.

5. CONCLUSION

This paper presents preliminary findings of an ongoing research project that examines higher order thinking skills (HOTS) among UNIMAS undergraduates. The findings show that there is a range of instructional strategies that are frequently used during instruction and the types of instructional strategies that students think help enhance HOTS. Furthermore, a majority of students believe that these instructional strategies that they really need to survive and succeed in the tertiary setting. The findings also show that the strategies used by the lecturers for this purpose may depend on several factors such as the subject taught and the approach taken by lecturers themselves – a key point that the project team members should consider in developing instructional strategies to enhance HOTS.

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APPENDIX

Glossary of Instructional Strategies

Please consider the following glossary terms when responding the questions regarding instructional strategies (i.e. approaches, methods, or techniques that a lecturer may take or use to engage students in the learning process)

Case-based scenarios: Instructional design model where students consider realistic scenarios from a perspective which requires analysis
Concept mapping: Graphical tools for organizing and representing knowledge typically illustrated using diagrams to show the relationships among concepts.
Cooperative learning groups: Groups of students working together in groups with their peers to accomplish a common goal.
Debates: A formal discussion about the pros and cons of an issue.
Demonstration: Visual displays/presentations of something.
Discussion: Consideration of a subject by a group through conversation.
Journal writing: The process of using structured exercises for students to write educational experiences.
Lecture: An exposition of a given subject delivered before an audience/class for the purpose of instruction.
Meta-cognition: Teaching students how to plan, monitor, and repair their own comprehension.
Problem-based learning: An instructional strategy in which students collaboratively solve problems and reflect on their experiences.
Reflection: Teaching students to reflect critically on one's experience, integrate knowledge gained from experience with knowledge possessed, and take action on insights.
Scaffolding: Teaching students by defining parameters, rules, or suggestions for given learning situations.
Simulations: Artificial replication of components of a real-world situation to achieve specific goals.

Adapted from Savi, C., Collins, V., & Alexander, J. (2011). Higher order thinking (HOT) faculty survey (V1). *Surveys.* Paper 1.