Preliminary Studies on Issues of Implementing Higher Order Thinking Skills Among Technical and Vocational School Teachers in Malaysia

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Abstract

This preliminary study was conducted to find out issues related to the implementation of Higher Order Thinking Skills (HOTS) among technical and vocational school teachers in Malaysia. Focus was on the level of understanding as well as support given to the teachers. Participants were also asked about any other related issues on this matter. This study employed a qualitative approach under the case study design. Six teachers were interviewed using an open-ended protocol and the result was analyzed using the Miles & Huberman (1994) qualitative data analysis procedure. The result shows that teachers have a lack of understanding to implement HOTS in their lessons. The need for support is also an issue among the teachers. Changes in syllabus, and teaching approach as well as no clear guidelines in implementation was also an issue.

Keywords: Higher Order Thinking Skills, Teachers understanding, Support issues, Technical and vocational school.

1. Introduction

In defining and describing higher-order thinking skills, Bloom's taxonomy will always emerge as the main reference. Bloom's Taxonomy is a theory on how cognitive ability in learning works. The structure is based on how thinking ability develops from the most basic level to its highest potential. The taxonomy, which contains six levels, can be divided into two groups, which can be regarded as higher-order thinking skills and lower-order thinking skills. According to Anderson (2001), Bloom's Taxonomy places the abilities to analyze, evaluate, and create in the higher-level skills of the cognitive domain. These skills are considered higher-order thinking skills (HOTS) and are seen as the continuation of creativity and critical thinking skills, as stated by Najua et. Al (2017). HOTS involves assessing, analyzing, exploring, and creating aspects of learning. They are based on various taxonomies of learning, with Bloom's taxonomy being particularly influential. In Bloom's taxonomy, the top three levels - analysis, synthesis, and evaluation - reflect higher-order thinking skills.

Higher-order thinking skills (HOTS) have emerged as a very important skill to be adopted by the future generation. The main focus of the transformation of the education curriculum in the Malaysia Education Development Plan (PPPM) 2013-2025, as stated by Soo et al. (2015), is to produce knowledgeable students who are critical and creative in their thinking and can compete at the international level. Inayat et al (2013) share this concern as higher-order thinking skills are critical in ensuring economic stabilization. According to Ya Ting (2015), most developing countries rely on engineering and technical education to develop competent workers equipped with higher-order thinking skills applicable to their working environment. M. Pillay et al. (2018) stated that one of the important outcomes of the educational process in Malaysia is the teaching and learning of HOTS. These implementations can be seen through the *Dokumen Standard Kurikulum dan Pentaksiran* (DSKP) of every technical, science, engineering, and technology subject, which requires teachers to integrate the implementation of HOTS in their pedagogy.

Educators play an important role in inculcating the ability of higher-order thinking skills in students, as it is a skill that should be harnessed through proper pedagogy. This pedagogy, which includes planning, delivering, and assessing a lesson during a learning session has to be properly planned and executed by educators to ensure that it is effective. E.M. Janssen et al. (2019) state that teachers need to possess critical thinking skills, which are one of the higher-order thinking skills to be able to teach them. The Implementation of higher-order thinking skills in the current teaching and learning arena can be assessed through the ability of students to apply critical thinking in solving a problem. To assess this, observations can be made toward the student's skills when data or information

is needed to compare, discriminate, organize, manage, classify, and identify cause and effect (Yahya & Nooradinah, 2012). Therefore, it is clear that teachers' understanding and ability to teach HOTS with proper pedagogy is crucial.

The MOE (2014) has underlined seven elements that inculcate the culture of HOTS in schools. One of its main elements is pedagogy which bridges the other two main elements of curriculum and assessment. Pedagogy plays a very important role in delivering the aspiration of developing a student with the ability of HOTS and it requires teachers to be its mediator. The role of the teacher based on the MOE HOTS pedagogy implementation documents (2014) ranges from referring to the given standard, planning lessons, executing lessons, assessing students, and reflecting on the session.

Nevertheless, several issues in teaching HOTS in Malaysia were found by researchers throughout the decade, which are related to the element of pedagogy. One of the scenarios in Malaysia's current practice in training educators to ask higher-order thinking skills questions does not give them vast knowledge and understanding. This then results in their application in the learning session seeming questionable. (Rashvinder, 2018). Kong & Yee (2020) stated that one of the main constraints found in applying to teach is the level of understanding in higher order thinking skills among teachers is still very basic. This lack of understanding will then stunt the growth of our workforce as it is clearly stated that higher-order thinking skills need to be taught by those who understand it.

The study conducted by Aziz@Ahmad et al (2017) highlights the minimal implementation of higher-order thinking skills (HOTS) in Malaysian classrooms. This lack of implementation is attributed to various factors, including those related to students, pedagogical approaches, and institutional factors. The study suggests that a more holistic and integrated approach involving teachers, students, and administrators is needed to ensure the successful implementation of HOTS in classrooms. This indicates that all stakeholders must be involved and work together towards incorporating higher-order thinking skills into the teaching and learning process. Similarly, Hashim et al (2015) emphasize the crucial role of teachers in implementing HOTS. The study found that two-thirds of teachers were still low-level users of HOTS in their teaching practices. However, it is worth noting that teachers generally had positive perceptions towards the use of HOTS and recognized the need for further training and courses to enhance their knowledge and skills in implementing higher-order thinking skills.

The lack of resources and teaching materials, as well as a lack of understanding and guidance for teachers, are all significant barriers to promoting higher-order thinking skills (HOTS) in the classroom. Ramasamy et al (2016) suggest that the lack of resources can impact the interest of teachers to incorporate HOTS-based lessons, as they may not have the necessary tools or materials to support these types of activities. Similarly, Hassan et al (2017) argue that teachers require teaching materials specifically designed to develop HOTS in their students, and the absence of such materials can hinder the implementation of these lessons. Othman and Ahmad (2014) highlight that teachers may not fully understand the requirements needed to cultivate critical thinking among students. While teachers may believe that they are encouraging critical thinking in the classroom, they may be focusing solely on the subject matter and neglecting the development of higher-order thinking skills. This suggests a need for professional development and training to help teachers better understand and implement strategies for promoting HOTS.

To explore this issue specifically in technical and vocational education settings in Malaysia, exploratory research was done to answer these research questions:

    i.   How much do teachers understand the implementation of HOTS in their teaching?

    ii.   Is there enough support for integrating HOTS into their teachings?

    iii.   Are there any other particular issues in implementing HOTS in their teachings?

2. Method

The research utilized a qualitative approach, specifically a case study design. This design was chosen to allow for a deeper exploration of the issue at hand. According to Cresswell (2009), qualitative research involves

understanding social problems, analyzing words, and reporting detailed perspectives from participants in a natural way. The participants in this study were six technical and vocational teachers from Malaysian technical schools. Each participant was given a pseudonym (T1, T2, T3, T4, T5, and T6) for anonymity. These teachers were selected because they were certified and had more than 8 years of teaching experience. Table 1 provides profiles of the participants. The research employed purposive sampling, as the focus was specifically on technical and vocational school teacher issues. Creswell (2009) explains that purposive sampling is commonly used in qualitative research.

Code	institution	Years of service
T1	Vocational College	4
T2	Vocational College	9
T3	Vocational College	9
T4	Vocational College	9
T5	Technical School	9
T6	Technical School	19

The data gathered for the research was obtained through interview sessions. Wilkison and Birmingham (2003), regard an interview as a way of obtaining detailed information about a topic or subject. Specifically, a semi-structured type of interview was used. According to Wilkison and Birmingham (2003), questions in this type of interview are pre-determined; nevertheless, it remains flexible where researchers are allowed to ask follow-up questions.

The purpose of using interviews in this study was to gather in-depth information and insights from participants. The semi-structured format allowed the researchers to have a set of pre-determined questions to ensure consistency and comparability across interviews. However, the flexibility of the interview allowed the researchers to delve deeper into specific areas of interest and ask follow-up questions based on the participants' responses.

This approach to data collection is advantageous because it provides rich and detailed information that may not be captured through other methods such as surveys or observations. Interviews allow for a deeper understanding of participants' perspectives, experiences, and opinions on the topic or subject being studied.

By using semi-structured interviews, the researchers were able to strike a balance between having a structured approach to ensure consistency and comparability, while also allowing for flexibility and adaptability during the interview process. This approach maximizes the potential for gathering comprehensive and nuanced data that can contribute to a more comprehensive analysis and understanding of the topic under investigation.

The interview protocol was checked by two lecturers from the faculty of education at UTM to ensure the content validity. Before the interview starts, the participants are shown the protocol so that they understand what is expected from the interview session. They are also allowed to clarify if they are unclear with any questions. The data analysis procedures employed in this study were based on Miles, Huberman, and Saldaña's (2014) approach. The analysis consisted of three simultaneous flows of activity: data condensation, data display, and drawing and verifying conclusions.

The first step, data condensation, involved selecting, focusing, simplifying, abstracting, and/or transforming the data from field notes, interview transcripts, documents, and other empirical materials. The interview records were carefully and repeatedly listened to to extract clear information. Then, the records were transcribed based on the categorical questions.

The second step, data display, involved organizing the condensed data into an accessible and compressed form that allowed for conclusion drawing and action. The purpose of data display was to accumulate organized information that would enable the analyst to see what was happening and justify conclusions or move on to the next phase of analysis.

Once data reduction and data display were completed, the final step in the analysis was concluding. The researcher drew conclusions based on the research problems and the compiled results of the interview data. Themes and sub-themes were used to compile and analyze the interview data.

Overall, Miles, Huberman, and Saldaña's (2014) data analysis procedures provided a systematic and organized approach to analyzing the data in this study.

3. Findings

To find out whether the participants understand the implementation of HOTS in lessons, the participants were asked whether they are aware of the elements of HOTS in the DSKPs and whether they have tried to implement it in their lessons. The participants mentioned these:

- T2: *Tidak, guru tidak faham perlaksanaan KBAT dan banyak isu yang dihadapi semasa perlaksanaan KBAT di dalam kelas.*

- T1: *Tidak... Kerana kursus yang diberikan hanya untuk pendedahan dan tiada model khusus untuk diaplikasikan*

- T5: *...tidak pasti dalam kefahaman. tiada pengalaman dan tidak mengaplikasikan KBAT. Pelajar kita lebih mementingkan ilmu asas dulu. Kalau nak terapkan KBAT tu dia tak praktikal untuk budak2 ni.*

- T4: *Ya ada Isu. Kefahaman guru berkenaan KBAT untuk vokasional.*

- T3: *Guru-guru tidak jelas dengan KBAT berdasarkan DSKP dan tambahan pulak, Di KV penerapan untuk KBAT sangat kurang.*

- T6: *Guru-guru jelas dengan kehendak DSKP.*

Based on their answers, it is shown that there is awareness of the existence of HOTS elements within the DSKP as per T6's and T3's answers. In the meantime, teachers do have issues in their understanding of the application of HOTS. As shared by T1, T2, T3, T4, and T5, a lot of teachers have a lack of understanding of the execution, application, and how to infuse it into their lessons.

The participants were also asked about the support given to them in applying HOTS in their lessons. They were asked whether any courses or programs were conducted for them as well as whether there were any supporting materials given to help them integrate HOTS into their lessons. The responses given are as follows:

- T1: *ya perlu(support)..kerana selaras dengan permintaan KPM. tidak ada sumber idea atau rujukan mencukupi untuk mengintegrasikan KBAT. kerana tvet lebih kepada pembangunan kemahiran*

- T2 *Ya, perlu ada kursus atau program pemantapan terhadap KBAT untuk para guru.tidak ada sumber idea atau rujukan yag mencukupi untuk mengintegrasikan KBATdalam subjek-subjek yang di ajarkan…*

- T3: *Ya, perlu kursus atau porgram prmantapan KBAT kerana kurang pendedahan dalam perlaksanaan KBAT kepada guru vokasional. Langsung tiada rujukan….*

- T4*Ya, perlu ada.. Dalam masa yang sama, tiada sumber idea atau rujukan yag mencukupi untuk mengintegrasikan KBAT dalam subjek-subjek yang diajarkan…*

- T6 Yup diperlukan. Simulasi perlaksanaan KBAT diperlukan. Supaya guru-guru faham pelaksanaannya..

Based on the responses, T1, T2, T3, and T4 agreed that there is a need for courses or programs to be conducted to help them integrate HOTS into their lessons. At the same time, all of them agreed that there are no clear resources to refer to in integrating HOTS into their lessons. T6 added that simulations are necessary to guide teachers in correctly applying HOTS elements in their lessons.

The participants were also asked whether there were any other issues in applying HOTS in their lessons. They were asked to share their experience in an attempt to integrate HOTS with their lessons. The responses given are as follows:

- T1: *tiada peneguhan dalam pengajaran dan pembelajaran…tiada garis panduan khusus bagi TVET.*

- T3 *Tahap pelajar vokasional tidak cenderung untuk melaksanakan kbat…dalam masa yang sama Silibus dan kskv selalu berubah… dalam pengintegrasian pula, saya berpendapat Ya..problem solving penting dalam automotif*

- T4: *Ya, penerapan KBAT boleh memberi impak kepada pelajar kerana ia Ya…Memberi ruang pada pelajar untuk mengeluarkan idea mereka. Pengalaman saya dalam pengaplikasian adalah Pelajar diberi tugasan aplikasi menghasilkan projek berdasarkan teori yang telah dipelajari Dari segi isu pelajar, Pelajar tidak memahami kehendak soalan. . dari pihak guru pula, tiada perkongsian khusus berkenaan KBAT*

- T5: *Impak tu nampak bila kita bagi mereka masalah , tapi dia still mengharapkan cikgu. Penyelesaian masalah mereka pun kurang jauh.*

- T6: *Isunya nak tukar dari kaedah lama ke cara yang baru itu sukar. Sebab kaedah dulu kita guna dari aras rendah ke aras tinggi. Dahulu PDPC dari aras rendah ke tinggi..lebih kepada one lecture.. Sekarang tidak lagi.. Guru lebih kepada pemudah cara..*

In the integration of HOTS, T3, and T4 tried to integrate and agreed that it is important. T3 shares the issue of the ever-changing syllabus that has affected the integration planning. T4 on the other hand shared that both teachers and students are having issues such as difficulties in understanding questions as well as lack of specific sharing on HOTS itself. T5 shared that students still need teachers as student's problem-solving capability is still low.T6 on the other hand highlighted that the need for approach change has created difficulties, as teachers now need to facilitate rather than lecture.

4. Discussion

The result from the interview shows that there is a lack of understanding of how HOTS can be integrated into the lessons. It also shows that teachers are still unsure of the way to integrate this component and tend to go back to basic knowledge teaching. As shared by all participants, teachers have a lack of understanding of the integration. As for those who are teaching in Vocational colleges, they believe that there is no emphasis on their field of study. This is clarified further by T5 who said that teachers focus more on basic knowledge and it is not practical to implement HOTS in their lessons. This shows that understanding of the way to integrate HOTS in lessons is still low among technical and vocational teachers although it is part of the DSKP. This lack of understanding among teachers regarding the requirements for infusing critical thinking among students is a significant issue. Despite believing that they are promoting critical thinking, teachers are only focusing on the content of the subject matter. This finding is supported by the research of Othman and Ahmad (2014) and Rashvinder (2018). Additionally, Kong and Yee (2020) highlight that a major constraint in teaching is the limited understanding of higher-order thinking skills among teachers, which remains at a basic level.

As for the support given to teachers in integrating HOTS in their lessons. It is clear that teachers do need support in lots of areas from teaching plans, teaching methods as well and materials. T1 to T4 agreed that the teachers need support in terms of ideas and materials, especially in teaching TVET subjects. T6 shares those simulations on how HOTS is blended into lessons will help technical schoolteachers improve their application of HOTS. Hassan et al (2017) emphasized that the lack of resources impacts the interest of teachers to promote HOTs based lessons and teachers do require teaching materials to develop HOTs in their students to further support this. The lack of materials

Another issue found based on the interview was that there are no clear guidelines for integrating HOTS in lessons, which then makes it tough for teachers who lack the knowledge to integrate this component. The ever-changing syllabus also makes it harder for teachers to plan their teaching well. The lack of understanding among teachers then affects students' understanding and capability, which then disrupts everything as students still, need teachers

to guide them throughout the lesson. The changes in approach also cause strain for teachers when there is no clear understanding of applying new methods of teaching.

5. Conclusion

The main purpose of this preliminary study is to find out the level of understanding of teachers in applying HOTS in school-level technical and vocational education, to find out whether there are enough resources as well as any other issues related. Based on the interview, there is evidence that teachers still have issues understanding the HOTS application and integration in their lessons. Resources and guidelines must also be improved to further help teachers integrate this component into their teaching. Stability in the subject as well as more support should be given to further improve this issue.

Although this study is limited in scope, the results have shown that there is evidence of the need for guidelines to further support teachers in improving the integration. Training should also be provided to teachers to further strengthen their current understanding as well as show them new approaches and teaching styles. To further this research, it is suggested that a framework to integrate HOTS in TVET or engineering education at the school level be created.

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