

# Exploring Approaches to Strengthen Higher-Order Thinking Skills in Malaysian Higher Education

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## Abstract

*This study explores factors influencing the development of Higher-Order Thinking Skills (HOTS) among students in Malaysian higher education institutions (HEIs) and their impact on graduates' employability. Using a phenomenological approach, data were collected through in-depth interviews with nine participants, including educators and students. The findings highlight key challenges such as power imbalances, rigid teaching methods, low student engagement, inadequate knowledge, and ineffective learning strategies. Institutional issues, including restrictive regulations and less effective learning outcomes, hinder HOTS development. To address these challenges, the study suggests adopting student-centered teaching approaches, encouraging active student involvement in problem-solving, and revising institutional policies to foster a supportive learning environment. Graduates with strong HOTS were found to be more competitive in the job market. However, the study's scope is limited by its small sample size and focus on select HEIs, which may not fully represent the national context. Future research should include a broader sample and examine the role of technology in enhancing HOTS. This study provides practical insights for policymakers, HEI administrators, and educators to develop strategies that improve HOTS and graduate employability, contributing to the body of knowledge in higher education by offering a holistic and evidence-based perspective on teaching and learning HOTS.*

**Keywords:** Higher-Order Thinking Skills (HOTS), Students, Educators, Problem-Solving.

## INTRODUCTION

Received: 1 February 2025

Accepted: 1 March 2025

Published: 30 April 2025

In the era of globalization and rapid technological development, HOTS has become a skill that is very necessary for university students to meet the needs of the increasingly competitive job market. Higher-order thinking skills are vital for equipping students with the tools to navigate real-life situations effectively (Haritani et al., 2021). These skills can be further developed through a contextual learning process that fosters critical thinking (Haritani et al., 2021). These skills include the ability to critically analyze, solve complex problems, make effective decisions, and think creatively, all of which are vital in meeting the challenges of the modern world of work. In Malaysia, HOTS has become the main focus of the government's efforts to improve the quality of higher education, as outlined in the Malaysian Education Development Plan (2015-2025) for Higher Education. However, The Malaysian

Education Development Plan 2015-2025 highlights the importance of critical thinking skills, but its effectiveness is limited due to inadequate assessment methods (Zulkifli & Abidin, 2022).

Students in Malaysia exhibit limited proficiency in higher-order thinking skills (Susilo et al., 2023). The observed low performance of students on writing assignments can be attributed to their underdeveloped higher-order thinking skills (Hubers, 2022). This not only harms their academic performance but also affects their ability to face challenges in the world of work that requires these skills. Developing students' higher-order thinking skills, including analysis, evaluation, and creation, is below the expected standards (Susilo et al., 2023). The absence of analytical thinking and interdisciplinary skills can significantly hinder an individual's ability to effectively address challenges in the workplace (Ozen & Kazancoglu, 2022).

Secondly, university students in Malaysia do not get enough exposure to activities that stimulate critical thinking and problem-solving in their learning process. Most learning modules still rely on traditional teaching methods emphasizing memorization and basic understanding without challenging students to explore ideas or make decisions in complex situations. Conventional teaching methods may limit students' capacity for innovative thinking and can lead to distractions in the learning environment (Bo et al., 2022). For example, most vocational education undergraduates in Malaysia demonstrate low to moderate levels of critical thinking and problem-solving skills (Sharif et al., 2021). This finding highlights the necessity for targeted intervention programs to enhance these essential competencies for improved academic and professional performance (Sharif et al., 2021). It shows that lack of exposure limits students' ability to develop critical skills in analysis and innovation, which are essential in today's increasingly competitive and complex work environment. Students have identified several barriers to developing critical thinking skills (Eze et al., 2022). These include a lack of sufficient knowledge among educators, student disengagement, and the absence of a robust framework for critical thinking within the educational system (Eze et al., 2022).

This lack of integration of practical elements makes it difficult for students to understand how the knowledge gained can be applied in a broader context. This causes students to be less confident and less prepared to face challenges in the workplace, where HOTS is needed to solve real problems. Higher education institutions produce

graduates who have strong communication skills (Estiar et al., 2021). However, their critical thinking and problem-solving skills are only moderate (Estiar et al., 2021). Thus, connecting theory with real situations is essential to help students develop robust analysis, synthesis, and evaluation skills. This study aims to identify various factors that cause the lack of HOTS and analyze the effectiveness of current learning strategies in improving HOTS among university students in Malaysia. As a result, this study aims to formulate strategies that can empower HOTS among university students in Malaysia. By using qualitative methods, this study will identify the factors contributing to the lack of HOTS and analyze the effectiveness of current learning strategies in improving these skills.

Therefore, this study can contribute meaningfully to higher education institutions and educators designing a more effective and innovative learning approach. The significance of this study is to enhance HOTS among university students in Malaysia, which is essential for academic excellence and meeting job market demands. Its contribution to the government includes aiding policymakers in evaluating the effectiveness of existing education policies and improving curricula, aligning with the Malaysian Education Blueprint (2015-2025). The study benefits employers in the industry by providing graduates with better preparation to meet job criteria, thus reducing the skills gap. Finally, the research adds new knowledge in higher education and HOTS, supporting future studies to develop innovative learning approaches.

## **HIGHER-ORDER THINKING SKILLS (HOTS)**

Higher-order thinking Skills (HOTS) refer to cognitive abilities that go beyond essential thinking, involving analysis, evaluation, and creating new ideas. HOTS encompasses the capacity of students to effectively analyze, evaluate, and create solutions to complex problems (Fatahillah et al., 2021). These skills are essential for fostering advanced cognitive abilities and promoting deeper understanding in various subject areas (Fatahillah et al., 2021). This concept is vital in education because it helps students apply knowledge in complex situations, think critically, and make rational decisions. In the context of Bloom's Taxonomy, HOTS includes the three highest levels, which are analysis (analyzing concepts and organizing information in depth), evaluation (making evaluations based on criteria and logical justification), and creation (producing new ideas or products from existing knowledge there is). HOTS are essential cognitive abilities encompassing the upper three levels of the revised Bloom's Taxonomy:

analyzing, evaluating, and creating (Sholikah et al., 2021). These skills are vital for fostering critical thinking and problem-solving abilities in various educational and professional contexts.

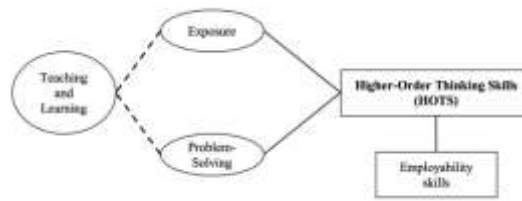
In higher education, HOTS is essential in preparing students for a world of work that requires problem-solving skills and innovation. Developing higher-order thinking skills is crucial for effectively tackling the challenges of the 21st century (Nanda et al., 2023). These skills, particularly in the cognitive domains of analysis and evaluation, are essential for fostering critical thinking and informed decision-making (Nanda et al., 2023). Therefore, HOTS develops intellectual ability and equips students with valuable skills that can be applied in their careers and daily lives. HOTS is essential because of its ability to form independent individuals who can make decisions based on logical justification and evidence. Higher-order thinking skills empower learners to solve problems and make informed decisions effectively (Gendenjamts, 2023). These skills enhance critical analysis and creativity in problem-solving processes by fostering the ability to recognize connections between diverse ideas (Gendenjamts, 2023). In the world of work, these skills are highly sought after by employers because employees who can think critically and creatively are usually more adaptive in facing change, more innovative in solving problems, and more competitive.

### *Bloom's Taxonomy Theory*

Bloom's Taxonomy is organized into six levels within its cognitive framework: remembering, understanding, applying, analyzing, evaluating, and creating (Prakash & Litoriya, 2022). Each level represents a different stage of cognitive processing, allowing for a structured approach to learning and assessment (Prakash & Litoriya, 2022). Educators are empowered to effectively incorporate and implement these essential components into their teaching process, significantly impacting student learning and success. According to Bloom's Taxonomy, effective teaching and learning should progress beyond the foundational domains of remembering, understanding, and applying (Chandio et al., 2021). It is essential also to incorporate higher-order domains, including analyzing, evaluating, and creating, to enhance critical thinking and foster deeper cognitive engagement among learners (Chandio et al., 2021). It shows how to encourage the students to upgrade their thinking skills.

Furthermore, there are two levels in the pyramid model: the lowest and the highest (Sobral, 2021). Bloom's taxonomy is structured into two distinct levels. The foundational level comprises three vital components: knowledge, comprehension, and application at the higher level, encounter analysis, synthesis, and evaluation. The theory has undergone revisions to enhance the categorization of the model. The cognitive domain of Bloom's taxonomy encompasses knowledge, comprehension, application, analysis, synthesis, and evaluation, providing a comprehensive framework for understanding cognitive development (Shaikh et al., 2021). This theory shows that HOTS can be developed through six essential elements. Completing this stage is crucial for students to master the skills of evaluation and creation. By cultivating these abilities, students enhance their higher-order thinking skills, vital for success in academics and life. The majors involved are strategically designed to foster critical thinking, empowering students to think analytically and confidently approach challenges.

### *Strategies for Enhancing HOTS*



*Figure 1: Adapted Model*  
Source: Author's Illustration

Teaching and learning are the primary basis for developing HOTS. In this context, student-centered teaching approaches, such as active learning, inquiry-based learning, and group discussions, play an important role. Student-centered methodologies, such as project-based learning and inquiry-based approaches, promote critical thinking and foster student engagement (Levitt & Grubaugh, 2023). A well-structured curriculum and various instructional methods can allow students to engage with more complex and abstract concepts and ideas. This approach significantly enhances critical thinking skills and prepares students for advanced academic and real-world challenges (Ulfa et al., 2021). Using an interactive instructional learning methodology, students' cognitive abilities can be further accelerated (Ulfa et al., 2021). Incorporating active learning methods like group discussions, research projects, and

case studies can inspire students to think critically and creatively. Students engage in group projects and exercises, which makes their learning experience more effective (Dogani, 2023).

Exposure is essential for students to apply their knowledge in actual or simulated situations. Simulation-based learning in social work education allows students to investigate theoretical and practical parameters within real-world scenarios (Tortorelli et al., 2021). This approach significantly enhances the learning experience by supplementing direct practice when such experiences may be limited or unavailable (Tortorelli et al., 2021). This exposure occurs through various activities such as industrial training, academic visits, and workshops, which allow students to see how concepts and theories are put into practice in real-world realities. Industrial training helps catering students gain knowledge and skills. This training improves their understanding and allows them to apply what they learn, which boosts their academic performance (Rahman, 2022). A broad range of exposure fosters critical and creative thinking among students, equipping them to navigate the changes and challenges of the contemporary world effectively. Students exposed to a wide range of complex, critical, and creative thinking exercises are better able to think critically and creatively (Montoya et al., 2022).

Problem-solving is an essential component of HOTS that trains students to identify issues, analyze related factors, and devise effective solutions. The development of students' HOTS is closely linked to their capacity to address contextual problems (Arnellis et al., 2021). Those with more advanced skills tend to exhibit excellent proficiency in critical areas such as analysis, evaluation, and creation (Arnellis et al., 2021). Problem-solving activities in learning allow students to hone their analytical skills. This includes their ability to evaluate multiple options and formulate innovative solution strategies. Problem-solving skills are essential for learners, as they facilitate the analysis of complex challenges, the development of creative solutions, and the effective implementation of those solutions (Adeoye & Jimoh, 2023). This process ultimately leads to enhanced levels of innovation and creativity within various contexts (Adeoye & Jimoh, 2023). Thus, problem-solving skills applied through the education system, such as high-order thinking skills activities, are the best preparation for students before entering the challenging world of work.

## MATERIALS AND METHOD

This data was collected through in-depth interviews. In qualitative research, the number of participants cannot be predetermined, and it depends on the issue at hand, the facts presented, and the direction of the analysis (Merriam & Tisdell, 2016). In this study, the researchers determined that the participation of 9 individuals was necessary to ensure that the collected data would adequately address the research questions and objectives. Within the qualitative research framework, a greater emphasis is placed on the quality of data rather than the quantity. Saturation involves carefully selecting an appropriate sample that can be effectively utilized in analytical procedures (Baker et al., 2018).

The researchers engage in semi-structured personal interviews to investigate the critical thinking skills necessary for employment. Educators and selected second and final-year students contribute valuable insights based on their experiences. This study explores explicitly three prominent institutions: Universiti Malaya (UM), Universiti Kebangsaan Malaysia (UKM), and Universiti Teknologi Mara (UiTM). These universities have been selected for their exceptional academic rankings and well-established reputations within national and international contexts. UM and UKM are celebrated as prestigious public institutions renowned for their rigorous academic standards and commitment to excellence. UiTM stands out as Malaysia's largest university, boasting a vibrant student population while serving as the premier institution that provides education to Bumiputera. To capture a wide range of perspectives, the informants are thoughtfully categorized into two distinct groups: students and educators. Table 1 contains detailed information about participant's backgrounds, highlighting the varied experiences and insights each group brings to the study.

Table 1: *Demographic Profile of the Informants*

Informant	Category	Gender	University	Working Experience	Year of Study
1	Student	Male	UiTM	-	Final year
2	Student	Male	UM	-	Final year
3	Student	Male	UKM	-	Final year
4	Student	Male	UiTM	-	Final year
5	Student	Female	UKM	-	Second year
6	Educator	Male	UKM	17 years	-
7	Educator	Female	UKM	16 years	-
8	Educator	Female	UiTM	15 years	-
9	Educator	Female	UM	13 years	-

This study employed a phenomenological approach to explore individuals' subjective experiences and perspectives regarding higher-order thinking skills in higher education. A total of 9 participants from 3 public universities contributed to the research. The sampling technique was purposive, aimed at discovering, understanding, and gaining valuable insights from the participants' experiences (Merriam & Tisdell, 2016). The data analysis in this study employs two principal methodologies: narrative analysis and thematic analysis, executed utilizing NVivo software. Narrative research is instrumental in constructing stories and narratives that reflect participants' experiences and perceptions. This methodology entails thoroughly examining the data through the perspectives of their narratives and lived experiences. From that, the researchers restore the information gathered in narrative chronology, as Creswell (2009) suggested. The research design was grounded in participant responses. This narrative research aimed to investigate three primary aspects: "what occurred," "how individuals comprehend the occurrences," and "the potential impacts that may ensue" (Bryman, 2012).

## RESULTS



*Figure 2: Strategies for Enhancing the HOTS Model*  
Source: Authors own work

### *Teaching and Learning*

Effective teaching and learning can be enhanced through solid engagement between educators and students. This involvement is essential in implementing an efficient and effective educational process. Thinking skills can be strengthened through this kind of synergy. According to a student's view, this informant agreed that good engagement between educators and students helps improve thinking ability among students. It can be implemented through teaching and learning sessions that create a platform to share knowledge about the current situation. When communication is

created in the class, the teaching session and the learner indirectly attract the students' attention to think about and share ideas about what was discussed.

*Before the learning session, the lecturer can hold a discussion session between the students and the lecturer. So, we can share other ideas from students about current issues, politics, the economy, what can be done to improve the economy, for example, what can be done to improve the country's political situation. (Student 4, Male)*

According to an educator, engaging with students is essential for fostering higher-order thinking skills through effective communication and interaction between educators and students. They believe receiving prompt feedback from educators is crucial in significantly boosting students' confidence in their cognitive abilities. Educators responding quickly and thoughtfully validate students' efforts and nurture their willingness to engage in critical thinking. This encourages students to openly share their knowledge, express their opinions, and voice their ideas, creating an enriching dialogue that enhances the learning experience for everyone involved.

*If possible, apply these to build and sustain relationships. First is a quick response. Try to respond quickly in any situation, whether verbally or non-verbally. People need to feel appreciated—whatever they do, if they ask a question, respond quickly; if they want something, respond quickly. The second is a positive response. This is the hardest to do because you still respond positively even if they are wrong. If they are correct, then, of course, respond positively. Praise them—"Good," "Well done," "Excellent." (Educator 1, Male)*

### *Exposure*

Another essential component needed is exposure to the importance of having higher-order thinking skills among the students. This element needs to be emphasized in higher education. Besides, it is pivotal for every student to know that one of the higher criteria required in the labor market nowadays is the ability of individuals to think creatively and be criticized.

The informant emphasizes raising awareness regarding the significance of essential skills in the current labor market, focusing on higher-order thinking skills to encourage students effectively. Both universities and educators can develop initiatives that prioritize these competencies. As indicated by the informant, universities can establish various initiatives, including creating a dedicated module to foster higher-

order thinking skills among students. Furthermore, universities can organize events or programs that align with the objectives outlined in the module. Concurrently, educators can enhance the teaching and learning experience by giving students meaningful exposure to these critical concepts.

*I suggest focusing on raising awareness. We could create a specialized module that targets university students, focusing specifically on employability skills. This module could outline what employers need regarding specific skills, giving a more detailed and targeted perspective on what is required in the job market. (Student 2, Male)*

### *Problem-Solving*

Problem-solving in advanced cognitive skills involves identifying and evaluating optimal solutions or actions in response to challenges. Students need to be consistently exposed to strategies that enhance their competencies, particularly in leadership roles, to effectively mitigate issues and approach problems from a strategic perspective. One of the informants mentioned that examinations could help students think wisely. This can be seen in the questions that require answers by applying higher-order thinking skills. From here, when the students can solve all of the questions related to higher-order thinking skills, it can encourage them to provide good answers through their strategic thinking skills in various ways to solve the problems. This informant agreed that one method is that examination can help the students think strategically, especially when giving out their opinions and ideas.

*When the government introduced Higher-Order Thinking Skills (HOTS) questions in the examination system, it effectively enhanced these skills among students. This method encourages students to think outside the box, as opposed to previously, when students might believe only within their immediate surroundings or "Circle A" alone. With HOTS exam questions, they must consider multiple perspectives or situations they may never have encountered. This is what makes HOTS in examinations so valuable and interesting. (Student 2, Male)*

The third student's informant held a differing viewpoint, arguing that examinations alone do not effectively foster thinking skills. This suggests that relying solely on the examination system is inadequate for improving students' cognitive abilities. Exploring additional methods beyond students' exams and assessments is essential to promote higher-order thinking skills. The student's mindset will evolve to embrace creativity, enabling them to explore a range of approaches rather than being

restricted to a singular perspective. Furthermore, diverse evaluation methods can effectively gauge and enhance their capacity to devise solutions and introduce original concepts. The informant also emphasizes the importance of exposing students to various experiences that foster their thinking skills rather than solely depending on traditional assessments and examinations. This broader exposure is crucial, as relying exclusively on exams to bolster their cognitive development is insufficient for nurturing well-rounded thinkers.

*From the perspective of examinations, I do not see them having a lasting impact. Even though they may have some effect, logically speaking, when it comes to job opportunities and other real-world applications, simply demonstrating knowledge on paper does not have much long-term impact or improve an individual's employability. (Student 3, Male)*

### Technology

An essential factor that aligns with the higher-order thinking skills discussed in this study is the advancement of technology. In today's globalized world, many sectors increasingly utilize technology daily. Technology plays a crucial role in enhancing the effectiveness and efficiency of service delivery. Over the past few years, the education system has shifted to an online platform, emphasizing the use of technology due to global challenges. The initiatives discussed focus on utilizing technology as a new approach to foster higher-order thinking skills among students. Universities and educators need to implement innovative teaching and learning methods. As highlighted by one educator, she is actively seeking the best alternatives to incorporate technology, especially since the current teaching mode is primarily through online platforms. This effort represents a commitment to promoting and enhancing students' thinking skills through novel approaches. However, developing higher-order thinking skills using advanced technology can be challenging, particularly for educators from the baby boomer generation. To address this, these educators must participate in workshops to help them update and strengthen their digital skills.

*The use of technology also changes the way people think. (Student 1, Male, UITM)*

*I need to understand my students better and become more familiar with using technology to engage them more effectively. If I incorporate multimedia technology, I am not entirely sure how it will go—I may need to experiment with different approaches. I believe this could make my students more engaged in the learning process. I am not very proficient with technology, I will admit. However, I am still considering how to ensure my students*

*develop higher-order thinking skills with the help of these tools. (Educator 3, Female, UITM)*

## DISCUSSION

Teaching and learning components play a crucial role in developing high-level thinking skills among students. The findings of this study indicate that the interaction between educators and students is the primary factor supporting the development of these skills. Good communication and interaction skills are crucial for helping students learn and breaking down communication barriers in higher education (Gao & Regina, 2024). This engagement fosters an active communication environment, allowing students to express their opinions, share ideas, and cultivate critical perspectives. For instance, students in this study reported that the discussion session before the learning activity helped them better understand current issues, enhance classroom discussions, and build a closer relationship with their educators. This illustrates that strong interaction between educators and students creates a supportive environment for developing higher-order thinking skills (HOTS). This finding directly relates to the first research question regarding the factors contributing to the lack of HOTS. Without effective interaction, students may feel unmotivated to think critically and creatively. Collaborative learning helps students think creatively and critically (Muawiyah, 2024). It allows them to interact, share ideas, and work together to reach common learning goals (Muawiyah, 2024). Thus, this conclusion highlights the importance of an interactive teaching approach to promote HOTS among students. Additionally, the active involvement of educators demonstrates that prompt responses to students' questions or opinions can boost their self-confidence in their cognitive abilities.

The study's findings indicate that sufficient exposure to the importance of HOTS in the workforce is a crucial yet lacking element in higher education in Malaysia. Both students and educators agree on raising awareness about the value of HOTS in the job market, which emphasizes the importance of thinking creatively and critically and providing thoughtful insights. By increasing exposure to HOTS, students can better recognize the significance of these skills, ultimately empowering themselves in the competitive job landscape. HOTS can develop by using challenging questions, engaging in projects, holding group discussions, and practicing metacognition (Chaojing, 2023). These methods help students grow academically. This finding implies that raising awareness about the importance of HOTS can significantly change students' attitudes toward learning. Learning based on HOTS can enhance students' critical thinking

abilities but necessitates focusing on the educator's competence, facilities, technology, strategies, and student motivation (Diena et al., 2023). This aligns with the second research question, which evaluates the effectiveness of learning strategies in enhancing HOTS. When students are introduced to the necessity of these skills at an early stage, they will be better prepared and more motivated to develop them. Additionally, this finding suggests that universities and educators could implement initiatives, such as specialized modules or programs that highlight the significance of HOTS in the workplace, to foster a long-term perspective among students.

Problem-solving is a fundamental skill within HOTS that enables students to apply their knowledge in real-life situations. The study's findings indicate that some students believe that exams featuring HOTS questions can enhance their strategic and creative thinking. Questions that require higher-order thinking about relations and functions help students think creatively (Utari & Gustiningsi, 2021). However, there is also a perspective that exams alone are insufficient for fostering long-term critical thinking development. This suggests that relying solely on exam-based learning may not significantly impact students' HOTS, as it overlooks the variety of approaches needed for effective problem-solving. This finding suggests that a more diverse approach to learning beyond traditional exams is necessary to support HOTS fully. This connects to the third research question, which explores ways to enhance HOTS among university students. Implementing comprehensive methods, such as project-based assessments and actual problem-solving assignments, can offer students valuable hands-on experience in addressing challenges. Project-based learning helps students improve their problem-solving skills, find jobs, and continue learning throughout their lives (Upadhye et al., 2022). This, in turn, can help develop their strategic and critical thinking abilities. Therefore, educational institutions should consider introducing activities that focus on solving real-world problems, as this can positively influence the development of better HOTS among students.

The final factor influencing HOTS is the role of technology in education. The study's findings reveal that both students and educators believe technology can enhance the learning experience and promote the development of HOTS. Technology, educators, students, and learning materials help university teachers use tools to improve students' thinking (Letchumanan et al., 2022). However, there are challenges for educators who are not as proficient in using technology, particularly among the older generation. Educators need to receive support, such as workshops or training, to improve their

digital skills and better prepare themselves for the demands of technology-assisted teaching. Using digital technologies in the classroom helps educators improve their teaching methods (Mukherjee et al., 2024). Intentional teaching approaches support established strategies and encourage innovation (Mukherjee et al., 2024). The findings suggest that technology can effectively promote HOTS, but it must be supported by appropriate training for educators. This ties into the second research question, which evaluates the effectiveness of current learning strategies. When technology is optimally used in the classroom, it can enhance student interest and interaction, thereby fostering the development of HOTS. Universities should consider offering specific training programs to assist educators who need to improve with technology, ensuring they can positively impact students in the long term.

## CONCLUSION

This study highlights the importance of enhancing Higher-Order Thinking Skills (HOTS) among Malaysian higher education students to improve their employability. Key challenges identified include rigid teaching methods, limited student engagement, and institutional constraints, necessitating adopting student-centered approaches, integrating problem-solving activities, and revising institutional policies. While the findings provide valuable insights, the study is limited by its small sample size and focus on specific fields, which may not fully represent the diversity of Malaysian higher education. Future research should expand to include more extensive, more diverse samples, explore the role of technology in fostering HOTS, and examine the long-term impact of these skills on graduates' career outcomes.

## *Acknowledgement*

The authors would like to extend their sincere appreciation to all participants involved in this study. Additionally, they wish to acknowledge the valuable contributions of the anonymous reviewers and the editor, whose insightful and constructive comments significantly enhanced the review process.

## *Funding*

No funding

### **Conflict of interest**

There is no conflict of interest associated with this publication

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