

# Inquiry on the Improvement Teaching Quality in the Classroom with Meta-Teaching Skills

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**Abstract**—When teachers reflect and evaluate whether their teaching methods actually have an impact on students' learning, they will adjust their practices accordingly. This inevitably improves their students' learning and performance. The approach in meta-teaching can invigorate and create a passion for teaching. It thus helps to increase the commitment and love for the teaching profession. This study was conducted to determine the level of metacognitive thinking of teachers in the process of teaching and learning in the classroom. Metacognitive thinking teachers include the use of metacognitive knowledge which consists of different types of knowledge: declarative, procedural and conditional. The ability of the teachers to plan, monitor and evaluate the teaching process can also be determined. This study was conducted on 377 graduate teachers in Klang Valley, Malaysia. The stratified sampling method was selected for the purpose of this study. The metacognitive teaching inventory consisting of 24 items is called InKePMG (Teacher Indicators of Effectiveness Meta-Teaching). The results showed the level of mean is high for two components of metacognitive knowledge; declarative knowledge (mean = 4.16) and conditional (mean = 4.11) whereas, the mean of procedural knowledge is 4.00 (moderately high). Similarly, the level of knowledge in monitoring (mean = 4.11), evaluating (mean = 4.00) which indicate high score and planning (mean = 4.00) are moderately high score among teachers. In conclusion, this study shows that the planning and procedural knowledge is an important element in improving the quality of teachers teaching in the classroom. Thus, the researcher recommended that further studies should focus on training programs for teachers on metacognitive skills and also on developing creative thinking among teachers.

**Keywords**—Metacognitive thinking skills, procedural knowledge, conditional knowledge, declarative knowledge, meta-teaching and regulation of cognitive.

## I. INTRODUCTION

**M**ETACOGNITIVE is an element that is growing and is influenced by contributions from various disciplines including philosophy, psychology, and education. The impact on teaching metacognitive increases the level of thinking [1] and academic achievement among the students [2] through metacognitive practices [3]. Reference [12] states that metacognition is one's knowledge concerning one's own cognitive processes and products or anything related to them. He defined metacognition as follows: "In any kind of cognitive transaction with the human or non-human environment, a variety of information processing activities may go on. Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration

of these processes in relation to the cognitive objects or data on which they bear, usually in service of some concrete goal or objective." (p.232). Emphasis will be given to the teaching of metacognition and how to teach metacognitively. Therefore, there is a great potential that can be debated on the meta-pedagogy of teaching to improve both aspects either student learning metacognition and metacognitive teaching practice among teachers [4]. Previous studies showed that the use of thinking skills metacognitive strategies have important implications for pedagogy because it involves teachers in developing new roles [5], [6].

First and foremost, meta-teaching is considered to be the ability for teachers how to learn the process of planning, monitoring, and evaluation of the teaching is done in the classroom [7]. In other words, meta-teaching as a "thinking about thinking" activities that occurred during the process of teaching and learning like how to plan, monitoring and evaluating. Therefore, meta-learning can help teachers to find the weaknesses in the system of teaching and problems solving. This shows that the meta-instruction contains any functions such as understanding the lesson, change the teaching and reflection on teaching.

Based on previous studies, metacognition research in teaching and learning can improve the effectiveness of teaching and learning process. Studies show that metacognitive skills can be taught to students to enhance their learning [8]-[10]. To develop students' understanding requires both cognitive and metacognitive elements. Students "build" knowledge using metacognitive strategy, to plan, control and evaluate their learning. This means that the individual is "thinking about thinking"; real learning occurs through the use of metacognitive strategies, as students become more adept at using metacognitive strategies, they gain confidence and become more mature as a student. Individuals with good metacognitive skills can think how to approach learning, choose appropriate strategies, and decide on an action to resolve problems or successfully carry out the task. They often think about their own thinking process, take the time to think and learn from mistakes or inaccuracies [11]. Therefore, metacognitive strategies help students to encourage and engage in "conversation metacognitive" with themselves so they can "talk" with themselves about their learning, the challenges they face, and the ways in which they can correct themselves and continue to learn.

Reference [12] describes that the metacognitive knowledge consists of knowledge or belief of one's basic knowledge about the factors influence the cognitive process. He divides knowledge into three categories, namely knowledge about

yourself or individuals (declarative knowledge), knowledge about procedures for tasks or activities (procedural knowledge) and knowledge of learning strategies (conditional knowledge).

Declarative knowledge (facts and information) is "knowledge about" or "knowledge concerning". Some researchers argue that all declarative knowledge stored or disclosed in the statement and the joint statement in memory [16]. This knowledge includes facts, beliefs, opinions, generalizations, theories, hypotheses and attitudes toward something, someone and yourself [13]. References [14] and [15] state that the use of declarative knowledge can be understood as follows; (i) what do i want to know? (ii) what information can be obtained? (iii) what is already known by me? and (iv) what information should I seek?

Procedural knowledge refers to knowledge of 'how' to perform cognitive activities [16], [13]. Meanwhile, procedural knowledge [17] is knowledge that helps us control the related factors when evaluating certain phenomena (specific steps taken in completing a task or activity). Example procedure metacognitive strategy is to teach math skills is through the use of questions such as; (i) How I can use the information correctly? (ii) How can I convey this information? (iii) What are the steps that I need to use it in complete task or activities? Therefore, knowledge of the important procedures in carrying out cognitive activity is expected to improve the control of the teacher.

Conditional knowledge as referring to the question of when and why a particular strategy or procedure used [18]. In this study, conditional knowledge is a description of the context and circumstances in accordance with the application or procedures implemented by teachers. In addition, students can show a variety of meta-cognitive skills, perform better in examinations and produce quality of work and more efficient. They use the right tool for the job, and they modify learning strategies as needed, identify blocks for learning and changing tools or strategies to ensure achievement of the goals. This is so because metacognition plays an important role in successful learning, it is important that teachers help students develop metacognitively. Teachers should increase the use of meta-teaching strategies to improve students' metacognitive knowledge. Therefore, the objective of this study was to identify the use of meta-teaching skills of knowledge (declarative, conditional, procedural knowledge, meta-reflection, planning, monitoring and evaluation) among graduate teachers.

## II. METHODOLOGY

This study is a descriptive research. This is so because the descriptive research aims to explain the phenomenon that is taking place and can be used to solve problem related to the future. Acquisition of survey data can also be done in a way that is more appropriate and in accordance with the time specified by the researcher. The descriptive survey is preferred in this study to describe the present situation. 377 out of 385 respondents were selected in this study. The respondent of this study is 306 teachers are women and 71 of them are men. 8 of

the total of this study eliminated because they do not fulfil the scale and so the sample of the study consisted of 377 teachers. Metacognitive teaching inventory (Teacher Indicators of Effectiveness Meta-Teaching -InKePMG) is used to measure the level of meta teaching in this study. Data obtained through InKePMG instruments are assigned to the sample. This instrument measures the meta-teaching component of declarative knowledge, conditional knowledge, procedural knowledge, planning, mentoring, and evaluation. The value of Cronbach's alpha for each item are 0.93. Each construct being measured alpha value of 0.60 (declarative), 0.64 (conditional), 0.61 (procedural), 0.68 (planning), 0.61 (monitoring), and 0.71 (evaluation). In conclusion, based on Cronbach's alpha value, item measures what you want to measure those elements in the implementation of the meta-teaching among teachers.

## III. FINDINGS

The findings showed that the mean of declarative knowledge, procedural knowledge, conditional knowledge, planning, monitoring, and evaluating; with mean score between 4.04 to 4.16 and std.dev. 0.337 to 0.367. Declarative knowledge with mean score 4.00 to 4.23, while the overall mean for these elements is 4.16 std.dev 0.337 which is a high level. The result showed that all items for the declarative knowledge element are at a high level (4.01 to 5.00). In other words, there were items that had mean scores on a moderate level of high, medium low, and low.

The result showed that, two components of metacognitive knowledge, which are declarative knowledge and conditional knowledge showed high level of means, 4.16 std. = 0.33 and 4.11, std. = 0.35, respectively. As for the procedural knowledge, mean 4.04, std. = 0.35, indicates moderately high level of mean. Analysis of the regulation of cognition (planning, monitoring and evaluating) indicates that the level of planning has a moderately high score with mean = 4.00, std. 0.36. The level of monitoring has a mean score = 4.11, std. = 0.34 and the level of evaluating has a mean score = 4.10, std. = 0.38 which indicate a high mean score among teachers.

## IV. DISCUSSION

In this study, meta-teaching knowledge skill was found to be between high and moderately high. Therefore, declarative knowledge can be applied when someone wants to know or understand the given question from students during the teaching process. This skill has assisted students in transferring the various strategies into their own learning. The skill involved active learning such as small group discussion, experimentation and elaboration as opposed to direct instruction like giving a lecture. Declarative knowledge is essential to use either directly or implicitly involving internalization or absorption in the process of teaching and learning in the classroom. Through declarative knowledge, a teacher not only can identify the strengths and weaknesses in teaching but also is aware of the skills that are needed to improve the quality of teaching and thus will become an effective teacher. In addition, teachers can also realize the

goals expected of the teaching process itself. Such a realization has a high impact on the success of the teachers' way of teaching. Therefore, it can be concluded that declarative knowledge can form an effective instructional leader among teachers.

TABLE I  
DESCRIPTIVE ANALYSIS OF META-TEACHING ELEMENTS AMONG GRADUATE TEACHERS (N=377)

	Mean	Std.Dev
<b>Declarative Knowledge</b>		
1 I am aware of the strengths and weaknesses in my teaching.	4.22	.439
2 I know what skills are most important in order to be a good teacher	4.20	.552
3 I have control over how well I teach	4.00	.523
4 I know what I am expected to teach	4.23	.506
<b>Overall mean</b>	<b>4.16</b>	<b>.337</b>
<b>Procedural Knowledge</b>		
1 I try to use the teaching techniques that worked in the past.	4.15	.490
2 I have a specific reason for choosing each teaching technique I use in class	4.10	.526
3 I am aware of what teaching technique that I use while I am teaching	4.03	.484
4 I use teaching technique that are helpful to students automatically	3.87	.556
<b>Overall mean</b>	<b>4.04</b>	<b>.351</b>
<b>Conditional Knowledge</b>		
1 I use my teaching and learning strategies knowledge strengths to compensate for my weaknesses in my teaching	4.13	.512
2 I can motivate myself to teach	4.22	.531
3 I use different teaching techniques depending on the situation	4.15	.530
4 I know to use the teaching technique, which is more effective	3.95	.498
<b>Overall mean</b>	<b>4.11</b>	<b>.355</b>
<b>Planning</b>		
1 I pace myself while I am teaching in order to complete a lesson in a given time.	3.95	.505
2 I set my specific teaching goals before I start teaching	4.17	.504
3 I ask myself about the teaching materials that I am going to use before I teach.	4.09	.558
4 I organize my time to best accomplish my teaching goals	4.05	.480
<b>Overall mean</b>	<b>4.07</b>	<b>.367</b>
<b>Monitoring</b>		
1 I ask myself periodically if I have met my teaching goals while I am teaching	4.11	.524
2 I find myself assessing whether I have reached my teaching goals while I am teaching	4.09	.501
3 I regularly check students understanding towards the topic I am teaching	4.14	.528
4 I ask my self-questions about how well I am doing while I am teaching	4.11	.467
<b>Overall mean</b>	<b>4.11</b>	<b>.344</b>
<b>Evaluating</b>		
1 I ask myself how well I have accomplished my teaching goals once I have finished teaching	4.15	.521
2 I find myself assessing should I use other teaching techniques are after I teach.	4.15	.499
3 After teaching a lesson, I ask myself if I would teach more effectively next time	4.14	.514
4 I ask myself if I have considered all possible techniques after teaching a lesson	3.97	.555
<b>Overall mean</b>	<b>4.10</b>	<b>.382</b>

The study also showed a high level of conditional knowledge. This knowledge emphasizes on knowledge of teaching strategies used, which includes when the need to use a strategy and why certain strategies are used. Hence, teachers

who lack the skill of teaching can identify appropriate strategies to make their teaching more effective. Therefore, the study showed that most of the respondents agreed to the importance of conditional knowledge.

Although the study showed a moderately high level of procedural knowledge, this knowledge cannot be ignored by the respondents. The moderately high level is probably caused by the procedural implementation in teaching and learning which are considered to be a routine procedure. Procedural knowledge refers to knowledge of 'how' to do cognitive activities [16], [13]. Reference [17] states that this knowledge helps teachers how to control the relevant factors to evaluate a phenomenon in the classroom (the specific steps of a task or how to complete a task or activity). This is because knowledge of the procedures means that the teachers learn specific methods to be applied during the process of teaching and learning. Therefore, the knowledge is important in carrying out cognitive activities [16], [13].

In this study, meta-regulation cognitive skill was found to be between moderately high and high. This is because the teacher has assessed the students' prior knowledge of their own understanding of the learning strategies. The teacher assessed the immediate retention of knowledge and the progress of learning about learning strategies during class. Therefore, the teachers will encourage students to be aware of the process of planning, monitoring and evaluating during the learning process. In a meta-teaching strategy, the teacher will explain the learning outcomes to be achieved to the students. Through this activity, the teacher explains to the students the learning process of how to perform self-monitoring activities (self-monitoring) and self-assessment (self-evaluate). These activities are not only discussed explicitly to raise awareness of students, but also they help improving the skills of monitoring, evaluating and using these skills during the learning process occurs and in the future. Besides, meta-teaching reflection also encourages students to learning processes that occur during learning. For example, using the technique of 'Think-Pair-Share', students can reveal the thought process that went through and compared with measures of thinking used by their colleagues. Discussions are explicitly committed by teachers to improve their skills in assessing students. The results obtained through metacognitive reflection revealed that students have the option to compare the procedures with one other and also assess their strengths and weaknesses. In terms of metacognitive awareness among students, high metacognitive awareness will help students in improving their metacognitive skills including planning, monitoring, assessment focus, understanding and skills assessment evaluation [19]. All of these skills would simplify the process of learning and teaching.

Based on the analysis of the most effective instructional method, it was found that active learning instruction increased higher-level of learning. To the teachers, this study will provide additional knowledge about how the elements of metacognitive strategies namely planning, monitoring, evaluation and meta-reflection and factors related to academic performance can further improve students' academic

performance. In addition, besides focusing on students' classroom management responsibilities and interactions, attention should also be focused on how to improve students' academic performance and the quality and techniques of teaching to meet the needs of the students.

#### V. CONCLUSION

The above discussion clearly shows that meta-teaching element including planning, evaluation and monitoring is very helpful to the process of teaching. In addition, the metacognitive knowledge of declarative knowledge, procedural and conditional also need to focus on as the three basic knowledge acts as a mediator to the teaching process. It is believed that many teachers are using meta-teaching strategies. However, it is important for teachers to explore how we can learn ways to improve the quality of teaching through meta-cognitive teaching practices so that our teaching more meaningful in the classroom. When teachers effectively use meta-teaching skill strategies they can explain the reasoning behind specific pedagogical practices and they can explain the successes and failures of meta-teaching strategies [7].

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