KEMENTERIAN PENDIDIKAN TINGGI

LAPORAN PROGRAM PENGHANTARAN PELAJAR TEMPATAN KE LUAR NEGARA DIBAWAH PROGRAM OUTBOUND MOBILITI UNIVERSITI AWAM 2024 PELAJAR UNIVERSITI PUTRA MALAYSIA KE UNIVERSITAS NEGERI MALANG, INDONESIA

THE INBOUND MOBILITY RESEARCH IN UNIVERSITAS NEGERI MALANG

1. INTRODUCTION

Date of Program : 12 FEBRUARI 2024 – 8 MARCH 2024

Host University/place : UNIVERSITAS NEGERI MALANG, INDONESIA

Duration : 25 DAYS

Student Information :

No	Student Name	Matric No
1	HAMIDAH BINTI MAT	GS58983

2. Activities / Schedule

Date/Week	Activities
12th February 2024	6.20pm : Departure from KLIA (Kuala Lumpur) 9.20pm : Arrived at Juanada International airport, Surabaya. 10.00pm : Custom clearance 10.30pm : Fetch by Dr. Faiz at the airport and left to Kota Malang 12.00am : Arrived at Universitas Negeri Malang and accomodation at De Kost S26 Syariah.
13th February 2024	First day in Faculty of PascaSarjana - block (A21). The faculty provide a working station to the researcher at *Bilik Jurnal 209* at second floor. Ice breaking session with Prof. Yusuf Hanafi and some other administrative staff. Meeting with Prof Toto Nusantara at 1930 using Google Meet platform because Prof Toto at Jakarta. Short discussion about proposal draft.
14th February 2024	**PUBLIC HOLIDAY BECAUSE OF THE PEMILU DAY**
15th February 2024	**Discussion session 2:** Discussing the area of research study. Then, the researcher proposed to do Need analysis by using an interview to the selected respondents. Working on Literature Review, Understanding the methodology, determine the suitable sample, Finding the right journal to get published.
16th February 2024	Working on Literature Review, Understanding the methodology, determine the suitable sample, Finding the right journal to get published.
19th February 2024	Working on Literature Review, Understanding the methodology, determine the suitable sample, Finding the right journal to get published. Discussion on research progress report with Prof Toto Nusantara.

20th February 2024	Participated in class of MK Studi Mandiri 2, Room SPs301. Have a good experience sharing knowledge with the collagues in this class. Working on draft the proposal. Researcher using Root Writing Templete to draf the proposal
21st February 2024	Researcher develop interview protocol to collect the data. This instrument already got the validation from an expert, lecturer from Universiti Pendidikan Sultan Idris, Malaysia.
22nd February 2024	Conducted an online in dept interview with six science teacher to get information about issues in science education and issues in implementing HOTS among elementary school students.
23rd February 2024	Writing process begin. The researcher using International Journal of Evaluation and Research in Education (IJERE) template to do the writing process.
26th February 2024	Writing process started. The researcher using International Journal of Evaluation and Research in Education (IJERE) template to do the writing process. Writing progress : Introduction and Research Objectives
27th February 2024	Attend for class of MK Studi Mandiri 2, Room SPs301. Have a good experience sharing kowledge about paper publication with the collagues in this class. Writing process started. The researcher using International Journal of Evaluation and Research in Education (IJERE) template to do the writing process. Writing progress : Continue writing Introduction and Research Objectives
28th February 2024	Writing process started. The researcher using International Journal of Evaluation and Research in Education (IJERE) template to do the writing process. Writing progress : Methodology
29th February 2024	Writing process started. The researcher using International Journal of Evaluation and Research in Education (IJERE) template to do the writing process. Writing progress : Continue writing Methodology part.
1st March 2024	Writing process started. The researcher using International Journal of Evaluation and Research in Education (IJERE) template to do the writing process. Writing progress : Data Analysis and Data reporting/writing.
4th March 2024	Participated in Seminar Hasil students S3 at A2 room 211. 10.30 am. Writing process started. The researcher using International Journal of Evaluation and Research in Education (IJERE) template to do the writing process. Writing progress : Continue Analysis and Data reporting/writing.
5st March 2024	Participated in the interweaving and networking program between UM and UIN Sunan Kalijaga, Yogyakarta. Writing process started. The researcher using International Journal of Evaluation and Research in Education (IJERE) template to do the writing process.

	Writing progress : Result and discussion
6th March 2024	Finalizing and polishing the full draft of research articles. Send for proofreading and formatting.
7th March 2024	Received the proofreading result. Research article submitted to IJERE.
8th March 2024	Flying back to Kuala Lumpur

3. Study Experiences

This report presents the findings of a research study on need analysis: development of a teaching module for enhancing higher-order thinking skills of malaysian primary school students, which was conducted as part of a doctoral dissertation. The research was conducted in collaboration between the University Putra Malaysia (UPM) and Universitas Negeri Malang, Indonesia (UM), over a six-month period from February 2024 to August 2024. This research aims to identify the need to develop teaching modules for electrical topics under the science syllabus based on students' HOTS. This qualitative study employed a semi-structured interview method on six science teachers from various schools in Malaysia. Four themes emerged from the needs analysis, namely the importance of HOTS knowledge, challenges in teaching HOTS, teaching strategies, and teaching HOTS. The development of this module can contribute to teaching and facilitation to improve students' HOTS in primary school science subjects.

This research study is entitled " Need Analysis: Development Of A Teaching Module For Enhancing Higher-Order Thinking Skills Of Malaysian Primary School Students " The study is organized into four main parts. Part one provides an introduction to the topic and outlines the research questions and objectives. Part two presents a review of the literature on issues in science education in primary school. Part three presents the methodology used in the research, including the process of implementing the Nominal Group Technique, the data collection and analysis methods, and the ethical considerations. Finally, part four presents the findings of the study, organized into categories that emerged from the Nominal Group Technique and the decisions generated from need analysis.

The findings of this study have important implications for educators, instructional designers, and administrators involved in enhancing higher order thinking skills of primary school students. Through this study, we identified the factors of the need of teaching module for enhance higher order thinking skills of primary school students, as well as the challenges and opportunities they face during their preparation of the module. We also identified the need to develop a new instrument to measure the level of higer order thinking skills among primary school student, which has important implications for the development of teaching module for enhance higher order thinking skills of primary school students.

I would like to express our gratitude to UM as the main funding institution that supported this research study, as well as to all the participants who took part in the study. Their valuable insights and feedback were essential in shaping the findings and recommendations of this report. I also thank the University Putra Malaysia (UPM) and Universitas Negeri Malang, Indonesia (UM) for their support and collaboration throughout this research. I would like to express my gratitude to Prof. Dr. Toto Nusantara, my supervisor, who provided me with valuable guidance and support throughout the research process. I would also like to thank Dr. Ade Eka Aggraini, my advisor, for her insightful feedback and suggestions. Additionally, I would like to acknowledge the lecturers at Sekolah Gedung PascaSarjana (A21), namely Dr. Siti Faizah, Dr. Radeni Sukma Indra Dewi, Dr. Slamet Arrifin and Ilham Mulya Putra Pradana who always made me feel comfortable and supported during my entire time at the university.

During our collaboration, we ensured that we had regular meetings to discuss the progress of the research and address any issues that arose. This allowed us to stay on track and ensure that the research was completed within the given timeframe. Additionally, we made sure to leverage the strengths of both institutions by assigning tasks based on each team's expertise, which allowed us to produce high quality research findings. Overall, the collaboration between UPM and UM was successful due to our open communication, effective project management, and shared commitment to producing meaningful research outcomes. I beleive that the finding of this study will be interest to policymakers, practitioners and researchers in the field of primary education, particularly involvove in enhancing higher order thinking skills of primary school students. This report is the result of a collaborative effort between UM and UPM. I am grateful for their support and contributions and I hope that this report will reflect the breadth and depth of our collective expertise and insights. I hope that this research will serve as a valuable resource for those who working in pramary school education. we look forward to continuing our collaboration in future research endeavours.

4. Suggestion / Recommendation

The study underscores the importance of creating teaching modules specifically designed to enhance higher-order thinking skills among primary school students. Educators and instructional designers should focus on identifying the factors crucial for the effectiveness of these modules. Understanding the challenges and opportunities involved in preparing modules to enhance higher-order thinking skills is essential. This knowledge can help educators and administrators address barriers and capitalize on favorable conditions for effective teaching. There is a clear need to develop a new instrument for measuring the level of higher-order thinking skills among primary school students. This instrument would facilitate accurate assessment and monitoring of students' progress, enabling educators to tailor teaching strategies accordingly. Expressing gratitude to funding institutions like UM and acknowledging the contributions of study participants is crucial. Their support and insights were instrumental in shaping the findings and recommendations of the study. Recognizing the support and collaboration of institutions like University Putra Malaysia (UPM) and Universitas Negeri Malang, Indonesia (UM), as well as the guidance of mentors like Prof. Dr. Toto Nusantara and Dr. Ade Eka Aggraini, are important gestures of appreciation. Additionally, acknowledging the contributions of supportive lecturers, such as those at Sekolah Gedung PascaSarjana (A21), fosters a culture of gratitude and collaboration within academic communities.

5. Summary of the program

This report details a research study conducted collaboratively between the University Putra Malaysia (UPM) and Universitas Negeri Malang, Indonesia (UM) with the aim of identifying the need for developing teaching modules to enhance higher-order thinking skills (HOTS) among Malaysian primary school students. The study, undertaken over a six-month period, utilized qualitative methods, particularly semi-structured interviews with six science teachers from various Malaysian schools.

Four main themes emerged from the needs analysis: the significance of HOTS knowledge, challenges in teaching HOTS, effective teaching strategies, and methods for teaching HOTS. The study underscores the importance of developing teaching modules that address these themes, with a particular focus on improving students' HOTS in primary school science subjects. The research study is structured into four parts: introduction, literature review, methodology, and findings. The findings highlight the necessity of creating new instruments to measure the level of HOTS among primary school students and emphasize the implications for educators, instructional designers, and administrators involved in primary school education.

Acknowledgements are extended to UM for funding the research, participants for their valuable insights, UPM and UM for their collaboration, and mentors and colleagues for their guidance and support. The collaborative effort between UPM and UM was marked by regular communication, effective project management, and a shared commitment to producing meaningful research outcomes. The report concludes with a call for policymakers, practitioners, and researchers in primary education to consider the findings and recommendations outlined in the study. It expresses gratitude for the collaborative effort and anticipates continued collaboration in future research endeavors.

APPENDIX A : FIRST DRAFT OF RESEARCH PAPER

Need Analysis: Development Of A Teaching Module For Enhancing Higher-Order Thinking Skills Of Malaysian Primary School Students

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ABSTRACT

This research aims to identify the need to develop teaching modules for electrical topics under the science syllabus based on students' HOTS. This qualitative study employed a semi-structured interview method on six science teachers from various schools in Malaysia. Four themes emerged from the needs analysis, namely the importance of HOTS knowledge, challenges in teaching HOTS, teaching strategies, and teaching HOTS. The development of this module can contribute to teaching and facilitation to improve students' HOTS in primary school science subjects.

Keywords: Teaching module, higher-order thinking skills, primary school student, teacher, science

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1.0 INTRODUCTION

In recent years, there has been much attention on effective science teaching strategies for student achievement (Fauth et al., 2019; Sahin & Yilmaz, 2020). Science education research has long focused on scientific higher-order thinking skills (HOTS). It has been recognized that students' HOTS plays a significant part in the science learning process (Sun et al., 2022b). HOTS refers to the ability to think on a higher level than remembering information or repeating something back to someone (Zohar, 2005). Science learning is characterized by conceptual understanding, involvement, and collaboration between students while conducting practical activities. HOTS not only allows students to learn scientific concepts but also enables them to develop scientific literacy by involving them in scientific research (Caiman & Jakobson, 2019).

Besides helping students pass exams, science also assists them in understanding and applying what they have studied. Several initiatives over the past 20 years have been made to overhaul scientific instruction in schools (Sahin & Yilmaz, 2020). Teachers, as "change agents", can better comprehend, practice, and implement HOTS, such as critical thinking and argumentation skills, for science education reform to be successful. Teachers may be smart and creative in choosing and developing effective teaching and learning techniques, and they can entice students to follow them. As a result, the teaching approach adopted can develop students' thinking skills by developing their preferences, abilities, and competencies. According to Yeung (2015), teaching for developing HOTS is critical for preparing students to participate in and contribute to modern societies. Previous research has suggested that most students are uninterested in science courses, even though these disciplines have a significant association with their daily life (e.g., Sulaiman et al., 2021). One of the most challenging tasks for educational systems, including Malaysia's, has been to encourage students to continue their science education (Bal-Taştan et al., 2018). The problem of reduced interest in school science subjects is caused by various factors, including gender and age, primary school teachers' lack of confidence in teaching science courses, lack of subject expertise, lack of abstract thinking, and traditional teaching methods (Lin et al., 2019).

Study Context

The Trends in International Mathematics and Science Study (TIMSS) is an international comparative study by the International Association for the Evaluation of Educational Achievement (IEA). The TIMSS study is conducted every four years, and the first TIMSS study was undertaken in TIMSS 1995. The studies offered by the IEA include TIMSS Grade Four, TIMSS Grade Eight, and TIMSS Advanced. The Program for International Students Assessment (PISA) measures the literacy rate of 15-year-old students, especially in mathematics, science, and reading ability rate. Based on the report on the status of Malaysia's achievements in TIMSS and PISA in 2018, Malaysia is in the bottom 20 countries (OECD, 2018). This result shows that Malaysia's achievements in TIMSS are still not something to be proud of (Ministry of Education, 2019). According to Damaianti et al. (2020), core literacy for student growth should focus on increasing students' HOTS, where HOTS indicates the greater pursuit of disciplinary education principles. Therefore, the current study aims to explore the problems and requirements related to developing teaching modules to improve students' HOTS in science subjects for the topic of electricity. The study addressed the following question: what are the problems and requirements related to the development of a module to improve students' HOTS in science subjects for the topic of electricity based on the teachers' point of view?

LITERATURE REVIEW

The Importance of Science Education

The development of science and technology has always been a feature of developed countries. Part of this achievement can be attributed to their ongoing evaluation and understanding of the science curriculum development. They aim to raise all age groups' proficiency levels in math and science (Razali et al., 2020). Past researchers have placed a great deal of emphasis on the importance of science for employment, especially its global significance in improving the socioeconomic status of the nation, ensuring the stability of technology, and improving the standard of science curriculum development (Mat & Mustakim, 2021; Paige et al., 2016). Nevertheless, several factors must be recognized to produce scientifically literate students interested in science to create a workforce of qualified professionals. Factors that affect students' interest in science must also be analyzed in terms of their learning criteria.

Issues in Science Education in Primary Schools

The most recent technology developments have the potential to transform the educational landscape. The development of multimedia and the Internet has given teachers and students additional opportunities to study and facilities to rapidly and easily access information and educational resources online (Suwono & Dewi, 2019). Yet, many students are unable to understand HOTS due to the traditional teacher-centered approach and the fact-memorizing phenomena (Mat & Yusoff, 2019; Zainudin et al., 2018). Consequently, mastery of HOTS among students is still low (Darling-Hammond & Oakes, 2021). Teachers must develop teaching resources that are not just focused on one source to provide students with relevant HOTS experiences. This situation demonstrates the critical necessity for one of these guides to serve as a teaching module that focuses on implementing HOTS starting in primary school. Many primary school students are still struggling to grasp HOTS. To apply HOTS to students, useful lessons and methods should be used by teachers.

Teaching and Learning in Science Education

Numerous factors influence success and interest in science among students. They include the topics studied, workload, student assignments, personal orientation and skills, teaching design, materials for successful teaching, teacher effectiveness, teaching skills, motivation, student personality, and the number of students in a class. They also comprise contextual, emotional, and motivational factors (Say & Bağ, 2017). Learning was viewed as linear and sequential in learning theories that were widely accepted until about 25 years ago. This perspective led to a hierarchical description of learning. Learning goals were organized in a progression from simple, lower-order cognitive tasks to more difficult ones. It was often believed that only the collection of fundamental, pre-requisite learning could lead to complicated comprehension (Bloom, 1956). According to Shepard (1991), the most problematic ramification of the mastery learning model of teaching is that when it is in the later stage in the hierarchy, HOTS is not taught until pre-requisite skills have been mastered. Frequently, students never reach the stage where they may participate in HOTS.

On the other hand, by enhancing the students' HOTS and learning abilities, science teaching and learning in primary schools has to be improved (Ichsan et al., 2019). Without a demand, efforts to raise the standard of education in this demanding 21st century become non-competitive (Scott, 2017). Because of the many ways that students learn, teachers must adopt various teaching approaches. The goal of learning is to combine new and old information. The growing complexity of today's technologically advanced students has made them disinterested in traditional teaching and learning techniques. According to Attard and Holmes (2020), teaching programs and instructional techniques require innovative methods for keeping students engaged. Although we are largely unaware of the distinctive characteristics of HOTS in science education, there is little doubt that science teachers need such a module to enhance their instruction and foster students' critical-thinking skills. Technological innovation is increasingly incorporated into the classroom nowadays (Gulley & Jackson, 2016). For instance, Jackman and Roberts' (2014) research showed that social media use positively affected students' idea understanding. Likewise, Moghavvemi et al. (2018) explored how the usage of YouTube assisted Malaysian students in successfully and independently completing their homework.

HOTS and Bloom's Taxonomy

According to Bloom's (1956) taxonomy, the term HOTS may be used to describe cognitive activities above the level of recall and comprehension. It alludes to cognitive exercises like analyzing, synthesizing, and evaluating (Bloom, 1956). Recently, several studies have suggested that Bloom's taxonomy should be used to guide the creation of HOTS in science education (e.g., Istiyono et al., 2020; Subia et al., 2020). HOTS enables students to work on problems involving operational analysis, evaluation, and creativity. Bloom's taxonomy consisted of six majors: knowledge, comprehension, application, analysis, synthesis, and evaluation. Moreover, Brookhart (2010) claimed that Bloom's cognitive taxonomy's highest level, HOTS, is intended. Any cognitive taxonomy's educational objective is to provide students with transferable skills and thinking capacity. Based on Bloom's taxonomy, Anderson and Krathwohl (2001) created a new classification system for knowledge and cognitive processes. However, they criticized the leveling system. Yet, the science education research community has fallen short of the requirement to create trustworthy and effective models to help students build their passion in science education (Sun et al., 2022b). The challenges of creating a HOTS model in practice are ascribed to a number of factors, such as teachers' lack of knowledge of how to communicate HOTS in science education, the ambiguity of the HOTS idea, and the challenges of looking into particular strategies to improve students' HOTS.

Science Education and HOTS

Helping students develop HOTS, which will enable them to think critically, ask meaningful questions, reason, and solve problems, is the main objective of science education (Sun et al., 2022a). The definition of HOTS includes the ability to produce complex, non-algorithmic, multiple solutions and make nuanced judgements and interpretations (Sun et al., 2022b). Metacognition is increasingly acknowledged as an essential component of HOTSs, according to Hamzah et al. (2022). Furthermore, other studies have accepted the common perspective of 'HOTS about cognition' (Nelson et al., 1999). When HOTS is needed to address difficult challenges, people use various abilities to accomplish their objectives (Pratama & Retnawati, 2018). In science education, science self-efficacy influences students' science-related activities as they experience success in science (Zeldin & Pajares, 2000). Metacognitive abilities have traditionally been seen as critical to the development of scientific reasoning because they provide the epistemological foundation, conceptual motivation, and cognitive control for individuals to employ underlying talents in science learning tasks (Lehmann, 2022).

2.0 RESEARCH METHODOLOGY

This study aimed to investigate the need to develop a module to enhance HOTS among primary school students. Throughout this study, the authors adhered to the Standards for Reporting Qualitative Research (Tong et al., 2007).

Design

This study utilized the qualitative approach to gather data. More detailed information was gathered via semi-structured interviews (Brown & Danaher, 2019). Creswell and Poth (2018) suggested that the appropriate minimum informants for a qualitative study were between three to seven people depending on the saturation of the data occurring during future studies. Yin's (2018) opinion presented that two to ten samples were sufficient to reach saturation. As a result, the sixth interviewee showed signs of saturation when the same themes were repeated with subsequent interviewees.

The Research Team and Reflexivity

The researchers had been working as research assistants (PhD students) and a faculty member (lecturer) on an education faculty. The researchers comprised two females, all trained in qualitative research. The researchers were also acquainted with six of the interviewees.

Setting and time

The data were collected between May 20, and June 12, 2022, in Negeri Sembilan, Malaysia.

Sample

This qualitative study's sample consisted of six specialist teachers from six different schools. Six primary school science teachers in Negeri Sembilan, Malaysia, participated in focus groups. Six people were interviewed as part of the study, all of whom were chosen by purposive sampling. The criteria for selecting these teachers to be study participants were based on theimportance of their personal and professional experiences and abilities to articulate and reflect on issues and challenges of teaching using various methods, such as virtual learning methods in teaching primary school science subjects. The participants of this study consisted of three male teachers and three female teachers. All participants must have an average of 5 to 25 years of full-time teaching experience in primary schools in Malaysia.

Table 1. Demographic Information of Informants.

Informant	Sex	Age	Post	Teaching Experience (years)	Education
T1	Male	45	Science teacher	25	Degree
T2	Male	45	Science teacher	25	Degree
T3	Male	43	Science teacher	22	Degree
T4	Female	40	Science teacher	18	Degree
T5	Female	42	Science teacher	19	Degree
T6	Female	41	Science teacher	17	Degree

Data Collection Tools

According to the existing literature, the data were gathered using a semi-structured interview form, which included the following open-ended questions:

1. How can students improve their HOTS in science classes?
2. How can technology help develop HOTS among primary students?

3. What are the challenges and opportunities of using virtual technologies in developing HOTS?
4. What has your experience been with a HOTS-related module in the classroom and among students?
5. How can you, as a teacher, develop HOTS among your students?

Data Collection Process

Individual in-depth interviews were used to acquire the data. Pilot interviews with two participants other than the main participants were conducted before the start of the study interviews. Based on the results of these pilot interviews, the interview procedure and questions were modified. Initially, phone calls were made to those selected using the snowball sampling technique, those who satisfied the inclusion criteria (i.e., science teachers, five years of experience in teaching) were informed of the study's goal and methodology, and times for online interviews were scheduled. Each interview only involved the interviewer and participant. The interviews lasted 45 to 90 minutes on average. Both verbal and nonverbal clues were noted using written notes and a voice recorder. Participants received interview transcripts for their approval, additional feedback, and/or revisions.

Ethical Issues

Prior to performing this research, the study's protocol was authorized by the UPM Ethics Council for Research Involving Human Subjects (No. JKEUPM-2021-844). The provisions of the 1995 Declaration of Helsinki (as amended in Brazil, 2013) were explained to the interviewees before the start of the sessions, and their verbal and written agreements were acquired. The researchers closely observed the privacy principle when gathering and storing the interviewees' information. In achieving this, all identifiable information was completely anonymized during transcription by using a pseudonym. All interviewees were given access to the transcriptions for their review. Voice recordings, transcripts, and interview notes were stored on a password-protected computer. All obtained data will be destroyed five years after the research and publication procedures are completed.

For the results to be trustworthy, bias issues are required to be appropriately addressed and acknowledged (Flick, 2008). The researchers evaluated potential bias against the aim to impartially examine the subjective experiences of the subjects (Patton, 2005). This study adhered to a strict protocol with much pre-planning to ensure the data were succinct and to lessen researcher bias in the semi-structured interview. The transcripts and findings were shared with team members for feedback. To engage in this study, the interviewees provided written informed permission.

Data Analysis

Thematic analysis was manually applied to the data. The study team used an inductive technique (Gratton & Jones, 2014) to read the transcripts line-by-line after the interviews to comprehend the interviewees' experiences and create themes. In addition, the MAXQDA 20.0 statistics software was employed to prevent any human errors. A constant comparison technique was adopted to compare and improve the developing themes about the participants' varied experiences (Ritchie et al., 2014).

Trustworthiness

The following four criteria—credibility, transferability, dependability, and confirmability—were used to determine the study's trustworthiness (Carcary, 2020). Obtaining participants' approval, describing the studied phenomenon in detail, using the MAXQDA 20.0 software package to analyze the data, comparing the results with previous research findings, holding researcher meetings at regular intervals to discuss the research process, and advantageously implementing the researchers' intertextual qualifications and experiences all contributed to credibility. The research sample, setting, and procedure were all properly reported to guarantee transferability. Intertextual participant utterances were explicitly cited, and comprehensive definitions between the researched environment and the study were established. Dependability was achieved by inter-coder consistency and by transmitting all data collecting tools, raw data, analytical encodings, and derived conclusions to a professional who was not involved in the research. Confirmability was ensured by using multiple data collection methods, considering each researcher's reflective comments, and having each researcher code the data individually.

3.0 RESULTS AND DISCUSSION

Analysis of the data revealed four major themes capturing the experiences of the study participants. An interview was conducted with six science teachers to examine the need to develop the teaching module. Four themes emerged from the need analysis, namely (1) the importance of HOTS knowledge, (2) challenges in teaching and learning, (3) teaching strategies, and (4) teaching skills.

Theme 1: Importance of HOTS Knowledge

The topic of electricity is one of the topics in the primary school science curriculum. In this topic, six objectives need to be mastered by students, namely explain with examples of the sources that produce electricity, identify the arrangement of bulbs in series and parallel in a complete electrical circuit, draw diagrams of series circuits using symbols, compare the brightness of bulbs in a series or parallel circuit, explain the effects of negligence in the handling of electrical equipment, describe safety measures, and explain observations on the safety of handling equipment and saving electricity.

From the interview sessions, two sub-themes emerged under the importance of the HOTS knowledge theme: basic issues and applications. All six teachers agreed that HOTS knowledge was fundamental to be mastered by students. Unfortunately, the data suggested that teachers had certain misunderstandings regarding some essential components of HOTS, and what is more, these critical components were difficult to grasp.

Since science is the study of technology, the concept of electricity is essential to understand getting a clearer picture of technological progress. Quoting the words of Teacher 5, "It is important that students can apply the concept of electricity in the Physics chapter while studying in secondary school later, and the knowledge of the teacher plays an important role". According to Teacher 1, it is vital to understand how electrical topics may be used and transferred to students so that they can utilize them in their future lives, such as when using electrical circuits. However, Teacher 2 stated that, "Even I as a teacher read a lot of topics related to the importance of HOTS when I was a preservice teacher, I am not sure about the significance of HOTS for my students in school and how having these skills will affect their lives in the future".

Theme 2: Challenges in Teaching HOTS

Students face many problems in learning science. Different perspectives were expressed by the six teachers on the problems faced by students during teaching. Under this theme, six sub-themes appeared: difficult terms, lack of thinking skills, misconceptions, techniques, nature of the topic, and students' attitudes. The analysis found that many related passages shared between the theme of the importance of HOTS and the theme of problems in the teaching and learning HOTS of electrical topics. As Teacher 3 said, "Students cannot imagine a complete electrical circuit process". According to Teacher 5, "Students have difficulty understanding various terms related to electrical topics". Four other teachers supported this statement as they mentioned that terms, such as serial circuit, parallel circuit, complete circuit, and green technology, are among the terms that were difficult for students to understand. According to Teacher 3, students struggled to understand the term because it was presented as something new.

The lack of HOTS was also a barrier for students to master this topic. According to the six teachers, most students could not apply the knowledge learned to complete the HOTS assignments. Often, students memorized sentences in textbooks and notes provided by the teacher,and they failed to provide further explanations in their own words and understanding. Students seemed to have difficulty analyzing the information provided to produce something satisfactory. For example, Teacher 6 described the student's answer, "Students are always confused to identify circuitdifferences". He added that students also faced difficulties explaining the difference between series and parallel circuits. Due to these difficulties, there was a high level of misconceptions among students, especially between the concepts of series circuits and parallel circuits.

Student attitudes also contributed to problems in teaching and understanding science subjects. For example, students refused to ask questions during teaching and learning activities. Teacher 5 said, "Teachers assume students understand the lessons taught because not many ask". However, Teacher 2 added that students did not ask questions because they did not understand the information presented by the teacher and were not trained to ask questions. Teacher 2 also added that the absence of questions among the students might be due to the lack of existing knowledge. All six teachers agreed that this attitude would affect the learning culture among students and, in turn, their understanding of electrical topics.

All teachers agreed that classroom activities and experiments had a high potential to strengthen students' understanding. However, teachers have time constraints that prevent them from delivering different activities and experiments in the classroom. Teachers also need to rush on specific topics to ensure all topics in the curriculum specification are covered on time. Teacher 3 said, "I always have to attend teacher meetings outside, and sometimes it takes two or three days or even a week in a row. My students cannot continue learning Science because the substitute teachers are not Science teachers". Upon returning from the meeting, he had to rush to teach to finish the syllabus.

Teachers 4 and 5 also corresponded that using media, such as videos, would help students to visualize the complete circuit process. As for Teacher 6, he preferred to conduct experiments in his class because he believed that students would get better understanding through experiments. Teacher 6 said, "I prefer to conduct experiments with my students because they can observe phenomena and experience real-life situations". However, due to time constraints, experimental activities were limited.

Theme 3: Teaching Strategies

Teaching strategies consist of three main sub-themes, namely static illustrations, multimedia, and experiments. All teachers agreed they used many static illustrations to teach this topic to their students. As Teacher 1 said, he preferred to draw a circuit arrangement on a whiteboard traditionally and asks students to draw it along with it. For Teacher 3, he used a PowerPoint presentation to show static diagrams. He acknowledged that utilizing such graphics to depict the operation of an electrical circuit was rather difficult. He claimed that employing multimedia encouraged students to think abstractly, which was crucial for understanding science. On the other hand, Teacher 2 preferred to refer to diagrams in textbooks due to time constraints that prevented her from providing other teaching materials for her students.

Teacher 1 always used the workbook to familiarize his students with the HOTS questions and improve students' understanding, and he would typically ask questions to his students during his induction set. His justification for this strategy was to make sure students understood and remembered previous topics he had taught. Teacher 1 also emphasized that repetition of information was important to encourage students to retain information in their long-term memory. Teacher 1 then added, "The difficult terms in science need to be memorized; there is no other way for them to get used to the terms. We as a teacher need to play a role in helping them memorize those terms".

All six teachers had similar perspectives on video presentations. They argued that the video presentation would help students visualize the differentiation between series circuits and parallel circuits. Teachers sometimes use videos in the classroom to enhance students' understanding. All teachers agreed that these experiments were beneficial in helping students experience real-lifesituations. Through these learning activities, students would be able to apply the concepts taught toreal phenomena that occur in everyday life.

Theme 4: Teaching HOTS

All six teachers voiced their desired improvements in teaching HOTS in electrical topics from the interview sessions. The desired improvements can be summarized into two categories, i.e., active learning and technology assignments. Under the active learning task sub-theme, all six teachers agreed that students should be encouraged to ask questions in the classroom because questions are rarely asked during teaching and learning, except during experimental activities. Asking questions can help teachers measure two factors: students' level of interest and level of understanding. Meanwhile, group experiments and activities will encourage students to communicate and collaborate with their peers. As Teacher 5 said, "Teachers also need to play an important role in engaging in student learning during active learning tasks. From my personal experience, without a plan, I cannot improve HOTS among my students. Students do not want to engage in various topics, and I need to encourage them by some methods, such as asking questions and [giving] rewards. I also allow my students to have a presentation in the classroom, and other students can have a debate about other students' presentation to develop their sense of critical thinking".

Under the technology sub-theme, all six teachers agreed that videos, animations, and diagrams thatresembled real structures could make it easier for students to describe the structure and processes of series circuits and parallel circuits. Teacher 2 said, “I believe using technology such as animationor video can help students to visualize the process”. This was supported by Teachers 4 and 6,who agreed that most students could understand the process of electrical circuits more easilythrough visualization.

From the perspective of the six teachers, having a clear strategy to teach HOTS is very important for students to understand the basic concepts of science and apply that knowledge across the subject. The main problem students encounter is their failure to describe abstract processes in science, especially those that occur in electrical circuits. Teachers mustuse different strategies to teach their students to understand this concept. However, time constraints usually prevent them from preparing teaching materials. Even worse, technical problems such as poor internet connections prevent them from regularly using technology in theirclassrooms.

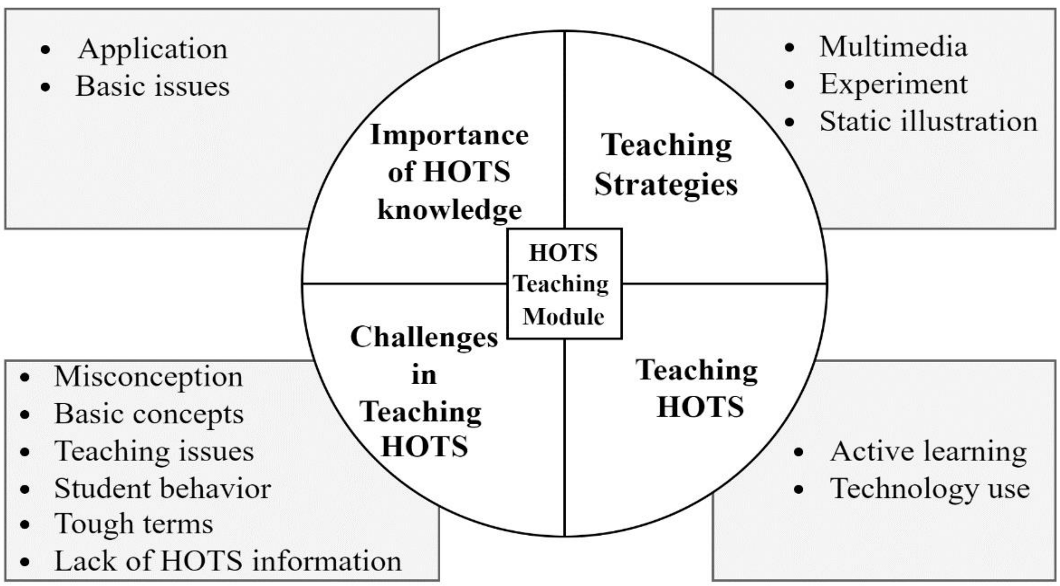

Figure 1. Themes and sub-themes of the study.

DISCUSSION

The current study investigated Malaysian teachers’ experiences in building a teaching module to improve HOTS among students in the setting of primary schools. The data were collected through in-depth interviews to answer the research questions. The findings supported the previous studies that students’ HOTS depended on how teachers delivered the teaching (e.g., Seman et al., 2017). The data analysis resulted in four major themes describing the different ways of teaching science experienced by the study participants. The present findings showed that these four elements were also necessary for creating a module in the classroom to enhance HOTS among students. The researchers used interviews to investigate science teachers’ perceptions of developing a module to enhance HOTS and overcome the obstacles they have experienced in their classrooms. According to the interview, all interviewees agreed that teaching HOTS was crucial in their class since it helped students be more active and critical thinkers when learning science.

Past research has shown that teachers must have a combination of subject-matter, general pedagogical, and pedagogical content knowledge when teaching specific topics (e.g., Lederman & Gess-Newsome, 1999). HOTS is crucial for effective learning and is the core purpose of scientific education (Saido et al., 2018). The ever-changing and challenging world requires students to go beyond the building of their knowledge capacity. They need to develop their HOTS, such as critical system thinking, decision-making, and problem-solving (Roets & Maritz, 2017). There is no doubt that the development of HOTS among students is prominent; however, for that to occur, the teachers must acquire and practice these skills.

CONCLUSION

This study provided useful insight into science teachers' experiences regarding the promotion of HOTS. This study indicated that the participants highly perceived implementing HOTS in 21st-century learning. However, the participants faced some challenges in implementing HOTS in science teaching. Malaysian schools have been using the HOTS module for more than five years. We are now uncertain about how the module was implemented in classrooms and whether it met its stated goals. The present study has given some insight into Malaysian schools' application of science modules and the use of HOTS by teachers. It has shown some discrepancy between what is occurring in classrooms and the real situation. The results of this study showed that students require a suitable module to improve their HOTS.

Implications

Based on the four themes raised through the interviews, it seems that there is a need for alternative teaching modules to facilitate HOTS for both students and science teachers. The information obtained can also lead to different teaching approaches, which challenge students' cognitive skills because these skills require students to process the knowledge they receive. Moreover, the study findings will be helpful to instructors and curriculum designers. First, science teachers might benefit from analyzing students' cognitive skill levels to detect and correct shortcomings by implementing learning activities that promote HOTS. Second, curriculum designers might utilize the data to analyze how far the new science curriculum has met its goals and propose methods to improve HOTS among science students. HOTS acquisition may also be aided by in-service professional development programs for science teachers on using the curriculum to transmit the understanding of scientific principles and their applications in daily life.

Like many advanced proficiencies, technical training cannot realize HOTS alone. It is essential that connections be made between theory and practice, so that students, particularly teachers, will be able to apply HOTS while learning. Teachers today should focus on promising educational activities and settings to foster thinking and the thinking skills that they seek to induce in these settings. The present findings suggest that professional development programs would be structured so that teachers will better understand what HOTS is and will be able to conceptualize it more coherently. The study also suggests encouraging teachers to apply various instructional strategies, as presented in this study and others, to help their students accomplish tasks requiring HOTS. The findings can help to elaborate on the pedagogical aspects of HOTS, such as metacognition, critical thinking, and problem-solving. Specifically, this can be done by first eliciting teachers' intuitive knowledge on these issues and then bringing into the discussion some of the literature about HOTS, transferring in a way that will connect to teachers' pre-instructional knowledge. The teaching module should consider the students' inclinations, abilities, and skills based on their thinking capacity. Suitable teaching methods will help students follow the lesson and acquire knowledge and skills, cultivating a deep interest in students.

Limitations

The current study had some limitations that should be addressed in future research. The impacts on students' learning were not tested, which is one of the study's limitations. Further research is needed to evaluate such impacts. Another issue in this study is that the interpretations are restricted. Observations and opinions are influenced by personal experience and expertise. Further research, such as empirical and longitudinal studies, will be required to assess the efficacy of teaching the HOTS module. The limitations that science teachers confront may reflect the setting at the study location. Additional research in a different culture may validate the findings and provide a better understanding of the barriers to developing HOTS. Lastly, the researchers chose the participants based on their interests and willingness to be interviewed. As a result, the volunteers may have had strong feelings on the subject.

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SECOND DRAFT OF RESEARCH PAPER

Determining The Mastery Level Of Higher Order Thinking Skills Among Elementary School Students in Science Learning.

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ABSTRACT

A main goal for science education is to enhance higher order thinking skills among the students. Thus, a survey was conducted to identify the level of higher order thinking skills among the elementary school students. The survey method was carried out on 280 elementary school students to determine the level of mastery of HOTS in Science subjects for year 5 students in elementary schools in Malaysia. Elementary school students are selected stratified by zone in each state. Finding shows that most of the responden still lack in masteri of higher order thinking skills in science learning. These findings emphasize the importance of a tailored approach to science education to foster a deeper understanding and application of scientific principles.

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1. INTRODUCTION

If highlighted to past studies [1] -[4] there are significant studies that suggest the role of technology to facilitate students' learning and further improve Higher Order Thinking Skills (HOTS) during teaching and learning. Realizing the importance of technology, witnessed the creation of a new curriculum that applies elements of technology, or better known as Information Communication anf Technology (ICT). The introduction of ICT subjects for Form One and Form Two is evidence seen in the words of [5] that the use of technology promotes constructive and meaningful learning. Students must learn not only to receive information, but they must manage, analyze, critique and transform that information into meaningful and usable knowledge. Therefore, learning using technology is necessary to stimulate active student involvement in problem solving and critical thinking as it plays a role as a delivery mechanism for teaching and a future platform for student activity.

There is a need for innovative and immersive ways to connect students with scientific issues. While digital learning has emerged as a viable answer, there are concerns that it may reduce learners' opportunities to socialize and learn by observing each other [6],[7]. The COVID-19 pandemic has also disrupted science education, with science becoming a lower priority in most districts surveyed, and key implementation activities, such as textbook adoption and course model alignment, being delayed. Additionally, staff shortages, teacher burnout, lack of dedicated funding, and an emphasis on English language arts and math are barriers to prioritizing science education [8], [9]. To address these challenges, it is recommended that the state provide dedicated funding for science education implementation, to help districts build capacity, provide high-quality professional learning to teachers and administrators, adopt and purchase standards-aligned instructional materials, and address the pandemic's impact.

LITERATURE REVIEW

The Importance of Science Education

Scientific and technological development has always been a characteristic of developed countries. Part of this achievement is due to continued evaluation and understanding of science curriculum development. Its goal is to improve achievement levels in mathematics and science for all age groups [10]. Previous researchers have placed great emphasis on the importance of science in employment, especially the global importance of science in improving the socio-economic status of countries, ensuring technological stability, and raising the standard of science curriculum development [11], [12]. However, to produce science-interested and scientifically talented students and a workforce of qualified professionals, several factors need to be considered. Factors that influence students' interest in science also need to be analyzed from the perspective of learning standards.

Issues in Science Education in Elementary Schools

The most recent technology developments have the potential to transform the educational landscape. The development of multimedia and the Internet has given teachers and students additional opportunities to study and facilities to rapidly and easily access information and educational resources online [13]; [14]. Yet, many students are unable to understand HOTS due to the traditional teacher-centered approach and the fact-memorizing phenomena [15]; [16]. Consequently, mastery of HOTS among students is still low [17]. Teachers must develop teaching resources that are not just focused on one source to provide students with relevant HOTS experiences. This situation demonstrates the critical necessity for one of these guides to serve as a teaching module that focuses on implementing HOTS starting in elementary school. Many elementary school students are still struggling to grasp HOTS. To apply HOTS to students, useful lessons and methods should be used by teachers.

Science Education and HOTS

The primary aim of science education is to facilitate the cultivation of Higher Order Thinking Skills (HOTS) among students. These skills empower individuals to engage in critical thinking, pose meaningful inquiries, engage in logical reasoning, and tackle problems effectively [18]. HOTS, as defined, encompasses the capacity to generate intricate, non-algorithmic solutions and to formulate nuanced judgments and interpretations [19]. Within this framework, metacognition is increasingly recognized as a fundamental element of HOTS [20]. Moreover, scholarly discourse has embraced the notion of 'HOTS regarding cognition' as a shared perspective [21]. When confronted with challenging tasks, individuals draw upon diverse abilities to navigate and accomplish their objectives through the application of HOTS [22]. In the realm of science education, students' belief in their own scientific capabilities, known as science self-efficacy, significantly influences their engagement in science-related activities, spurred by their achievements in scientific endeavors [23]. Traditionally, metacognitive abilities have been viewed as pivotal for fostering scientific reasoning, serving as the epistemological underpinning, conceptual impetus, and cognitive guidance that enable individuals to leverage their inherent aptitudes in science learning endeavors [24].

2. METHOD

The survey method was also carried out on 280 elementary school students to determine the level of mastery of HOTS in Science subjects for year 5 students in elementary schools in Malaysia In each state, researchers stratify elementary school students by zone for selection. The researcher used a questionnaire survey method to assess the level of need to implement the HOTS teaching module, which incorporates virtual learning, in elementary schools. Both instructors and students contribute to achieving this by examining their perspectives. After that, the results will be the basis for creating HOTS teaching modules that incorporate virtual education. Table 1 shows the location and number of respondents in the study. Respondents were selected stratified by zone, and in groups according to the type of school placement.

Table 1. Cross-sectional survey study location and number of schools

No	Zone	State/District	Number of Responden
1	North	Perlis	54
2	South	Johor	55
3	Middle	Kuala Lumpur	55
4	East	Terengganu	55
5	West	Selangor	55
6	Sabah	Kota Kinabalu	55
7	Sarawak	Kucing	55
		Total	**384**

Results obtained from data collected using quantitative methods. Quantitative data presents descriptive data of participants and results from questionnaire surveys. Only 280 elementary school students responded to this study by answering a questionnaire. A survey was carried out to determine the level of mastery of HOTS in Science subjects of year 5 students in elementary schools in Malaysia, which will answer the first research question. The findings can determine the level of control of HOTS during the teaching and learning that is carried out in Malaysia until today.

3. RESULTS AND DISCUSSION

In this study, as many as five states involving elementary school students were given stratified random sampling to answer the questionnaire. They are (1) Northern Zone (Perlis): 60 respondents, (2) Southern Zone (Johor): 52 respondents, (3) Central Zone (Kuala Lumpur): 66 respondents, (4) Eastern Zone (Terengganu) : 44 respondents and (5) West Zone (Selangor) : 59 respondents. The five states are a stratified random sampling to show the total population in the research area, and to infer the results of the population from which it was drawn. Table 2 shows the demographic profile of the respondents.

Table 2. Demographic Profile of Respondents (N=280)

No	Descriptor	N	Percentage
1	Race		
	Malay	263	93.9
	Chinase	3	0.01
	Indian	14	6.09
	Total	280	100
2	Gender		
	Male	120	42.9
	Female	160	57.1
	Total	280	100
3	Negeri		
	Selangor	59	21.1
	Perlis	58	21.1
	Kuala Lumpur	66	25.6
	Terengganu	45	13.6
	Johor	52	18.6
	Total	280	100

Based on the table above, Malays are the majority of respondents in this study (93.9%). The number of female respondents is 57.1% and male respondents is 42.9%. apart from that, Kuala Lumpur has the largest number of respondents which is 25.6%. Table 3 also shows the Feedback on Mastery of Science Subjects in General.

Table 3. Feedback on Mastery of Science Subjects in General

Item	Descriptor	N	Mean	Standard Division
A1	I agree that science subjects are subjects that I am interested in.	280	2.435	0.873
A2	I agree that science subjects encourage me to think.	280	2.807	0.879
A3	I agree that science subjects are useful in my life.	280	3.185	0.843
A4	I agree that science subjects should be given more time.	280	2.842	0.963
A5	I agree that science is a fun subject.	280	2.853	0.985
	Average		**2.824**	**0.909**

Based on the table above, the highest agreement is that science subjects are useful in life (M = 3.185, SD = .843). While the lowest agreement is that science subjects are subjects that I am interested in. (M = 2.435, SD = .873). Overall, it shows that the mastery of science subjects in general is at a moderate level (M = 2.824, SD = .0.909). Table 4 shows the feedback on kbat mastery in general.

Table 4. Feedback on Mastering higher order thinking skills in general

Item	Descriptor	N	Mean	Standard Division
B1	HOTS makes me always ask to get creative and innovative ideas.	280	2.528	0.946
B2	HOTS makes me constantly ask to make a decision.	280	2.764	0.951
B3	HOTS keeps me asking for more information.	280	3.067	0.854
B4	HOTS makes me always ask to share opinions in carrying out activities.	280	3.082	0.917
B5	HOTS makes me constantly ask to perform activities without teacher supervision.	280	2.282	1.082
	Average		**2.745**	**0.950**

Based on the table above, the highest agreement is that HOTS makes me always ask to share opinions in implementing activities. (M = 3.082, SD = 0.917). While the lowest agreement is that KBAT makes me always ask to carry out activities without teacher supervision.. (M = 2.282, SD = 1.082). Overall, it shows that the mastery of HOTS is generally at a moderate level (M = 2.745, SD = . 0.950). Table 5 shows the feedback on the source of electricity.

Table 5. Feedback About Electrical Energy Sources

Item	Descriptor	N	Mean	Standard Division
C1	I can explain that solar cells can produce electricity.	280	2.367	1.049
C2	I can explain that a power station can produce electricity.	280	2.632	1.052
C3	I can explain that dry cells can produce electricity.	280	3.007	0.976
C4	I can explain that a dynamo can produce electricity.	280	2.442	1.052
C5	I can explain that accumulators can produce electricity.	280	2.439	1.052
C6	I can explain that a generator can produce electricity.	280	2.635	1.082
	Average		**2.587**	**1.044**

Based on the table above, the highest agreement is to be able to explain that dry cells can produce electricity (M = 3.007, SD = 0.976). While the lowest agreement is being able to explain that solar cells can produce electricity (M = 2.367, SD = 1.049). Overall, it shows that the mastery of electricity sources is at a moderate level (M = 2.587, SD = 1.044). Table 6 shows the feedback on the series circuit and the parallel circuit.

Table 6. Feedback About Series Circuits and Parallel Circuits

Item	Descriptor	N	Mean	Standard Division
D1	I can identify the series arrangement of bulbs in a complete electrical circuit.	280	2.732	1.118
D2	I can identify the arrangement of bulbs in parallel in a complete electrical circuit.	280	2.985	1.005
D3	I can draw a series circuit diagram using symbols.	280	3.060	1.022
D4	I can draw a parallel circuit diagram using symbols.	280	3.021	1.060
D5	I was able to compare the brightness of bulbs in a series circuit.	280	3.139	2.567
D6	I was able to compare the brightness of bulbs in a parallel circuit.	280	3.050	0.918
D7	I was able to experiment with varying the brightness of bulbs in a series circuit by varying the number of bulbs.	280	2.967	0.947
D8	I was able to experiment with varying the brightness of bulbs in a parallel circuit by varying the number of bulbs.	280	2.925	0.971

D9	I was able to experiment with varying the brightness of bulbs in a series circuit by varying the number of dry cells.	280	2.925	0.997
D10	I was able to experiment to vary the brightness of the bulb in a parallel circuit by varying the number of dry cells.	280	2.867	0.961
D11	I can explain observations about circuits by various methods	280	2.625	1.036
	Average		**2.936**	**1.147**

Based on the table above the highest agreement is to be able to compare the brightness of bulbs in a series circuit. (M = 3.139, SD = 2.567). While the lowest agreement is being able to explain observations about the circuit with various methods (M = 2.625, SD = 1.036). Overall, it shows that mastery of series and parallel circuits is at a moderate level (M = 2.936, SD = 1.147).

DISCUSSION

Finding from this research helps educators assess how well students comprehend and apply complex scientific concepts beyond simple memorization. This understanding is essential for building a strong foundation in science education. Moreover, higher-order thinking skills, such as analysis, evaluation, and synthesis, are vital for developing critical thinking abilities. Assessing mastery in these skills enables educators to identify areas where students may need additional support and guidance. On the other hand, Proficiency in higher-order thinking skills prepares students for more advanced science topics in secondary school. It equips them with the necessary skills to tackle complex scientific problems and engage in scientific inquiry effectively. Additionally, HOTS also encourages sharing opinions during activities [25], although there was less agreement on conducting activities without teacher supervision [26]. However, based on the results of the study, it was found that students' mastery of HOTS is still at a moderate level. Science education is not just about learning facts; it's about understanding how to apply scientific principles to real-world situations. Therefore, it is important to master high-level thinking skills to enable students to make connections between classroom learning and daily experience. Developing higher-level thinking skills contributes to the holistic development of students, fostering intellectual curiosity, creativity, and problem-solving abilities that are valuable beyond the classroom setting. Finally, determining the level of mastery of higher-order thinking skills in science learning among elementary school students is important to ensure a comprehensive and effective science education that prepares students for future academic and professional endeavors.

CONCLUSIONS

This study provides an overview of the mastery of science subjects among elementary school students who are mostly Malay, with Kuala Lumpur having the highest representation. Although there is moderate mastery in Higher Level Thinking Skills (HLS) and understanding of series and parallel circuits, there are areas for improvement, especially in encouraging self-learning and understanding concepts related to electrical sources, such as solar cells. Therefore, the need for the construction of a teaching module that can help students master Higher Level Thinking Skills (HTS) and improve understanding of electrical topics.

These findings emphasize the importance of a tailored approach to science education to foster a deeper understanding and application of scientific principles.

ACKNOWLEDGEMENTS

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Our ref. : 24.1.39/UN32.31/TU/2024 — 24 January 2024
Subject : Letter of Acceptance (IIRM - Hamidah Binti Mat)

Dear Ms. Hamidah Binti Mat

Congratulations! We are pleased to inform you that your application for the International Inbound Research Mobility (IIRM) program at Universitas Negeri Malang (UM) has been accepted. We are excited to welcome you as an inbound researcher at our institution. Details of your acceptance are as follows:

Name	: Hamidah Binti Mat
Sex	: Female
Nationality	: Malaysian
Passport No.	: A56834016

You will be participating as an inbound researcher at UM for the period of February to June 2024 under the supervision of Prof. Dr. Toto Nusantara. You can reach Prof. Dr. Toto Nusantara at toto.nusantara.fmipa@um.ac.id. During your tenure, you are responsible for producing one draft of a research paper resulting from your consultations with Prof. Dr. Toto Nusantara and one supervisor at your home institution.

As an accepted participant of IIRM, you are entitled to the following benefits:

- One package of economic class round-trip airfare ticket
- Living allowance for one month
- Shared room accommodation at an on-campus international student apartment at Universitas Negeri Malang

Further, we warmly invite you to visit our institution on 12 February 2023. Should you have any further questions or require additional information, please do not hesitate to contact Dr. Muhammad Aris Ichwanto, the Person in Charge (PIC) for this program at muh.aris.ichwanto.ft@um.ac.id. Kindly copy your inquiries to the official email of the Office of International Affairs at oia@um.ac.id.

Thank you for your kind cooperation. We look forward to a productive research collaboration with you.

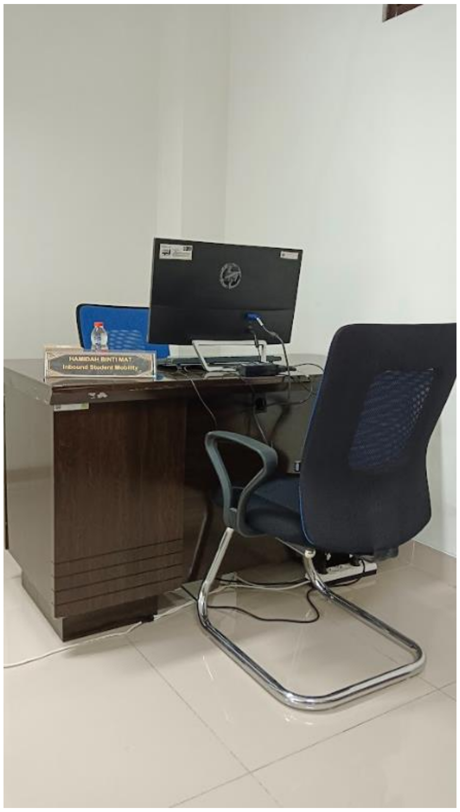
Director,

Evi Eliyanah, S.S., M.A., Ph.D
NIP 198103272005012003

Cc:
1. Ketua LPPM
2. Prof. Dr. Toto Nusantara, M.Si
3. Muhammad Aris Ichwanto, S.Pd, M.A., Ph.D

Universitas Negeri Malang

Galery photo

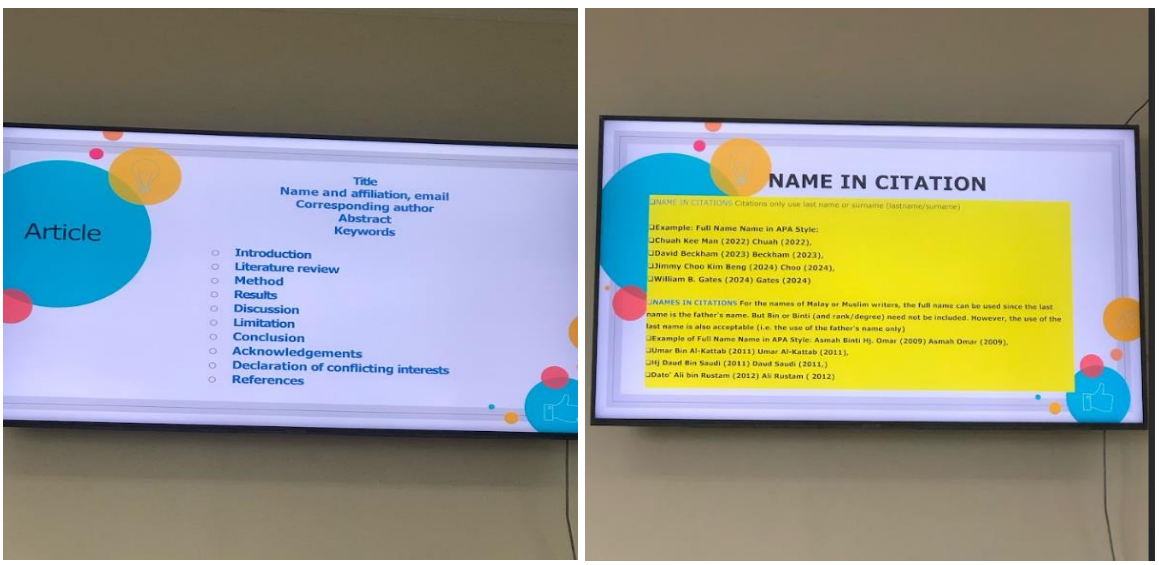


Work station provided by UM

With Bu Lidya Amalia Rahmania at Jurnal Room 209.

Discussion session with Prof Toto Nusantara

With S3 students  in class of MK Studi Mandiri 2, Room SPs301. (Tuesday. 20/2/2024. 1.10pm)



Sharing session With S3 students in class of MK Studi Mandiri 2, Room SPs301. (Tuesday. 22/2/2024. 2.10pm)

Participated in Seminar Hasil students S3 at A2 room 211. 10.30 am.

Participated in the interweaving and networking program between UM and UIN Sunan Kalijaga, Yogyakarta.

Perakuan Ahli Jawatankuasa Penyeliaan:

Dengan ini, diperakukan bahawa penyelidikan dan penulisan laporan kajian ini adalah di bawah seliaan saya.

Tandatangan : ______________________________________

Nama Penyelia: Prof. Dr. Toto Nusantara