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PREFACE

Proceedings of the 2nd International Conference on Management, Business, Economy, Education, Engineering, Social Science and Technology (METEC2021)

It is my pleasure to welcome you to 2nd International Conference on Management, Business, Economy, Education, Engineering, Social Science and Technology (METEC2021)**.** **METEC2021** aims to provide a platform for connecting academic scholars and industry practitioners world-wide to share the research findings from various disciplines and create a space for intellectual discussion, exploration and reflection of key issues that are shaping the world today. This is a great opportunity for delegates to expand knowledge, plan and implement innovative strategies, overcome barriers and move forward with the initiatives that benefit the community.

Your participation in this conference and submission of research papers is greatly appreciated and on behalf of the Organizing Committee, I wish you all the safety and health and together we must strive to get over with the Covid-19 pandemic challenge as soon as possible. Our research works must endure despite these challenges to continue contributing to the body of knowledge from new research ideas, methods and problem resolutions.

Thank you.

Dr. Safaie Mangir
Conference Chairman

ABSTRACT

The objective of this conference is to provide a platform for scholars, intellectuals and professionals from various academic and industrial disciplines to share the research findings from various disciplines and create a space for intellectual discussion, exploration and reflection of key issues that are shaping the world today. The conference welcomes all authors from related fields of research to submit and/or present the research papers. All accepted papers will be published in the conference proceeding book with ISBN number. More importantly, the accepted papers will also be published in refereed journals indexed by Malaysia Citation Centre (MCC). Papers that have the merits for publication in high index journals will be selected for publication in SCOPUS-indexed journals.

The conference has attracted quite a number of participations especially in the Video Presentation category and accepted research papers from various research disciplines for publication in proceeding book and journals. All submitted papers were reviewed by the review committee and the corresponding acceptance notifications were emailed to the authors upon acceptance approval by the review committee. Subsequently all accepted papers will be published in conference proceeding book which is targeted to complete by middle of July 2021. All accepted papers correspondingly, will be published in September 2021 Issue of the refereed journals. The proceeding (with ISBN) will be provided in PDF format while the journal is online and the related online URL links will be provided via email upon successful journal publication of the papers.

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TEACHERS' MODEL FOR TEACHING CRITICAL THINKING IN PRIMARY SCHOOL

Wirawani Kamarulzaman[1*], Khairul Hamimah Mohd Jodi[2], Oo Cheng Keat[3], Rosinah Mahmood[4] and Raziana Che Aziz[5]

[1] Kulliyyah of Education, International Islamic University Malaysia, Gombak, MALAYSIA

[2][3][4][5] Cluster of Education and Social Sciences, Open University Malaysia, Kelana Jaya, MALAYSIA

*Corresponding author: wirawani@iium.edu.my

Abstract: *The general purpose of this study is to investigate the applicability of the teachers' model for critical thinking in primary school to several selected schools. The model suggested several steps need to be fulfilled to promote critical thinking in the classroom. Thus, the study employed 25 primary school teachers to investigate their understanding of critical thinking skills and their techniques for teaching the skills. A training was given to teachers to help them improve their teaching techniques. Findings revealed that teachers understood the concept and were able to infuse the techniques in their teaching. They believed that the techniques were not new, but after the training, they are able to teach the skills more systematically. This shows that the model can be used in exploring the promotion of critical thinking and primary school classroom.*

Keywords: critical thinking skills, primary school students, qualitative approach teaching technique.

1. Introduction

The changing world that society is facing requires adjustment in the teaching and learning process. Individuals face the demands and challenges imparted by the increasing diversity, interconnected population, and globalisation of the economy. People usually have established their comfort zone and uneasy with changes that are forced by technology. It is believed that future success relies on people's mindset when they use the technology rather than the technology itself (McCain & Jukes 2001). Aligned with such development, changes in the school systems are required so that the correct mindset can also be developed. Higher-order thinking skills, such as analysis, synthesis and evaluation, are essential for practical problem solving and must be taught by educators in schools (McCain & Jukes 2001). Thus, to adapt to the need to change the mindset and the new roles of teachers, school systems need to improve in the curriculum policy to be able to teach students new skills for future survival.

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A lot of teaching approaches could be employed to enhance critical thinking in children. Among them is Problem-based Learning (PBL), where teachers initiate problems to stimulate, contextualised, and integrates learning (Newman, 2005). In PBL, a problem is the starting point of the learning process. Another approach is the Philosophy for Children (P4C) (Lipman, 2003) and its offshoot, the Hikmah pedagogy (Rosnani, 2013), which aimed to provide some fundamental reasoning skills that apply to various contexts. Bloom's taxonomy is also widely used as a classroom planning tool in education for preparing learning objectives. De Bono (1994) also has produced several books to teach higher-order thinking where in his books he mentioned several teaching techniques that can be used in teaching critical thinking skills.

In 2011, the curriculum for Malaysia primary school system had changed from the New Primary School Curriculum (Kurikulum Baru Sekolah Rendah) or KBSR to the new Primary School Standard Curriculum (Kurikulum Standard Sekolah Rendah) with more emphasis on developing higher-order thinking skills and not only on knowledge acquisition (Malaysia Education Blueprint 2013-2025 p.E-4). Since students should be provided with the skills for the 21st century, the establishment of KSSR was a great move. It has added another skill to the previous curriculum, which only had three skills: reading, writing, and arithmetic. The new skill is the reasoning skill, which specifically known to be a branch of critical thinking skills (McCain & Jukes 2001).

In relation to that, Kamarulzaman (2017) has conducted a study to explore the promotion of critical thinking skills in the KSSR classrooms. With the findings gathered, she proposed a model, namely the Teachers' Model for Critical Thinking in Classroom which laid down several elements that must be achieved to encourage critical thinking in classroom. The model was adopted from A-Four-Part model advocated by Halpern (2014), a stand-alone approach in critical thinking instruction.

2. Literature Review

2.1 Teachers' Model for Critical Thinking in Classrooms

The current study wished to investigate the applicability of the model introduced by Kamarulzaman (2017) on critical thinking among primary school teachers. Thus, the model, as shown in Figure 1 below, is the framework of the study.
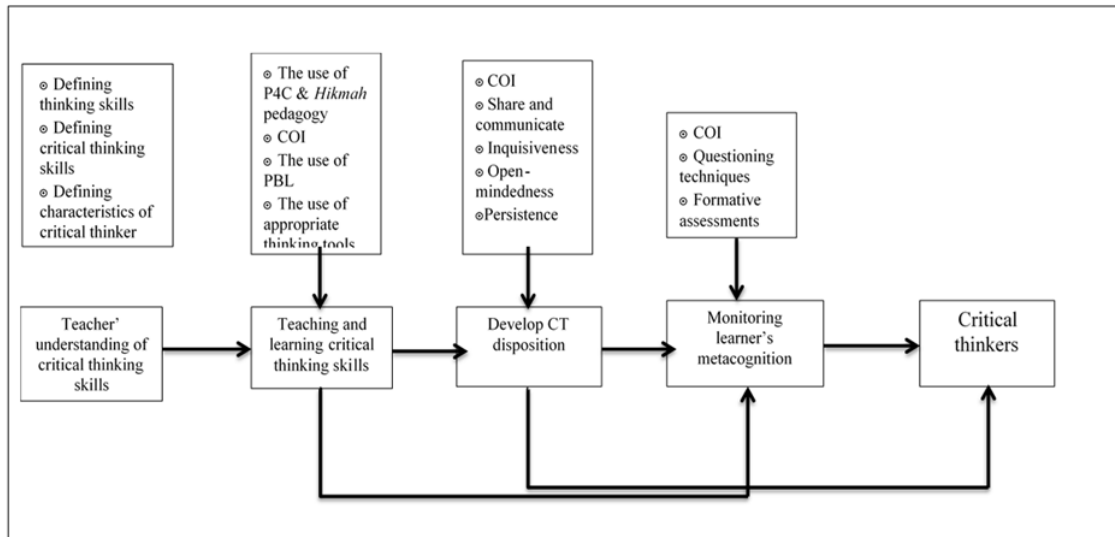

Figure 1: Teachers' Model for Critical Thinking in Classrooms.

2.1.1 Teachers' Ability to Define Critical Thinking Skills and Identify the Importance

Teachers are the agents for student learning. Teachers should equip themselves with the necessary knowledge and information to deliver subject matter efficiently and to be able to produce excellent students. Before a teacher can teach any skills, they must understand the skills fully. For teachers to promote critical thinking skills in classrooms, they need to master the definitions, dispositions and significance of critical thinking skills to be instilled in students. How can someone teach something that they do not well-verse at? Therefore, the first step to promoting critical thinking skills is knowing the critical thinking skills of teachers themselves.

Kamarulzaman (2017) found that teachers have a shallow understanding of the skills where they mentioned that critical thinking is only the ability to gather information, express thoughts, solve problems, and analyse. She also found that the teachers believed that the skills are essential for students as it helps students apply knowledge and make decisions (Kamarulzaman, 2017).

2.1.2 Teaching and Learning Critical Thinking Skills Implicitly

Swartz and Perkins (1990) suggested two approaches to teaching thinking; one is direct, where teaching involves teachers giving specific strategies to go through various steps in thinking, while the other is indirect, through many discussions and questioning method. However, it is believed that the latter is more attractive as it also signifies the application of thinking skills.

According to Kamarulzaman (2017), teachers were able to use questioning techniques and mind-maps in the classrooms, which was mentioned by Swartz and Perkins (1990) as the indirect approach. The types of questions were different when it comes to the academic ability of the students. Good students were asked to give reasons and to explain further, while teachers asked memorisation questions to weak students. The same goes with the selection of i-Think maps used in the classrooms. Good students were allowed to choose the appropriate type of mind-map to be used in-class activities, whereas, for weak students, teachers will select the type of mind maps, and students had to include information in the mind maps (Kamarulzaman, 2017). Kamarulzaman (2017) also found that teachers adopted the student-centred approach since it is crucial to focus on developing critical thinking skills (Lipman 2003).

2.1.3 Develop Critical Thinking Disposition

To think critically, students need to put many efforts and those efforts leading to the development of critical thinking dispositions, which are the internal motivation to use critical thinking skills (Facione, 2000). This step proposed that a critical thinker should exhibit the following dispositions or attitudes, which are the willingness to a) understand and used language; b) be inquisitive; c) evaluate evidence; d) to plan; e) ask for clarity; f) be open-minded, and g) be persistent.

Similar findings were found by Kamarulzaman (2017) when she suggested that teachers acknowledged some critical thinking dispositions among students. They were having inquisitiveness, open-mindedness, reasoning skills, persistence, and communicated their ideas views.

2.1.4 Methods to Monitor Learners' Metacognition

Metacognition is defined as thinking about thinking (Lipman, 2003). Teachers may monitor students' metacognition within the teaching and learning process through the infused method. Students and learners need to have metacognitive skills to be lifelong learners.

Through a student-centred approach, questioning techniques and formative assessment, it was found that teachers were able to monitor student's metacognitive skills (Kamarulzaman, 2017). This is congruent with Darling-Hammond et al. (2003), who proposed that the questioning method is beneficial in developing reflective skills since students will have the opportunity to monitor their learning and its progress through questions given by teachers (Darling-Hammond et al., 2003) and through making predictions to outcomes and providing reasons for solutions and answers. Through various group activities, especially group discussions, teachers will help students build metacognition since discussions promote self-regulations that involve planning, monitoring, and evaluating their thinking.

2.2 Problem Statement

When the model was proposed in 2017, it was intended to investigate the readiness to teach critical thinking skills to students, which should be aligned with the development of KSSR in 2011. Although it is considered that each part of the model has been investigated, Kamarulzaman (2017) believed that more could be done to enhance teachers' knowledge and skills in critical thinking so that they can teach the skills to students in the classroom better.

Therefore, the current study aimed extend the model by introducing some critical thinking skills teaching techniques to teachers in a more systematic way and exploring their perceptions and experiences on the techniques. Specifically, the objectives of the study are:

- to explore primary school teachers' understanding and teaching techniques for critical thinking skills in the classroom *before* the training of critical thinking skills teaching techniques,
- to investigate primary school teachers' experience in teaching techniques for critical thinking skills in the classroom *after* the training of critical thinking skills teaching techniques.

3. Method

A qualitative design was employed in the research, where interviews, training and observations were involved in the process. Through a qualitative study, rich data can be obtained from the triangulation process where teachers were first being asked about their knowledge and critical thinking teaching technique through focus group interview sessions. Second, they were observed in mock teaching activities. Third, they were trained with some teaching techniques. Fourth, they were observed again in their application of the new techniques introduced to mock teaching activities. Finally, another focus interview session was conducted to explore their perceptions and experience in the study.

3.1 Materials

For the training, a brief module was developed, which include the teaching of critical thinking techniques. Among the techniques introduced were Consider All Factors (CAF), Alternative, Possibilities, Choices (APC), Focus and Purpose, and Aims, Goals and Objectives (AGO), which were all introduced by de Bono (1994).

Moreover, a set of semi-structured interview questions were developed for the purpose of focus group interview sessions. The focus group interview sessions were done before and after the training to explore teachers' understanding of critical thinking skills and the techniques they used in the classroom.

Apart from that, the teachers were also asked to conduct mock teachings based on their major teaching areas before they were given the training and afterwards to look into their view and changes in their knowledge about critical thinking teaching techniques and skills. Anecdotal records were made based on the video recording of the mock teaching activities.

3.1.1 Samples

A total of 25 primary school teachers from four selected schools were employed for the study. All of them were voluntarily involved when the school was contacted by the researcher. The selection of the teachers was made by the School Principals.

3.1.2 Site

Convenience sampling was used to employ the respondents. The schools were in Shah Alam area, which is close to a learning centre of Open University Malaysia (OUM) so that teachers can come to the University during the training.

3.1.3 Procedures

Permissions from the Ministry of Education, State Education Department and District Education office were obtained since the research employed teachers from four public schools. After the consent was attained, researchers went to the schools to meet with the School Principals to select five teachers from different teaching areas to participant in the study. Teachers were asked to come to the OUM Shah Alam learning centre for the training and focus group interview sessions.

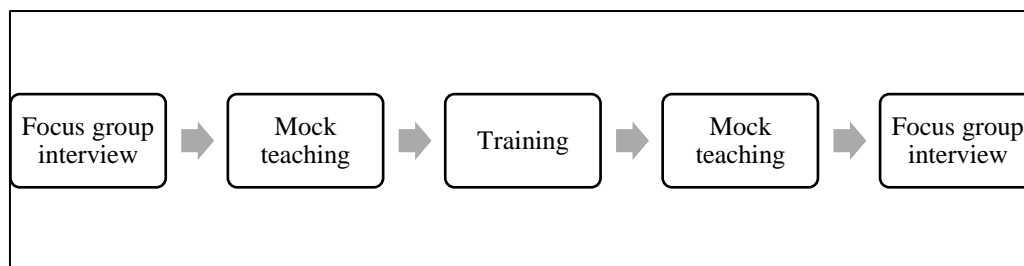Several steps were employed in the process of data collection:

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Focus group   →   Mock      →   Training   →   Mock      →   Focus group
interview         teaching                     teaching      interview
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Figure 2: The steps in data collection

The data collection was done in OUM Shah Alam learning centre, where teachers were invited to the centre for three days. On the first day of the gathering, an introduction to the study and a focus group interview session was done. Teachers were grouped into five groups based on their major teaching areas: science, mathematics, English language, Bahasa Melayu, and Islamic education. On the second day, teachers were asked to conduct mock teaching, and they were guided on the teaching techniques for critical thinking skills. On the final day, the teachers ran mock teaching again by utilising the techniques learned. Final group interviews were conducted to investigate their perceptions and experience of learning the techniques and participating in the study.

3.2 Data Analysis

During focus group interview sessions, voice recordings were made and later, the tapes were transcribed. While observing the mock teachings presented by teachers, video recordings were made and later transcribed in anecdotal form and analysed. The data was analysed by adopting to qualitative analyses proposed by Creswell (2017), as shown in Figure 3 below:
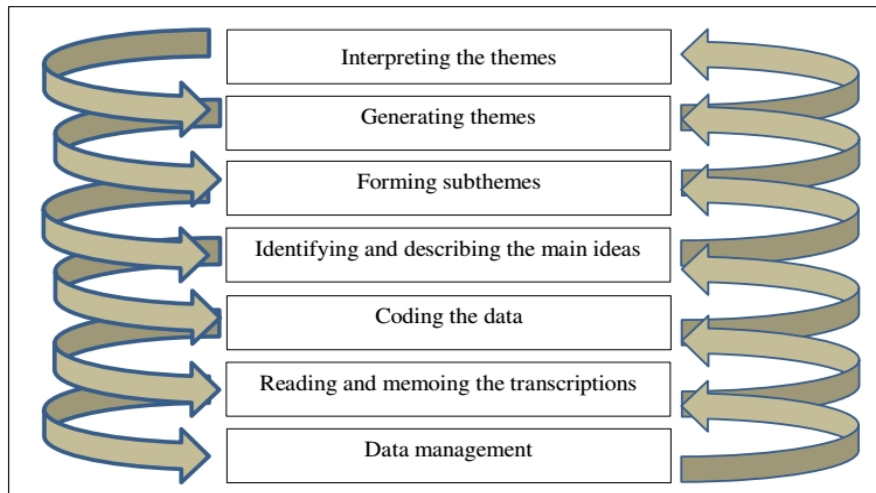

Figure 3: Data Analysis Framework, adopted from Creswell (2017)

4. Findings and Discussion

Several themes emerged from the interview data as well as the anecdotal observation reports. The themes were categorised into two sections to be able to see the achievements of the research objectives.

4.1 Primary school teachers' understanding and teaching techniques for critical thinking in the classroom before the training of critical thinking skills teaching techniques.

From the focus group interview session, it was found that teachers defined critical thinking as the ability to find several solutions to a problem. They mentioned that when students face a problem in learning, they can suggest a few answers to the problem and even create new ideas as the solutions to the problems. This view is aligned with Moon (2008), who suggested that critical thinking is to challenge ideas, consider different perspectives, and potentially add value to achieve an extra level of knowledge.

Teachers also believed critical thinking is seen when students can think deeply before making decisions. The notion is supported by Santrock (2011), who believed that critical thinking involves reflective thinking. Moreover, teachers also mentioned that when their students can communicate their views in an appropriate manner, they have critical thinking skills, which is similar to the finding by Elder and Paul (2011) who proposed that critical thinkers communicate effectively with others.

Focus group interviews and mock teaching observation data revealed that teachers used discussions in the classroom where group activities were conducted to teach critical thinking to students. Teachers believed that students would be able to help their peers during group discussions, which is also another opinion of the concept of critical thinking skills, and they can exchange ideas when they communicate in the group. Kamarulzaman (2017) also found similar findings where teachers conduct many group activities in their classroom to promote critical thinking skills among students. Also, another similar finding was the use of the questioning method in the classroom to invite students to think and present their ideas in the classroom (Kamarulzaman, 2017).

4.2 Primary school teachers' experience in teaching techniques for critical thinking skills in the classroom after the training of critical thinking skills teaching techniques.

After teachers were exposed to some teaching techniques, they were asked to conduct mock teachings by applying the techniques. Observation data revealed that teachers were able to infuse the techniques in their lessons. For example, by using the CAF technique (de Bono, 1994), teachers who major in the English language could create a situation where students must consider all factors before reaching the best solution.

Furthermore, it was also observed that when teachers from science major create questions for class activities, they were able to utilise the Focus and Purpose technique (de Bono, 1994) by preparing key questions and setting the focus of the questions. In short, it was found that teachers were able to impart the techniques in their subject matter and asked more meaningful and constructive questions.

Through interview data, teachers expressed that they noticed the techniques were not difficult to be practised. They believed that they have somehow used the techniques in their teaching and learning process, but after the training, they deemed that they can be more systematic in their teachings, and they are able to prepare lessons in a more organised manner.

5. Conclusion

The study's framework is based on the teacher's model for teaching critical thinking in primary school classroom developed by Kamarulzaman (2017) to explore teachers' understanding of critical thinking skills and their teaching techniques for the skills in the classroom. The model suggested that critical thinking can be taught in the classroom when teachers understand the definition of critical thinking and its importance. The teaching and learning of critical thinking skills can be done with exposure to several teaching techniques. With this exposure, teachers can help to develop students' disposition of critical thinking, and teachers also need to monitor students' metacognitive skills to ensure that students can adapt the skills effectively.

Thus, a brief module of critical thinking teaching techniques was developed and shared with 25 teachers from four selected primary schools to enhance their knowledge of teaching critical thinking skills to students. Findings revealed that teachers understood the concept of critical thinking and believed that it is important to students. They also managed to apply the techniques learned in training to their teaching and learning process with the notion that those techniques were not new to them, only that after the training, they can practice them more systematically.
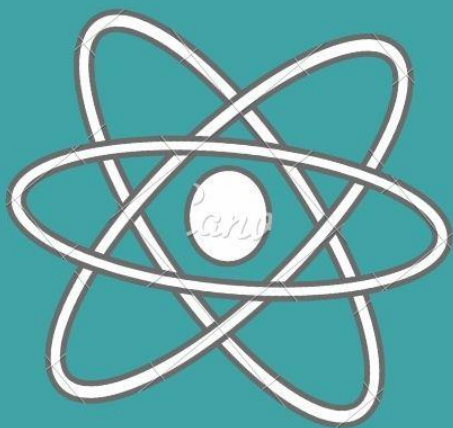
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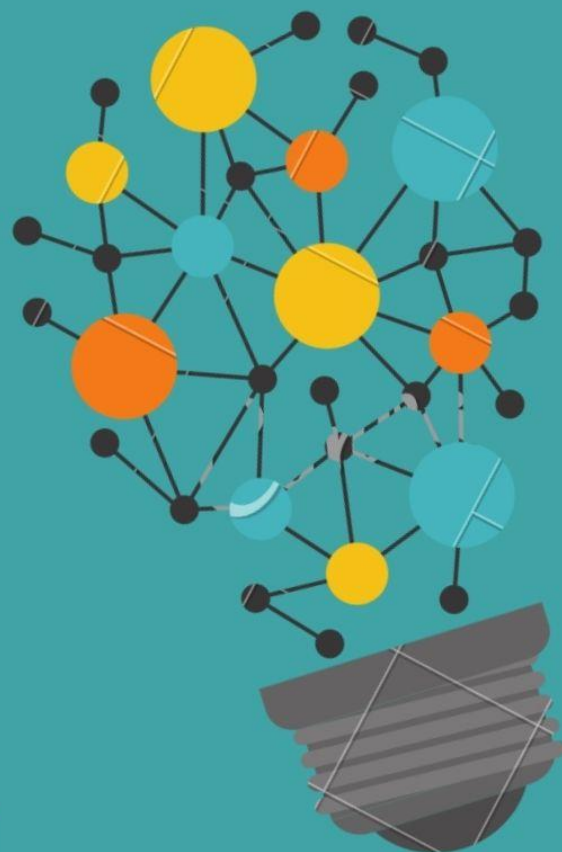
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