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The Promotion of Metacognitive Development in the Classroom

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Abstract: Metacognitive skills are an important component for effective learning because it enables individuals to plan, monitor and regulate their cognitive performance. However the development of students' metacognitive skills is not being emphasized in many classrooms today. This study sought to examine student's perception on seven metacognitive development activities in the classroom and its relationship to their metacognitive skills. A total of 160 secondary school students were involved in this study. Data collection was conducted using questionnaires to assess students' metacognitive skills and their perceptions on metacognitive development activities in the classroom. Results of the study showed that 'metacognitive reflection' activity contributed significantly to the variation in students' metacognitive skills; however, the study also found a lack of attention to this aspect by teachers in the classroom. As a whole, most teachers were not aware of the benefits of making the learning process explicit and visible to students. The study implies that efforts should be geared to encourage teachers to consider 'metacognitive reflection' activities in the classroom.

Key words: Metacognition · Metacognitive skill · Metacognitive development · Metacognitive reflection

INTRODUCTION

The emphasis in education now is to produce students who are able to take charge of their own learning. It refers to the development of self regulated learner who can plan, monitor and evaluate their learning process. It was suggested that students who are able to plan, monitor and evaluate their learning process are said to have a good metacognitive skills [1]. Many theorists believe that metacognitive skills functions as a mediator in the learning process. Results of past studies provided evidence that metacognitive skills can improve students' performances [2-5].

Metacognitive skills refer to knowledge about one's own learning process [1]. It also defines as individual's awareness, evaluation and regulation on their own thinking activity. In other words they can control and manage their own thinking and th eoutcome of their thinking process [6]. It is hypothesized that students' knowledge about their own thinking processes will help them solve problem effectively [7].

Metacognitive skills involve three basic skills that can help the process of learning, namely: 1) planning, 2) monitoring and 3) evaluation skills. It is belief that students who have the metacognitive skills will be able to plan and monitor their progress during the learning process and make changes or modify the strategy they use if it is found to be less effective. It was asserted by [8] that metacognition is an important component for effective learning because it enables individuals to plan, monitor, and regulate their cognitive performance. Metacognitive skills allow students to select and invent strategies explicitly by thinking about their understanding of the task demands, their available cognitive resources, and their own experience of solving similar problems [9].

One pertinent question that needs to be address in this context is to what extent teachers promote the development of students' metacognitive skills in the classroom. Results of past research have identified several factors that can help students develop effective study skills and enhance their metacognitive skills. Metacognitive approach is identified as one method that can be used to develop students' study skills and strategies [10-15]. Metacognitive approach refers to an approach which emphasizes the development of skills that help students plan, monitor and evaluate their own learning process. One important feature of this approach is the emphasis on the learning process in teaching and learning in the classroom. Emphasis on the learning process refers to activities that makes the learning process explicit and visible to students. The question is to what extent do teachers foster metacognitive development in the classroom.

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It was stated that teachers can enhance students' metacognitive skills by giving directions and explaining to students how to think about what the students do [16]. The teacher should have a desire to direct the students to think about how they learn and the problems they face in the learning process. Besides, teachers also should help students identify how they can improve their learning and become better students. It was claimed by [14] that metacognitive development can be developed when students learn the educational content. In other words, learning skills can be developed in the process of teaching and learning in the classroom. He suggested seven aspects in teaching and learning activities that can be used to foster students' metacognitive development.

Metacognitive development activities in this study refer to the seven aspects/activities as proposed by [14], namely: (a) Metacognitive reflection: Reflecting on metacognition indicates a conscious effort of teachers to guide students to think about how they learn. For example, the teacher asked the students how they learn, how they solve the task and the difficulties faced by students while studying. Teachers also asked students to try to learn a method or technique, (b) Student-student discourse: Interaction among students includes how they talk about a variety of learning styles. For example students discuss how they learn and the different ways to learn and how to improve the way they learn Student-teacher discourse: Interaction between teachers and students focusing on how they can improve their learning, (d) Student voice: The views of students referred to the opportunities created so that students realize the need to ask teachers about why they need to do certain activities in the classroom. Students also can suggest other learning activities and can voice their opinions about factors that hinder their learning, (e) Distributed control: Distributed control referred to the efforts of teachers and students to collaborate or work together to plan the study so that they can grow as an independent students. For example, students are given the authority by the teacher to plan what needed to be studied, to determine the activity to be done and the time required to perform these activities. (f) Teacher encouragement and support: Teacher encouragement and support refer to efforts to improve students' learning processes. For example teachers motivate students to try to improve how they learn, looking for and evaluate different ways of learning. The teacher also supports effort to understand and learn new methods of learning and motivate them to discuss how they learn, (g) Emotional support: emotional support refers to support given by teachers to students. For example, in the classroom teachers treat students fairly, appreciated the efforts of students, respect the ideas of students, respect for individual differences and also to promote trust between teachers and students.

Based on this framework, the study sought to identify the extent teachers carrying out activities to enhance student's metacognitive skills in the classroom as measured by the seven aspects of activities to promote metacognition in the classroom suggested by [14]. The concept of metacognitive skills defined by [17] was used to measure metacognitive skills in this study. Metacognitive skills comprises of three components of planning, monitoring and evaluation [17] Planning is a learning plan, setting goals, prioritizing materials instead of learning itself. Monitoring is the monitoring of learning and strategies used in self-analysis and assessment of the effectiveness of the implementation of the strategy.

The main issue in this study would be to equip the students with metacognitive skills in order to help them to learn effectively in the classroom. The literature reviews provide some insight into the importance of metacognition skills in developing students as expert learners. It is suggested that developing expert learner needs a deliberate effort geared towards creating awareness and procedural knowledge on how to implement and manage a learning activity [18]. Thus, the purpose of this study was to identify the use of strategies to promote the development of metacognitive skills in the classroom. The results of this study are expected to recommend appropriate strategies that can be used by teachers to enhance students' metacognitive skills in the classroom.

MATERIALS AND METHODS

This study is a descriptive study using self report questionnaire to gather information to answer the research questions.

Participants: A total of 160 secondary school students involved in this study. Data collection was conducted using a questionnaire to measure students' metacognitive skills and their perceptions on metacognitive development in the classroom.

Instruments: The instrument used in this study was adapted from [14] which is used to measure metacognitive development activities in the classroom. Meanwhile the instrument to measure metacognitive skills was adapted from "State Metacognitive Inventory" [14].

A total of 47 items (12 for metacognitive skills and 35 item for metacognitive development) were asked and evaluated based on 1-5 likert scale ranging from strongly disagree to strongly agree. Scales are constructed by taking the mean of the items that make up that scale. The reliability for both instruments is good with the overall value of Cronbach Alpha for metacognitive development and metacognitive skills were 0.813 and 0.812, respectively.

Data Analysis: Descriptive statistics were employed to describe the means and standard deviation of the data. To identify the contribution of metacognitive development activities to the development of metacognitive skills, a multiple regression analysis was computed. The independent variables were metacognitive development activities. The dependent variables in this case were components of metacognitive skills namely: 1) planning, 2) monitoring and 3) evaluation.

RESULTS AND DISCUSSION

Students' metacognitive skills: Table 1 shows the mean of students' metacognitive skills in the three components. Overall, the study shows the student's metacognitive skills is at a moderate level (Mean = 2.99). In terms of the components of metacognition, the lowest mean is for the planning component (mean = 2.92) and highest mean is monitoring component (mean = 3.04). Analysis of the findings shows that the level of student's metacognitive skills is moderate with low mean for the planning component as well as evaluation component. Thus effort to develop metacognitive skills especially the planning and evaluation components should be emphasized and given attention in the teaching and learning process. The evaluation skills will allow students to reduce errors and mistakes made in the learning process[19]. [18,20] asserted that planning and monitoring is also very important as it help students to plan how to solve problems, manage their learning process and making sure that it is on the right track.

The results show the importance of teaching the students to plan, monitor and evaluate the learning so that they can control the learning activities. This is consistent with the opinion that supports the important role of metacognition in the teaching and learning process [7, 10, 21-25].

Table 1: Mean and standard deviation for students' metacognitive skills

Scale	Mean	SD
Planning	2.92	.488
Monitoring	3.04	.552
Evaluation	3.01	.532
Overall	2.99	.477

Table 2: Mean and standard deviation of students' perceptions on metacognition development activities in the classroom

Metacognitive development activities in the classroom	Mean	Sd
Metacognitive reflection	3.30	0.74
Student-student discourse	3.26	0.75
Students-teacher discourse	3.15	0.88
Student voice	3.67	0.73
Distributed control	2.87	0.86
Teacher encouragement and support	3.80	0.78
Emotional support	3.91	0.79
Overall	3.42	0.55

The Promotion of Metacognitive Development in the Classroom: Table 2 shows that the overall mean for the development of metacognition in the classroom is at a moderate level (mean = 3.42). The lowest mean is the aspect of the distributed control and the highest mean is emotional support and teacher encouragement and support. The results showed that the teachers played a good roles in providing emotional support to students and also giving encouragement and support but still lack of emphasis on aspects that relates to giving more opportunities to students to express or share their ideas about their learning process. In terms of the development of metacognitive skills, lack of opportunities for students to interact with other students as well as with the teachers limit their opportunity to moved to higher order thinking that allows them to examined their own thinking as well as the thinking of others which is important in the development of students' metacognitive skills.

Contribution of the Metacognitive Development Activities to Variation in Students' Metacognitive Skills: Table 3a, 3b an 3c shows the results of multiple regression analysis on the planning, monitoring and evaluation components of metacognitive skills. The results shows only one aspect in metacognitive development activities contribute significantly to the variation in all the three components of metacognitive skills ie: metacognitive reflections ($\beta = 0.233$, $t = 4.797$, $p < 0.001$) for planning component; $\beta = 0.055$, $t = 3.296$, $p < 0.001$) for monitoring component;

Table 3a: Summary of multiple regressions on metacognitive skills (planning component)

Predictor	Beta	Std Error	t	Sig
Constant	2.15	.164	13.128	.000
Metacognitive	0.233	.049	4.797	.000*
reflection	0.012	.000	0.136	0.892
Students-student	0.087	.000	1.014	0.312
discourse	0.125	.000	1.905	0.059
Student-teacher	0.093	.000	1.187	0.237
discourse Student voice	0.134	.000	1.43	0.155
Distributed control				
Teacher encouragement	0.016	.000	0.201	0.841
and support				
Emotional support				

R^2 : .127; N = 160, * significant at α =0.05

Table 3b: Summary of multiple regressions on metacognitive skills (monitoring component)

Predictor	Beta	Std Error	t	Sig
Constant	1.93	.236	8.174	.000
Metacognitive reflection	0.195	.055	3.296	.000*
Students-student discourse	0.12	.000	1.349	0.179
Student-teacher	0.087	.000	0.999	0.319
Discourse Student voice	0.128	.060	2.129	0.035
Distributed control	0.077	.000	0.971	0.333
Teacher encouragement	0.1	.000	1.053	0.294
and support				
Emotional support	0.064	.000	0.794	0.428

R^2 : .133; N = 160, * significant at α =0.05.

Table 3c: Summary of multiple regressions on metacognitive skills (evaluation component)

Predictor	Beta	Std Error	t	Sig
Constant	2.358	.236	12.848	.000
Metacognitive reflection	.2	.055	3.681	.000*
Students-student discourse	.079	.000	0.868	0.387
Student-teacher	.069	.000	0.781	0.436
Discourse Student voice	.120	.060	1.457	0.347
Distributed control Teacher	.096	.000	1.2	0.232
Encouragement and support	.11	.000	1.155	0.25
Emotional support	.095	.000	1.163	0.247

R^2 : .079; N = 160, * significant at α=0.05.

$\beta = 0.200$, $t = 3.681$, $p < 0.001$ for evaluation component). All other aspects did not contribute significantly to the variation in metacognitive skills.

The findings of the multiple regression analysis showed that the aspect of metacognitive reflection is a significant contributor to variation in all three components of students' metacognitive skills (planning, monitoring and evaluation). These findings support the importance of making students thinking visible and explicit as recommended by Beyer [20] It is very important that students makes aware of the thinking process involved when they learn something. This can be achieved through the use of metacognitive reflections activities that asked students questions about the thinking process in the classroom. Asking questions like: how do they complete the tasks, or what steps they take to complete the task can help students visualize the steps involved in their learning process. In other words, the use of metacognitive reflection activities help students learn how to learn and improve their metacognitive skills.

However, the findings of metacognitive development activities showed that metacognitive reflection have a lowest mean. It can be concluded that most teachers do not realize the importance of making the students learning explicit and its impact on the development of student's metacognitive skills. The highest mean was for aspects of teacher encouragement and support and emotional support that shows that most teachers do show concern for students' learning process; however, these efforts are not strong enough to help develop students' metacognitive skills as it was not done explicitly in the classroom as compared to metacognitive reflection activities. Therefore, it is important to makes the teachers aware of the important of metacognitive reflection activities to promote metacognitive development in the classroom.

CONCLUSION

Teachers are still not paying enough attention to the development of student's metacognitive skills. Therefore efforts should be taken to increase the teachers awareness on the importance of promoting metacognitive development in the classroom and the effective ways to promote them in the classroom. In other words, it is important to gather effort to help students develop their metacognitive skills. Future study is suggested to develop a framework on how to promote metacognitive development in current education system.

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