
Oral Questioning Skills In Teaching Mathematics: A Preliminary Study

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ABSTRACT

Oral questioning is an essential element in the process of teaching mathematics. However, not much is known about what oral questioning skills are commonly used by mathematics teachers in teaching mathematics in primary schools. Thus, this study is qualitative takes the form of a case study of two study participants who have been selected using purposive sampling, conducted in a primary school in Negeri Sembilan. This study uses observation methods and field notes to collect data. The data obtained are analyzed using thematic and descriptive analysis to obtain information on the oral questioning skills used and the frequency of oral questions used by two mathematics teachers with different teaching experiences. The results show that these two mathematics teachers often use questioning in mathematics teaching, but that there is no significant difference between them in terms of frequency of the use of questioning. The study also found that both study participants used various oral questioning skills in teaching mathematics. This study is a preliminary study designed to enable general aspects of questioning skills in mathematics teaching to be identified and to guide future studies on oral questioning.

Keywords

Oral questioning skills, mathematics teaching, mathematics teachers

1. INTRODUCTION

Oral questioning is an essential element used in communication between teachers and students during mathematics lessons (Desli & Galanopoulou, 2017). Mahmud (2019) states that oral questioning plays a role in teaching mathematics as a thinking tool to help students think more systematically and focused. However, the communication process carried out in the teaching process today has undergone various changes and improvements as part of an initiative to improve the quality of education and student performance (Mojibur Rahman, 2010). These changes include using oral questioning as a method of communication to improve students' level of thinking and encourage active student involvement in every activity implemented in the classroom. But oral questioning is also used as a strategy to implement classroom assessments that allow teachers to gather information about student learning and to improve the quality of the teaching (Shahrill, 2013).

The implementation of oral questioning in mathematics teaching can help improve high-level thinking skills (HOTS), provoke students' thinking, and increase student inquiry and exploration of mathematics, as well as attract students to the teaching implemented (Mahmud, Yunus, Ayub, & Sulaiman, 2020a). Oral questioning can also help teachers understand the level of students' mastery of the content of mathematics lessons, and help them plan interventions for students (Çelik & Güzel, 2016). The selection of the right type of oral questions to be used in teaching mathematics can help teachers achieve teaching objectives more efficiently and stimulate students' thinking. Therefore, it must be ensured that teachers always implement oral questioning, as it is a crucial tool for teaching thinking skills to students and an art that needs to be mastered and practiced by every teacher (Curriculum Development Division, 2016).

However, to ensure the effective implementation of oral questioning activities in the mathematics teaching activities implemented, various important skills need to be applied by teachers, such as question distribution skills, providing waiting time, and providing feedback on student answers, as well as skills to provoke student thinking through oral questioning (Mahmud, Yunus, Ayub, & Sulaiman, 2020b). Moreover, the application of various skills in performing oral questioning allows oral questioning activities to be carried out in a more structured manner, while providing a platform for better two-way communication between teachers. Walsh and Sattes (2015) who also explained this matter, stated that skills such as providing waiting time and providing various types of feedback on student responses could increase students' understanding of mathematics as well as make question and answer activities between teachers and students more active and diverse. Therefore, teachers need to provide themselves with various important skills in implementing oral questioning activities in the teaching of mathematics so that the oral questioning activities can boost teaching activities while helping to improve students' understanding of mathematics.

2. PROBLEM STATEMENT

Asking questions is one way for teachers to deliver a lesson's substance to their students (Yoong, 2012). However, most teachers are still less skilled in questioning techniques in the classroom, and focus more on traditional teaching methods, that is, the methods known as "chalk and talk" (Mahmud & Yunus, 2018). These factors indirectly cause teachers to fail to stimulate student thinking and to cause less student involvement in the teaching and learning process. This has indirectly led teachers to dominate most classroom interactions, resulting in a lack of student involvement in the teaching and learning process, especially in oral questioning activities (Kassim & Zakaria, 2013). Yoong (2012) found that teaching methods using oral questioning were poorly implemented in the classroom, as teachers preferred using explanatory methods in their daily teaching and learning.

Mathematics teachers are also said to have insufficient knowledge and skills in applying various oral questioning processes, causing mathematics teaching activities to focus more on memorizing mathematical formulas and to be procedural in nature. McAninch (2015) stressed that a teacher should know the content of teaching and have skills in teaching and learning strategies, including in oral questioning. This is because one of the indicators of teachers who have a good level of pedagogical content knowledge is teachers who can effectively implement oral questioning skills (Tengku Zawawi, Ramlee, & Abdul Razak, 2009). Thus, teachers' verbal questioning can be a yardstick for their teaching effectiveness.

Another problem related to oral questioning is that teachers often neglect various oral questioning skills where teachers instruct students to answer the questions asked to them en

masse. This makes it difficult for teachers to assess the actual level of student achievement of mathematics teaching that has been implemented. Besides, oral questions posed by the teacher will be answered on their own, and then without realizing it, teachers will often ignore the waiting time needed to increase students' thinking skills in the process of oral questioning, on the grounds that time is limited (Kaya, Kablan, & Rice, 2014). As a result, the teacher will immediately turn to another question or to other students when a student does not provide answer to the teacher's question (Mahmud, 2019). There are also teachers who use reading strategies of questions from the protocol that have been prepared without looking at the Students' responses (Moyer & Milewicz, 2002). This creates a situation in which the feedback given by the teacher does not refer to the student's answer, and the teacher instead continues to use the next oral question on the checklist, prioritizing identified easy oral questions to get a response from students and use descriptive approaches (Mahmud, Yunus, et al., 2020a). In addition, Mahmud et al. (2020a) found that teachers' skills in handling oral questioning are relatively weak and less effective, as their use is more one-way and does not take into account students' answers.

However, so far not much is known about how primary school mathematics teachers perform oral questioning, especially from the aspects of the oral questioning of new teachers and experienced teachers in teaching mathematics. Thus, this study is expected to show the real scenario of how the practice of oral questioning is implemented by primary school mathematics teachers, so that the problems that arise can be identified and then can be solved through some solutions. This study was conducted to answer and explain the following question: Are there differences in the use of oral questioning skills in the teaching and learning of mathematics based on the teacher's experience?

3. METHODOLOGY

This study uses a qualitative approach and is carried out using the case study method. Two teachers in a school in Negeri Sembilan, Malaysia who taught mathematics and who had different teaching experiences were selected as study participants. Data was collected using observation, semi-structured interviews, and field notes. The use of various data collection techniques helps the researcher triangulate the data at the data analysis level while reinforcing the results obtained (Merriam & Tisdell, 2016). In this study, the observation instrument used is the oral questioning skill form. The instrument used was modified from Aji (1997) and Mayappan (2002), and was adapted from Mahamod and Lim (2011). The instrument used is to collect information on the frequency of oral questioning in the mathematics teaching of two study participants. A total of 5 observations were conducted for each study participant, and the data obtained were recorded using the instrument form. This study's data were analyzed using descriptive statistic based on the oral questioning skill form in order to determine the frequency and percentage of questioning skills used by mathematics teachers. Merriam and Tisdell (2016) stated that the validity and reliability refer to the extent to which the study findings can accurately and consistently represent the phenomenon under study. Therefore, in this study, the researcher used several methods to enhance the study's validity and reliability, using the triangulation method, member checking, and peer review.

4. FINDINGS

The findings are based on the data obtained from the case study of two teachers, and are presented for each study participant, referred to as Teacher A and Teacher B. These findings will compare Teacher A and Teacher B, who have different teaching experiences, in terms of frequency of oral questioning and questioning skills used in the teaching and learning of mathematics.

Table 1 summarizes the background of the participants for this study. Teacher A teaches two classes on a mathematical subject, one of which is a year 4 class and one of which is a year 5 class. Teacher B teaches three classes for a mathematics teaching, namely a year 3 class, a year 4 class and a year 6 class. Teacher A has 24 years' teaching experience, while Teacher B has 19 years' teaching experience.

Table 1. Profiles of Mathematics Teachers

Profile	Teacher A	Teacher B
Teaching experience	24 years	19 years
Specialization	Mathematics education	Mathematics education
Number of teaching classes	2 classes	3 Classes

Are there differences in the use of oral questioning skills in teaching and learning of mathematics based on the teaching experience?

There are two themes obtained as a result of data analysis conducted to describe the differences in the use of oral questioning skills in the teaching and learning of mathematics based on the teaching experience. The first theme will cover the frequency of oral questions posed by the study participants throughout the observed mathematics teaching sessions. The second theme in this section will cover the various oral questioning skills exhibited by the differently experienced teachers throughout the five teaching sessions observed.

Frequency of Oral Questions

In this section, a discussion on the frequency of oral questions is done by comparing the frequency of oral questions posed by Teacher A and Teacher B in the five teaching sessions observed. Table 2 shows the frequency of oral questions posed by in each study participant throughout the observed mathematics teaching process.

Table 2. Frequency of oral questioning

Teacher	Observation (Obs)	Class	Topic	Frequency of Questioning	Total
A	Obs 1	5M 2	Conversion of length units in decimal and fractions.	24	123
	Obs 2	5M 2	Addition of length	17	
	Obs 3	5M 2	Subtraction of length	20	
	Obs 4	5M 2	Multiplication of length	30	
	Obs 5	5M 2	Division of length	32	
B	Obs 1	4M 1	Addition of length	23	140
	Obs 2	4M 1	Subtraction of length	22	
	Obs 3	4M 1	Multiplication of length	28	
	Obs 4	4M 1	Division of length	32	
	Obs 5	3M 3	Problem-solving	35	

Table 2 shows the frequency of use of questioning by Teacher A and Teacher B. This frequency is obtained from five observations, where each teaching session takes 60 minutes. Teacher A presented 24 questions in observation 1, 17 questions in observation 2, 20 questions in observation 3, 30 questions in observation 4 and 32 questions in observation 5 for mathematics teaching year 5M2. Teacher B asked 23 questions in observation 1, 22 questions in observation 2, 28 questions in observation 3 and 32 questions in observation 4 for year 4M1 mathematics class, and 35 questions in observation 5 for a year 3M3 mathematics class. This makes the total number of questions asked by teacher A 123 questions, while Teacher B asked 140 questions. The frequency of questions posed by Teacher A and Teacher B varies according to the subject being taught.

Questioning Skills

The study also found that there are various oral questioning skills used by both participants in the process of teaching mathematics. All oral questioning skills identified in this study are based on five observations and are limited to the teaching subjects taught by the study participants during the observation process. Table 3 shows the oral questioning skills used by teachers in the mathematics teaching process, as well as the frequency of each oral questioning skill used.

Table 3. Frequency of oral questioning skills

Questioning Skills	Teacher A		Teacher B		Total Percentage
	F	%	F	%	
Question formation: Clear, concise and accurate	121	98.3	135	96.4	97.4
Questions focus on one idea or more than one idea	105	85.4	122	87.1	86.3
Spread questions across the classroom	99	80.5	111	79.3	80.0
Waiting time	83	67.5	108	77.1	72.3
Respond to the answers well	67	54.5	75	53.6	54.1

Provide guidance	9	7.3	20	14.3	10.8
Provoke student thinking	8	6.5	9	6.4	6.5
Questioning using student ideas/answers	19	15.4	22	15.7	15.6
Call the student's name to answer	97	78.9	121	86.4	82.3
Encourage students to ask	15	12.2	19	13.6	12.9
Students ask questions	3	2.4	2	1.4	1.9

Table 3 shows the frequency of use of questioning skills for Teacher A and Teacher B. For the 123 questions presented by Teacher A, the most frequently applied questioning skills are forming clear, concise and accurate questions (98.3%), followed by questioning skills focused on one idea or more than one idea, (85.4%). There are also questioning skills that are least frequently applied by Teacher A in his teaching session, namely students asking questions (2.4%), encouraging students to ask questions (12.2%), provoking student thinking (6.5%) and giving guidance to students (7.3%). Other verbal questioning skills are at a moderate level, such as the even distribution of questions throughout the whole class (80.5%), providing wait time (67.5%), Respond to the answers well (54.5%), questions using student ideas (15.4%) and calling students' names to answer (78.9%).

Like Teacher A, Teacher B was found to focus more on forming clear, concise and accurate oral questions (96.4 %). Teacher B also frequently applies questioning skills focused on one idea or more than one idea in his teaching, which is 87.1%. However, there are also oral questioning skills that are less frequently applied by Teacher B in mathematics teaching sessions, namely students asking questions (2.4%), encouraging students to ask questions (3.6%) and provoking student thinking (6.5%). Other questioning skills are the even distribution of oral questions throughout the whole class (79.3 %), providing wait time (77.1 %), respond to the answers well (53.6 %), giving clues (14.3%), questions using student ideas (15.7%) and calling students' names to answer (86.4 %), which are at a moderate level.

5. DISCUSSIONS

Overall, the frequency of oral questioning for both mathematics teachers is very high. There was no significant difference in the frequency of questioning between two teachers who had different amounts of teaching experience. However, the researcher observed some ways in which these factors influenced the frequency of questions asked by Teacher A and Teacher B during the five observation sessions. One of the factors that influence the frequency of oral questioning is the topic of the subject being taught. Different lesson topics indirectly affect the frequency of teacher oral questioning. In this context, the teacher will use various types of questions to inculcate mathematics skills in a specific topic, and this explains the difference in frequency of questions asked by the teacher in the mathematics teaching process. Thus, specific teaching topics require a specific teaching style appropriate to the needs of the instruction carried out, and this explains the interpretation made by the researcher that different mathematical instructions in terms of topics will generate different oral questioning styles (Gess-Newsome, 2015). Besides, the cognitive level of students also influences the frequency of oral questioning. For example, Teacher B asks year 3M3 students more questions compared with Year 4M1 students, because the 3M3 students are weaker than the 4M1 students. This situation indirectly shows how the cognitive differences in pupils influences the frequency of teacher's questioning.

In addition, a better knowledge structure either in terms of mathematics content knowledge or in terms of pedagogical knowledge can also contribute to a greater frequency of oral questions used by more experienced teachers than in less experienced teachers. Tengku Zawawi et al. (2009) explained that the teaching of more experienced mathematics teachers show a very close relationship between mastered content knowledge and pedagogical knowledge, and the teachers' pedagogical content knowledge play a role in helping teachers ask questions related to mathematical concepts better. Therefore, in this context, pedagogical content knowledge is found to grow in tandem with the increase in teaching experience, and indirectly enables more experienced teachers to pose more oral questions to students.

From the perspective of questioning skills, this study has found that some questioning skills have been applied well, such as the formation of clear and accurate questions, giving the students time to answer, calling the student's name and responding well to student answers. Throughout the observation, the questioning skill of being precise and clear was found to help students understand and answer questions quickly. Oral questions asked precisely and clearly will make it easier for students to understand the true purpose of the question and help them plan for a better solution. In addition, teachers' use of clear and precise questions in questioning mathematics can also help teachers assess students' understanding of the mathematics concepts taught as well as improve student learning (Gnoh Ong et al., 2010). Teachers are also found to practice effective questioning skills by giving students adequate time to answer or wait time to give students a chance to think before responding to a question. Wait time can provide students with the opportunity to talk to their friends first before responding to the teacher (Mahmud, 2019). Teachers also call the name of the student after the question is asked to draw the student's attention to the question raised. However, this is contrary to the statement issued by Curriculum Development Division (2013), according to which teachers should avoid calling the pupil's name once the question has been asked. This is important to encourage the student to be brave to answer questions and to provide chances for other students to think about and answer questions. In addition, each answer given by the student is well responded by the teacher, whether it is given positive reinforcement to encourage the repetition of the good behaviour or the teacher corrects the students' answers. This is a matter that needs to be given attention to ensure that the teaching and learning process can provide a positive environment where students dare to try and are not afraid of giving incorrect answers.

In this study, teachers are found to infrequently apply some oral questioning skills, namely encouraging students to ask questions, guiding questions, and questions that provoke students' thinking. Based on the observations, teachers focus more on knowledge questions, whether the knowledge is related to concepts or to mathematical problem-solving procedures. Thus, teachers are significantly less likely to ask questions that dig into the minds of students. This is in line with Muthy (2013), who states that the questions posed by teachers do not dig up the existing knowledge of students to be linked to the learning topic being discussed, particularly related to abstract mathematical concepts. . This can also be seen from the findings of this study's observations, namely that only 17 of the questions posed by the two teachers were used to dig out students' thoughts. Besides, a reasonable explanation for the study results is the low level of student achievement, causing teachers to focus more on questions that assess understanding and knowledge. It is also stated by Mahmud (2020) that the low level of student achievement makes it hard for students to understand high-level oral questions, and causes teachers to focus on asking simple questions rather than on provoking student thinking. In addition, the teaching practices of teachers who are more procedural and memorize without understanding the actual content of a teaching topic can also be the cause

of this. This is emphasized by Tengku Zawawi et al. (2009), who stated that students are more exposed to tips and formulas that need to be memorized to be used in the process of calculation, and that teaching activities begin and end with a set of various abstract mathematical symbols and terms, resulting in a lack of oral questioning activities that encourage students to think.

6. CONCLUSION

Overall, the two mathematics teachers in this study frequently carry out oral questioning activities. However, the oral questioning activities carried out are not activities that improve students' thinking skills, and very few oral questioning activities that provoke students' thinking. Besides, teachers' various skills in oral questioning should be given attention in order to ensure that the oral questioning activities carried out can be carried out more effectively and competently. However, mathematics teachers need to know how to apply various skills in oral questioning in accordance with the needs and level of students, so that students' understanding of the content of the lessons can be improved. This study is a preliminary study that requires more in-depth research as well as a broader discussion. Therefore, more studies need to be conducted to understand and explore the phenomenon of oral questioning, especially in the teaching of teaching mathematics.

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REFERENCE

- [1]. Aji, M. M. (1997). *Penggunaan Penyoalan di dalam Bilik Darjah oleh Guru-Guru Pelatih Maktab Perguruan Islam [Use of Questioning in the Classroom by Trainee Teachers of Islamic Teachers College]*. Unpublished Master's Thesis, Universiti Kebangsaan Malaysia.
- [2]. Çelik, A. Ö., & Güzel, E. B. (2016). A Mathematics Teacher's Questioning Approaches for Revealing Students' Thinking during Lesson Study. *Turkish Journal of Computer and Mathematics Education*, 7(2), 365–392. <https://doi.org/http://dx.doi.org/10.16949/turcomat.93160>
- [3]. Curriculum Development Division. (2013). *Bahan Sumber Peningkatan Kemahiran Berfikir Aras Tinggi Matematik: Panduan Penggunaan Soalan Programme For International Student Assessment (PISA) [Mathematics High Thinking Skills Improvement Resource Materials: Guide to Using Program Questions For Inter]*. Putrajaya: Ministry of Education Malaysia.
- [4]. Curriculum Development Division. (2016). *Panduan Pelaksanaan Pentaksiran Sekolah [School Assessment Implementation Guide]*. Putrajaya: Ministry of Education Malaysia.
- [5]. Desli, D., & Galanopoulou, E. (2017). Questioning in Primary School Mathematics: An Analysis of Questions Teachers Ask in Mathematics Lessons. *3rd International Symposium on New Issues on Teacher Education*, 97.
- [6]. Gess-Newsome, J. (2015). A Model of Teacher Professional Knowledge and Skill Including PCK: Results of the Thinking From the PCK Summit. In *Re-examining Pedagogical Content Knowledge in Science Education* (pp. 38–52). New York: Routledge.

- [7]. Gnoh Ong, E., Sam Lim, C., & Ghazali, M. (2010). Examining the Changes in Novice and Experienced Mathematics Teachers' Questioning Techniques Through the Lesson Study Process. *Journal of Science and Mathematics Education in Southeast Asia*, 33(1), 86–109.
- [8]. Kassim, N., & Zakaria, E. (2013). Integrasi Kemahiran Berfikir Aras Tinggi dalam Pengajaran dan Pembelajaran Matematik: Analisis Keperluan Guru [Integration of High-Level Thinking Skills in the Teaching and Learning of Mathematics: An Analysis of Teacher Needs]. *Jurnal Pendidikan Matematik [Journal of Mathematics Education]*, 3(1), 1–12.
- [9]. Kaya, S., Kablan, Z., & Rice, D. (2014). Examining question type and the timing of IRE pattern in elementary science classrooms. *International Journal of Human Sciences*, 11(1), 621–640. <https://doi.org/10.14687/ijhs.v11i1.2730>
- [10]. Mahamod, Z., & Lim, N. R. (2011). Kepelbagaian Kaedah Penyoalan Lisan Dalam Pengajaran Guru Bahasa Melayu: Kaedah Pemerhatian [Diversity Questioning Method in Teaching Oral English Teacher: Observation Method]. *Jurnal Pendidikan Bahasa Melayu [Malay Language Educational Journal]*, 1(1), 51–65.
- [11]. Mahmud, M. S. (2019). The Role of Wait Time in the Process of Oral Questioning in the Teaching and Learning Process of Mathematics. *International Journal of Advanced Science and Technology Vol.*, 28(16), 691–697.
- [12]. Mahmud, M. S. (2020). Level of Oral Questions Used by New and Experience Teachers in Mathematics Teaching in Primary Schools. *International Journal of Psychosocial Rehabilitation*, 24(8), 3533–3541.
- [13]. Mahmud, M. S., & Yunus, A. S. M. (2018). The Practice Of Giving Feedback Of Primary School Mathematics Teachers In Oral Questioning Activities. *Journal of Advanced Research in Dynamical and Control Systems*, 10(12), 1336–1343.
- [14]. Mahmud, M. S., Yunus, A. S. M., Ayub, A. F. M., & Sulaiman, T. (2020a). Enhancing Mathematical Language Through Oral Questioning in Primary School. *International Journal of Learning, Teaching and Educational Research*, 19(5), 395–410.
- [15]. Mahmud, M. S., Yunus, A. S. M., Ayub, A. F. M., & Sulaiman, T. (2020b). The use of oral questioning in inculcating values in mathematics for primary school students. *Universal Journal of Educational Research*, 8(3), 1–8. <https://doi.org/10.13189/ujer.2020.081601>
- [16]. Mayappan, M. a/l. (2002). *Aplikasi Kemahiran Berfikir Melalui Kaedah Penyoalan Oleh Guru Dalam Pengajaran Mata Pelajaran Ekonomi Asas: Satu Kajian Kes [Application of Thinking Skills Through Methods of Questioning by Teachers in the Teaching of the Subject of Basic Economics: A Ca.* Unpublished Master's Thesis, Universiti Kebangsaan Malaysia.
- [17]. McAninch, M. J. (2015). *A Qualitative Study Of Secondary Mathematics Teachers ' Questioning, Responses, And Perceived Influences.* Unpublished doctoral dissertation, University of Iowa.
- [18]. Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative Research A Guide to Design and Implementation.* San Francisco: Jossey-Bass Inc Pub.
- [19]. Mojibur Rahman, M. (2010). Teaching oral communication skills: A task based approach. *English for Specific Purposes World*, 9(1(27)), 1–11. Retrieved from <http://www.esp.world.info>
- [20]. Moyer, P. S., & Milewicz, E. (2002). Learning to question: Categories of questioning used by preservice teachers during diagnostic mathematics interviews. *Journal of Mathematics Teacher Education*, 5(4), 293–315.
- [21]. Muthy, G. A. (2013). *Aras Penyoalan Dan Pemikiran Dalam Proses Pembelajaran Bahasa Melayu Murid Sekolah Rendah [Level Questioning and Thought In The Process*

- of Learning English Primary School*]. Unpublished Master's Thesis, Universiti Malaya.
- [22]. Shahrill, M. (2013). Review of Effective Teacher Questioning in Mathematics Classrooms. *International Journal of Humanities and Social Science*, 3(17), 224–231.
- [23]. Tengku Zawawi, T. Z., Ramlee, M., & Abdul Razak, H. (2009). Pengetahuan Pedagogi Isi Kandungan Guru Matematik bagi Tajuk Pecahan : Kajian Kes di Sekolah Rendah [Pedagogical Content Knowledge of Mathematics Teachers for Fractional Titles: A Case Study in Primary Schools]. *Jurnal Pendidikan Malaysia [Malaysian Journal of Education]*, 34(1), 131–153.
- [24]. Walsh, J. A., & Sattes, B. D. (2015). *Questioning for classroom discussion: Purposeful Speaking, Engaged Listening & Deep Thinking*. Alexandria: ASCD.
- [25]. Yoong, W. K. (2012). Use of student mathematics questioning to promote active learning and metacognition. *12th International Congress on Mathematical Education (ICME-12)*, 8–15.
- [26]. Aji, M. M. (1997). Penggunaan Penyoalan di dalam Bilik Darjah oleh Guru-Guru Pelatih Maktab Perguruan Islam [Use of Questioning in the Classroom by Trainee Teachers of Islamic Teachers College]. Unpublished Master's Thesis, Universiti Kebangsaan Malaysia.
- [27]. Çelik, A. Ö., & Güzel, E. B. (2016). A Mathematics Teacher's Questioning Approaches for Revealing Students' Thinking during Lesson Study. *Turkish Journal of Computer and Mathematics Education*, 7(2), 365–392. <https://doi.org/http://dx.doi.org/10.16949/turcomat.93160>
- [28]. Curriculum Development Division. (2013). *Bahan Sumber Peningkatan Kemahiran Berfikir Aras Tinggi Matematik: Panduan Penggunaan Soalan Programme For International Student Assessment (PISA) [Mathematics High Thinking Skills Improvement Resource Materials: Guide to Using Program Questions For Inter*. Putrajaya: Ministry of Education Malaysia.
- [29]. Curriculum Development Division. (2016). *Panduan Pelaksanaan Pentaksiran Sekolah [School Assessment Implementation Guide]*. Putrajaya: Ministry of Education Malaysia.
- [30]. Desli, D., & Galanopoulou, E. (2017). Questioning in Primary School Mathematics: An Analysis of Questions Teachers Ask in Mathematics Lessons. *3rd International Symposium on New Issues on Teacher Education*, 97.
- [31]. Gess-Newsome, J. (2015). A Model of Teacher Professional Knowledge and Skill Including PCK: Results of the Thinking From the PCK Summit. In *Re-examining Pedagogical Content Knowledge in Science Education* (pp. 38–52). New York: Routledge.
- [32]. Gnoh Ong, E., Sam Lim, C., & Ghazali, M. (2010). Examining the Changes in Novice and Experienced Mathematics Teachers' Questioning Techniques Through the Lesson Study Process. *Journal of Science and Mathematics Education in Southeast Asia*, 33(1), 86–109.
- [33]. Kassim, N., & Zakaria, E. (2013). Integrasi Kemahiran Berfikir Aras Tinggi dalam Pengajaran dan Pembelajaran Matematik: Analisis Keperluan Guru [Integration of High-Level Thinking Skills in the Teaching and Learning of Mathematics: An Analysis of Teacher Needs]. *Jurnal Pendidikan Matematik [Journal of Mathematics Education]*, 3(1), 1–12.
- [34]. Kaya, S., Kablan, Z., & Rice, D. (2014). Examining question type and the timing of IRE pattern in elementary science classrooms. *International Journal of Human Sciences*, 11(1), 621–640. <https://doi.org/10.14687/ijhs.v11i1.2730>
- [35]. Mahamod, Z., & Lim, N. R. (2011). Kepelbagaian Kaedah Penyoalan Lisan Dalam Pengajaran Guru Bahasa Melayu: Kaedah Pemerhatian [Diversity Questioning Method in Teaching Oral English Teacher: Observation Method]. *Jurnal Pendidikan Bahasa*

- Melayu [Malay Language Educational Journal]*, 1(1), 51–65.
- [36]. Mahmud, M. S. (2019). The Role of Wait Time in the Process of Oral Questioning in the Teaching and Learning Process of Mathematics. *International Journal of Advanced Science and Technology Vol.*, 28(16), 691–697.
- [37]. Mahmud, M. S. (2020). Level of Oral Questions Used by New and Experience Teachers in Mathematics Teaching in Primary Schools. *International Journal of Psychosocial Rehabilitation*, 24(8), 3533–3541.
- [38]. Mahmud, M. S., & Yunus, A. S. M. (2018). The Practice Of Giving Feedback Of Primary School Mathematics Teachers In Oral Questioning Activities. *Journal of Advanced Research in Dynamical and Control Systems*, 10(12), 1336–1343.
- [39]. Mahmud, M. S., Yunus, A. S. M., Ayub, A. F. M., & Sulaiman, T. (2020a). Enhancing Mathematical Language Through Oral Questioning in Primary School. *International Journal of Learning, Teaching and Educational Research*, 19(5), 395–410.
- [40]. Mahmud, M. S., Yunus, A. S. M., Ayub, A. F. M., & Sulaiman, T. (2020b). The use of oral questioning in inculcating values in mathematics for primary school students. *Universal Journal of Educational Research*, 8(3), 1–8. <https://doi.org/10.13189/ujer.2020.081601>
- [41]. Mayappan, M. a/l. (2002). *Aplikasi Kemahiran Berfikir Melalui Kaedah Penyoalan Oleh Guru Dalam Pengajaran Mata Pelajaran Ekonomi Asas: Satu Kajian Kes [Application of Thinking Skills Through Methods of Questioning by Teachers in the Teaching of the Subject of Basic Economics: A Ca. Unpublished Master's Thesis, Universiti Kebangsaan Malaysia.*
- [42]. McAninch, M. J. (2015). *A Qualitative Study Of Secondary Mathematics Teachers ' Questioning, Responses, And Perceived Influences.* Unpublished doctoral dissertation, University of Iowa.
- [43]. Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative Research A Guide to Design and Implementation.* San Francisco: Jossey-Bass Inc Pub.
- [44]. Mojibur Rahman, M. (2010). Teaching oral communication skills: A task based approach. *English for Specific Purposes World*, 9(1(27)), 1–11. Retrieved from <http://www.esp.world.info>
- [45]. Moyer, P. S., & Milewicz, E. (2002). Learning to question: Categories of questioning used by preservice teachers during diagnostic mathematics interviews. *Journal of Mathematics Teacher Education*, 5(4), 293–315.
- [46]. Muthy, G. A. (2013). *Aras Penyoalan Dan Pemikiran Dalam Proses Pembelajaran Bahasa Melayu Murid Sekolah Rendah [Level Questioning and Thought In The Process of Learning English Primary School].* Unpublished Master's Thesis, Universiti Malaya.
- [47]. Shahrill, M. (2013). Review of Effective Teacher Questioning in Mathematics Classrooms. *International Journal of Humanities and Social Science*, 3(17), 224–231.
- [48]. Tengku Zawawi, T. Z., Ramlee, M., & Abdul Razak, H. (2009). Pengetahuan Pedagogi Isi Kandungan Guru Matematik bagi Tajuk Pecahan : Kajian Kes di Sekolah Rendah [Pedagogical Content Knowledge of Mathematics Teachers for Fractional Titles: A Case Study in Primary Schools]. *Jurnal Pendidikan Malaysia [Malaysian Journal of Education]*, 34(1), 131–153.
- [49]. Walsh, J. A., & Sattes, B. D. (2015). *Questioning for classroom discussion: Purposeful Speaking, Engaged Listening & Deep Thinking.* Alexandria: ASCD.
- [50]. Yoong, W. K. (2012). Use of student mathematics questioning to promote active learning and metacognition. *12th International Congress on Mathematical Education (ICME-12)*, 8–15.