"Applying Alternative Metacognitive Supports in order to Trigger Learners' Metacognitive Regulation in Doing Self Regulated Learning"

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Abstract: This study aims to determine the effectiveness of three alternative strategies of self-communication supports as one of metacognitive strategies, including guide learning, explicit training, and regular practicing in triggering one's metacognitive regulation in order to help the learner in learning process. This study is looking at how those supports can improve applying metacognitive regulation strategies in participants' self regulated learning. Study results that good metacognitive knowledge does not lead automatically to good metacognitive regulation in learning processes. Guide learning, explicit teaching, and regular practicing guide participant to apply and to follow some instructions of self-communication strategy in order to improve students' metacognitive knowledge and metacognitive regulation to achieve better performance in learning activities.

Key words: self-communication, metacognitive strategies, learning

Abstrak: Penelitian ini bertujuan untuk menentukan efektivitas dari tiga strategi alternatif penunjang *self-communication* (komunikasi diri) sebagai salah satu strategi metakognitif, termasuk *guide learning* (pembelajaran terpandu), pelatihan eksplisit, dan latihan teratur untuk mencetuskan regulasi metakognitif seseorang dengan tujuan meningkatkan proses pembelajarannya. Penelitian ini mempelajari bagaimana penunjang tersebut dapat meningkatkan penerapan strategi regulasi metakognitif pada pembelajaran mandiri peserta. Hasil penelitian menunjukkan bahwa pengetahuan metakognitif yang baik tidak secara otomatis menimbulkan regulasi metakognitif yang baik dalam proses pembelajaran. *Guide learning* (pembelajaran terpandu), pengajaran eksplisit, dan latihan teratur memandu peserta untuk menerapkan dan mengikuti beberapa instruksi strategi *self-communication* demi untuk meningkatkan pengetahuan metakognitif dan regulasi metakognitif siswa agar mereka dapat meningkatkan kemampuan dalam aktivitas pembelajaran.

Kata Kunci: *self-communication*, strategi metakognitif, pembelajaran

Metacognition is defined as awareness and monitoring of one's thoughts and task performance, or in other words, metacognition is thinking about our thinking (Schraw, 1998). It is related to high capacity of mental processes, which is involved in learning processes, such as making plans for learning, using appropriate skills and strategies to solve a problem in learning processes, estimating performance in learning, and also calibrating the extent of learning (Coutinho, 2007).

Metacognition refers to the psychological structures, knowledge, events and processes including the control, modification and

interpretation of thinking itself (Countinho, 2007). Metacognition is also defined as the ability to reflect upon, understand and control one's learning (Schraw & Dennison, 1994). Schraw and Dennison (1994) state that metacognition can control, monitor, and regulate learning and cognition activities in general. It reflects one's own learning processes and also its use and regulation on the other hand (Dignath, et al, 2006).

Research shows that metacognition is believed as one of important aspects in learning, including in writing since it leads learners to organise and to apply metacognitive strategies in their learning activities. Metacognition is considered not only to be important for learning process, but it is also important because it can be applied as part of the developing expertise (Sternberg, 1999). The reason behind this is because metacognition can also guide learners into better choice of strategies and where they will be necessary to achieve the best performance (Zimmerman, 2002). Research reveals that there is strong correlation between metacognition and performance in learning, including performance in reading and writing (Hammann & Steven, 1998; Hogan, 1999; Zimmerman, 2002; Benjamin & Bird, 2006; Coutinho, 2007; Hong & Peng, 2007; Bannet, et al, 2008). Learners with good metacognition are considered to demonstrate better performances in learning compared to learners with poor metacognition. This is because metacognition enables students to be more strategic and focus on learning new information received rather than studying information that they already learned (Countinho, 2007). Being more strategic in writing is also important because writing is an important aspect for learners to express their ideas. To those who concern in research and development area, writing skills is expected to be excellent because that is the only

way to report what they find in the research activities. Accordingly, applying metacognitive strategies in learning process, including in writing is considered to be valuable for learners to achieve better performances.

It is stated that metacognition is consisted of two major components: metacognitive knowledge and metacognitive regulation (Schraw, 1998). Metacognitive knowledge refers to knowledge of cognition, which means that what individuals know about their own cognition or about cognition in general, such as knowledge of skills and strategies that work best for the learners, and knowledge about how and when to use such skills and strategies. Moreover, metacognitive regulation is defined as a set of activities that control learners' thinking and learning, including planning, monitoring comprehension, and evaluation (Schraw, 1998).

According to Dixon (1989), self-communication is predicted as one of metacognitive strategies that can be applied for triggering metacognitive regulation since it is more likely affecting the more attentional allocation resources that one sets in the outset of tasks. It is stated that self-communication is believed to be more effective because writers who apply this strategy will show higher performance levels, use more strategies and regulate their own learning better (Hamman & Stevens, 1998). Therefore, it can be concluded that self-communication will be a good strategy in order to trigger one's metacognitive regulation in his learning for high performance.

However, even though metacognition is a crucial factor in learning process, research found that many learners have difficulties in performing such self-communication as none of metacognitive strategies automatically, which probably results in low achievement in learning (Banett at al., 2008). This means

that most of learners have difficulties in controlling their self-communication. Sheorey and Mokhtari (2001) argued the reason of this condition is because applying self-communication strategy may be influenced by a number of factors, such as previous experiences, beliefs, and culture specific instructional practices. On the other hand, metacognitive regulation strategies are those activities, which are intentional, carefully planned techniques by which learners monitor or manage their learning and those strategies require practices and automatic processes (Sheorey & Mokhtari, 2001). Therefore, it can be concluded that altering one's self-communication strategy could improve one's performance in learning by attracting his metacognitive regulation (Benjamin & Bird, 2006).

Therefore, according to Garavalia and Ray (2003), it is important for educators, researchers or trainers to not only help students acquire metacognitive knowledge, but also to help students use this knowledge to increase learning performance. Related to this, teaching and training learners explicitly about metacognitive strategies, including how to plan, monitor, and revise works by using self-communication method is necessarily in order to trigger their awareness of what they know and what they need to do (Borkowski, et al, 1989).

Metacognitive supports to trigger student's metacognitive awareness in applying metacognitive regulation can be created by using systematic instructions. There are three basic principles for effective self-communication as metacognitive instructions according to Bannet et al. (2008); (a) the instructions have to integrate self-communication instructions into domain specific instruction; (b) they are used to explain the application of all instructed metacognitive strategies; and (c) there should be enough training time

provided to students in order to implement the metacognitive activities that have just been taught.

A study reveals that self explanation is an effective metacognitive regulation strategy and it also key to getting students to learn with greater understanding (Veenman and Verheij, 2003). Thus, applying some strategies, including guide learning, explicit training, and regular practicing by proving metacognitive environment to the learners might be effective to trigger learners' metacognitive awareness in applying metacognitive regulation in their self regulated learning.

This study aims to determine the effectiveness three alternative metacognitive supports, including guide learning, explicit training, and regular practicing in triggering one's metacognitive awareness in order to help the learner in self-regulated learning process. This study is looking at how those metacognitive supports can improve applying metacognitive regulation strategies in participants' self regulated learning. There are three research questions in this study that should be answered: (1) How will the metacognitive training (including self-communication strategy) be effective to trigger one's metacognitive regulation?; (2) How will those strategies be effective to support one's self regulated learning strategies; and (3) How effective metacognitive strategies can be taught and be applied in order to trigger self regulated learners' metacognitive regulation in their learning activities?

Methodology

As this study is a qualitative study, four participants were asked to participate in this deep observational study. Four University students in Australia with English as their second language participated in this study.

This practical project was applying three data collection methods. First, participants were asked to collect their weekly reflective journal, which was about his learning activities during 13 weeks. Participants were also asked to apply think aloud in which researcher was recording participants' voice while they were doing self-communication during writing the self reflective journal to identify how many times they reflected metacognitive knowledge and metacognitive regulation in learning processes during latest 7 weeks.

In addition, participants were also requested to fill *Metacognitive Questionnaire* taken from *Metacognitive Awareness Inventory (MAI)* (Schraw & Dennison, 1994), *MCQ-30* (Wells & Cartwright-Hatton, 2004) and *Trait Thinking Questionnaire* (TTQ) (Hong & Peng, 2008) in order to identify participants' metacognitive knowledge and metacognitive regulation. In this questionnaire, participants were asked to rate their opinion for 67 questions, including 52 questions from MAI, 6 questions from MCQ-30, and 9 questions from TTQ on a scale of 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree). Metacognitive knowledge, metacognitive regulation, and correlation among them have been analysed based on data from self reflective journal, think aloud, and questionnaire.

This study collected qualitative data (participants' self reflective journals and think aloud) and quantitative data from questionnaire. Data collected by questionnaire was analyzed by using Microsoft Excel. Moreover, qualitative data from self reflective journals and think aloud were collected by using notes.

Procedures was conducted through baseline data collecting intervention and evaluation. Baseline data was collected and analysed by using qualitative data from self reflective journal during the first 3 weeks data collecting period and the quantitative data was collected by using questionnaire on week 3. Baseline data describes participants' metacognitive knowledge and metacognitive regulation performance before interventions. The analysed data results were used to create some interventions in order to improve participants' metacognitive performance.

According to baseline data, there are three intervention techniques designed in order to improve participants' metacognition performance. The interventions were conducted for 13 weeks before evaluation of effectiveness, including: (1) *Guide Learning.* This intervention technique aims to help participants understand more about how important metacognition in self regulated learning. In this intervention, there are some strategies that were applied to participants; (a) guiding and motivating participants to know more information related to metacognitive theory; (b) guiding participants to keep following weekly guidance for all topics'; and (c) helping participants to find some evidences to support their knowledge of metacognition. (2) *Explicit Training.* This technique aims to teach participants explicitly the steps of metacognitive strategies in order to help them understand and remember steps in applying metacognitive regulation in their learning by applying several strategies: (a) training and teaching participants about metacognitive regulation; (b) teaching participants explicitly some steps in applying metacognitive regulation; and (c) teaching and training explicitly the whole concept of metacognitive skills and its correlation with academic successful. (3) *Regular Practicing.* This technique is trying to help participants to apply and to practice some strategies regularly that they have already known. The regular practicing is considered to be important due to developing automati-

cally skills of participants. Accordingly, some strategies were done in order to help participants in improving their automatically metacognitive skills in his self regulated learning activities: (a) always asking participants to apply metacognitive strategies in their learning activities (planning, checking, and evaluating); (b) asking participants to follow their fixed planning and also asking them to do better organizing their resources; (c) giving positive attribution to participants whenever they did those strategies; (d) asking them to use self assessment quis in order to support their practicing activity in monitoring their cognition; and (e) motivating participants to do metacognitive strategies in their learning regularly by showing their improvement evidences of academic performance.

Evaluation effectiveness of interventions was conducted by collecting and analysing quantitative data, which was from post questionnaire (was conducted on week 16) and was also from analysing qualitative data, which was from self reflective journal (week 4 to week 16). The successful of interventions is presented by improvement of metacognitive regulation score on the questionnaire and also improvement of frequency statements of metacognitive regulation strategies on self reflective journal.

Results

Metacognitive Knowledge

According to quantitative data from metacognitive questionnaire, it was identified that all participants have good metacognitive knowledge. This indicates that participant knows about their cognition well, including declarative (knowing about what), procedural (knowing about when), and conditional knowledge (knowing about how). Data on Table 1 and Graphic 1 reveal that participants feel aware about their cognition, about when they should think of their cognition, and about how to apply strategies that they can use for thei cognition. Moreover, result also shows that participants have improved their metacognitive knowledge by intervention strategies, including declarative, procedural, and conditional knowledge.
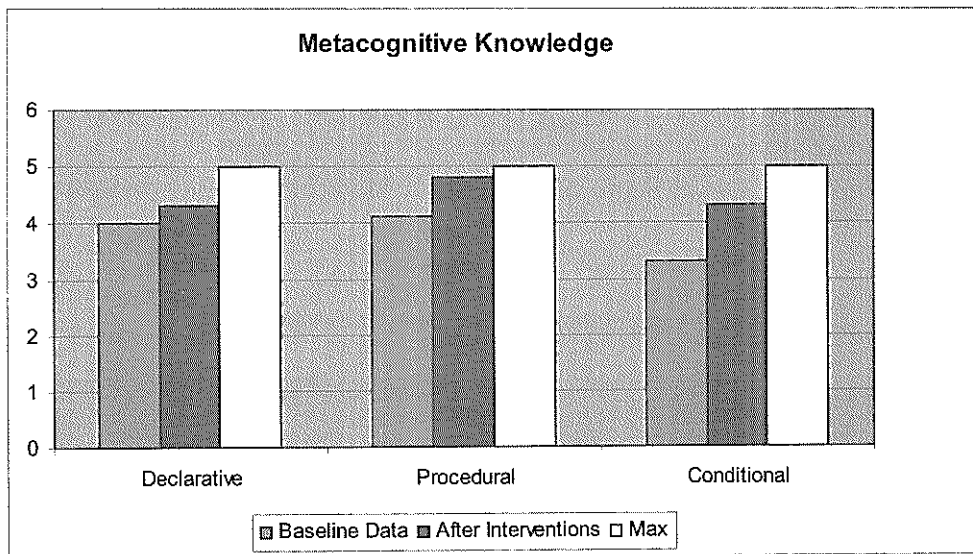
Table 1. Metacognitive Knowledge Score

Metacognitive Knowledge	Baseline Data (Mean)	After Interventions (Mean)	Score Max (Mean)
Declarative	4	4.33	5
Procedural	4	4.79	5
Conditional	3.3	4.33	5

In this case, participants' declarative metacognitive knowledge can be analysed from their answers for nine questions in the questionnaire, which ask about their awareness of their thinking and their ability to be aware of the way their mind works when they are thinking. Result shows that participants are aware of their thinking and their mind while thinking of their learning (detail result is presented on Graphic 2). Moreover, participants' procedural metacognitive knowledge can be identified from seven other questions in the questionnaire, such as "I slow down when I encounter important information " and "I learn more when I am interested in the topic". The results reveal that participants also know when they should think and be aware about their cognition (de-

tail result is presented on Graphic 3). Further, result from questionnaire on conditional metacognitive knowledge shows that participants engage with good conditional metacognitive knowledge. As an example question to identify conditional metacognitive knowledge is that "to understand the mate- rial, sometimes I draw graphs, maps, charts, diagrams, or tables" and all participants put high score in answering this question. This means that they have good knowledge about how to deal with their cognition in order to achieve the best performance in learning (de- tail result is presented on Graphic 4).
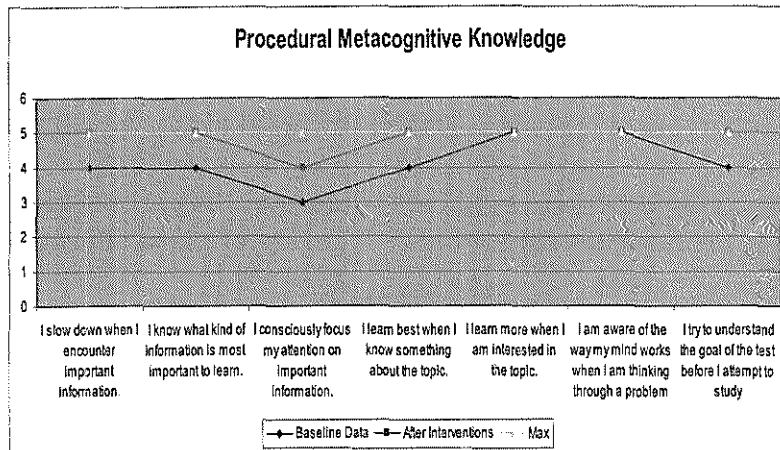

Graphic 1. Participants' Metacognitive Knowledge Scores

Data after intervention also shows that participants' metacognitive knowledge, in- cluding declarative, procedural, and condi- tiona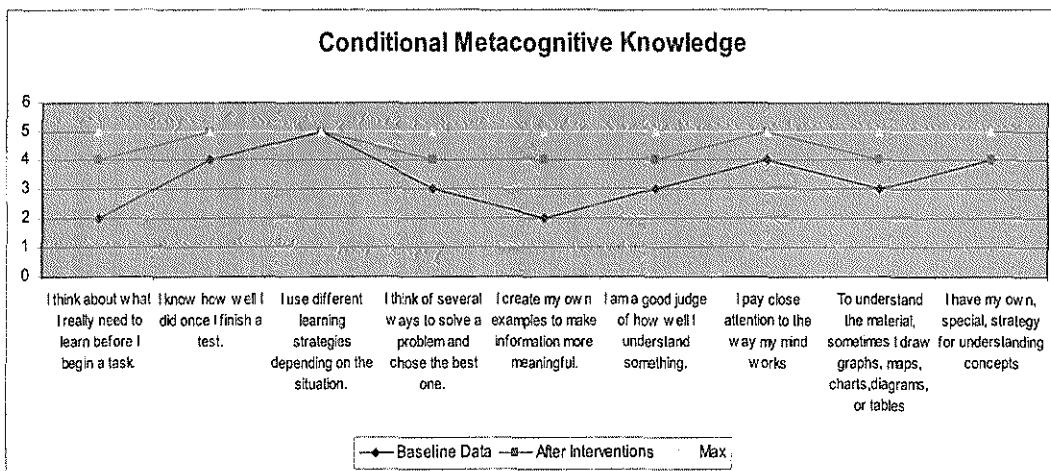l has improved. The evidence can be seen on Graph 2, 3, and 4 for declarative, proce- dural, and conditional knowledge respec- tively.
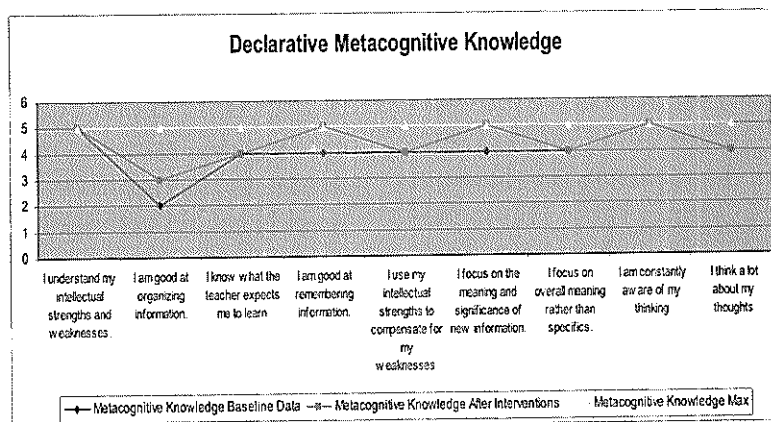
Graphic 2. Detail Score of Declarative Metacognitive Knowledge

Graphic 3. Detail Score of Procedural Metacognitive Knowledge

Graphic 4. Detail Score of Conditional Metacognitive Knowledge

In addition to support result from questionnaire, data from self reflective journals and think aloud show that all participants always think about their learning process and the way how their learning going. This means that participants show that they have good metacognitive knowledge by stating some statements either writing in their self reflective journals or in their think aloud. Frequency stating of statements and example of participants' metacognitive knowledge, including declarative, procedural, and conditional metacognitive knowledge on their weekly self reflective journal during 16 weeks (3 weeks baseline data and 13 weeks during and after intervention processes) is presented on Table 2.

Table 2. Metacognitive Knowledge Frequency and Example of Statement.

| Criteria	Example Statement	Baseline (3 weeks)	Intervention (13 weeks)
Metacognitive Knowledge **Declarative metacognitive Knowledge**	"I am wondering why I've only got Credit for my first paper assignment because actually I expected getting more than this score. Did I really grasp the idea and instruction from the lecturer in doing that assignment? Or because I didn't really understand the material that the lecturer tough in the class? But I felt quite confident when I was doing it." (participant 3)	4 (1.33/week)	23 (1.77/week)
Procedural metacognitive knowledge	" I feel like grasping the main idea in reading article whenever I feel confident about my understanding. And I realize that I must spend more time to read the articles whenever I don't feel quite confident in those."(participant 1)	2 (0.6/week)	13 (1.0/week)
Conditional metacognitive knowledge	"I really know the capacity of my long term memory, so, in order to keep my understanding about my learning, I usually write summary or make notes. However, if I have no enough time to take notes, I just try to grasp the main idea from the whole text." (participant 2)	3 (1.0/week)	20 (1.54/week)

Data about frequency above means how many times during 16 weeks (3 weeks for baseline data & 13 weeks for intervention periods) participants stated statements that show metacognitive knowledge, including declarative, procedural, and conditional metacognitive statements. From data above, it can be identified that participants' metacognitive knowledge has improved, which are statements of declarative metacognitive knowledge from 4 times in 3 weeks (with ratio 1.33/week) to 23 in 13 weeks (with ratio 1.67/week), statements of procedural metacognitive knowledge, from 2 in 3 weeks (with 0,67/week) to 13 times in 13 weeks, and statements of conditional metacognitive knowledge, from 3 times dur-

ing 3 weeks (ratio 1.0/week) to 20 times in 13 weeks (ratio 1.54/week).

Metacognitive Regulation

Data from questionnaire and self reflective journals also reveal that participants have good knowledge about his cognition. However, based on analysing quantitative data from metacognitive questionnaire, in general, participants' metacognitive regulation was not as good as their metacognitive knowledge. Nevertheless, participants' metacognitive regulation has improved due to the interventions packages. Data result is presented on Table 3 and Graphic 5.
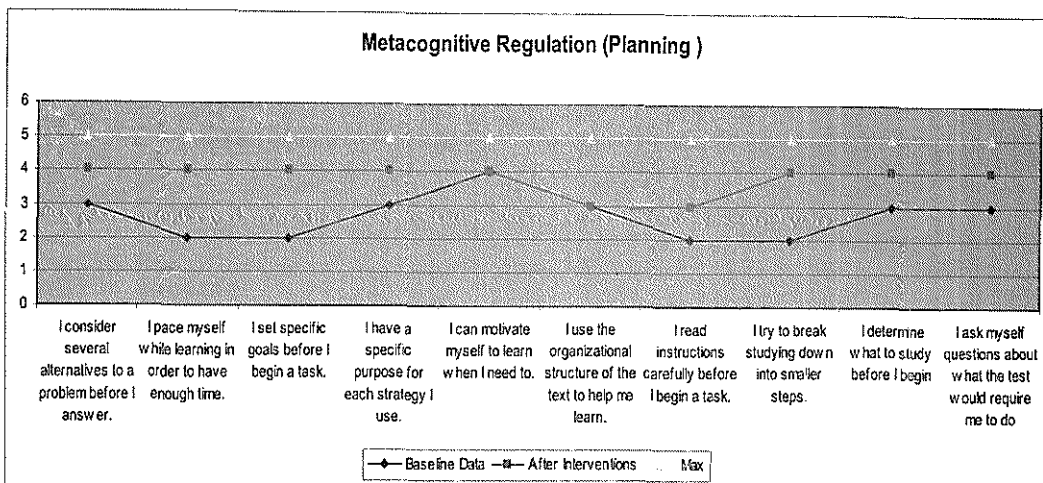
Table 3. Metacognitive Regulation Score
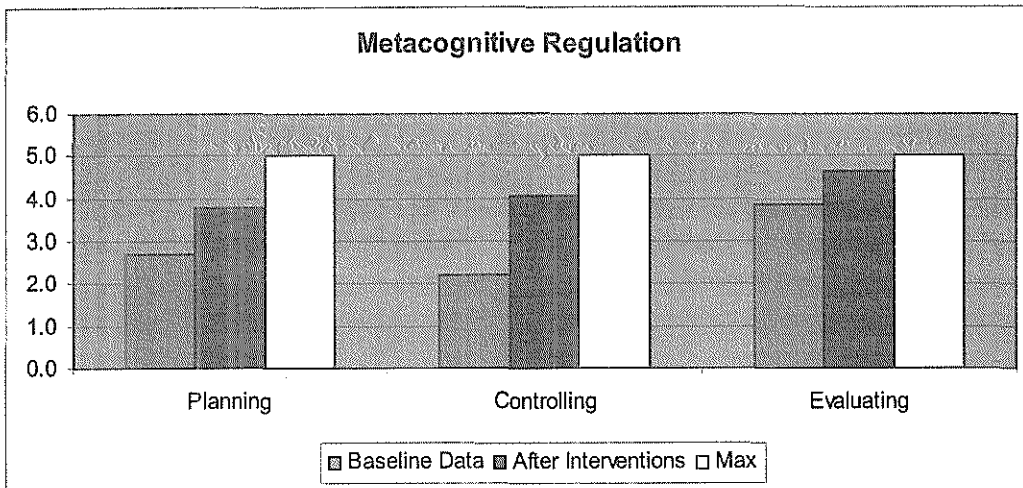
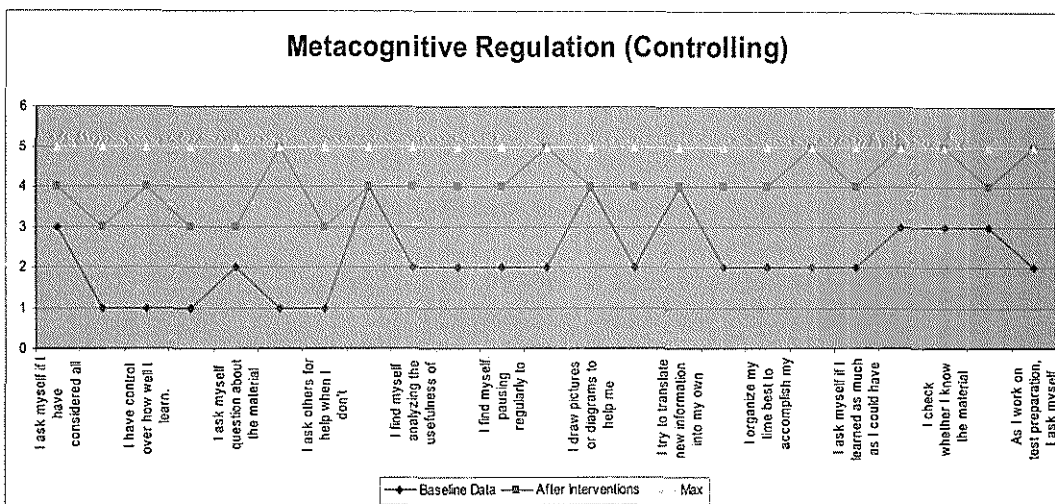**Graphic 5.** Participants' Metacognitive Regulation Score

Data from Table 3 is showing that participants were lack activities of metacognitive regulation in their learning processes have shown improvement of metacognitive regulation due to intervention packages. It can be analysed from mean score of the questionnaire in planning strategy, 2.7 out of 5 (maximum) increased to 3.8 out of 5 after interventions. Similarly, participants' scores for controlling and evaluating strategy, which were 2.2 and 3.9 out of 5, increase to 4.1 and 4.6 out of 5 after interventions.

In addition, data result of participants' planning strategy has also been improved by intervention programs. The improvement of metacognitive regulation (planning strategies) is shown on Graphic 5. The graphic is showing that participants have applied several planning strategies after receiving the interventions. This condition can be known by improving score from metacognitive questionnaire. Moreover, this condition also occurred in other metacognitive regulation, which are controlling strategy and evaluating strategy. Details of improvement those applied strategies (controlling and evaluating) are presented on Graphic 6 and Graphic 7 respectively.

Graphic 5. Detail Score of Metacognitive Regulation (Planning)

Graphic 6. Detail Score of Metacognitive Regulation (Controlling)
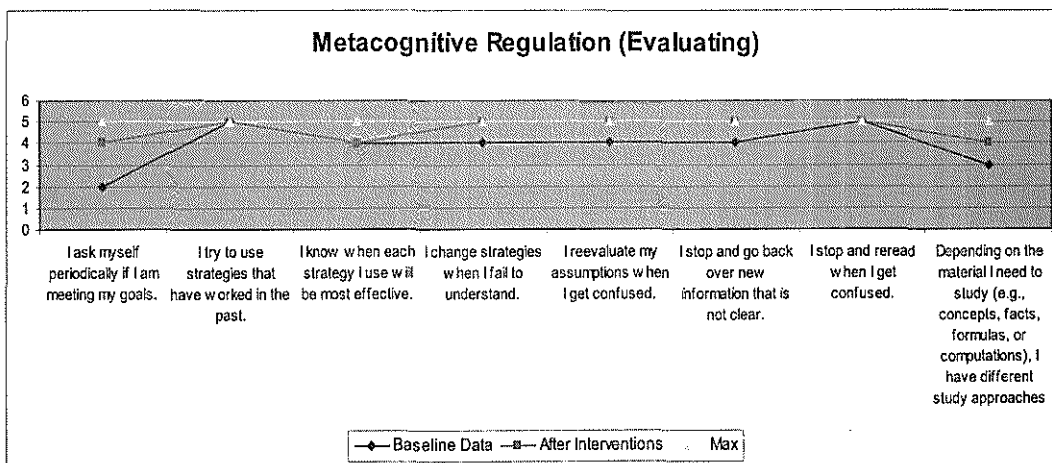
Graphic 7. Detail Score of Metacognitive Regulation (Evaluating)

Moreover, qualitative data results from self reflective journals also found the improvement of participants' metacognitive regulation after interventions. Detail qualitative data is presented on Table 4, including frequency of metacognitive regulative statements and example of the metacognitive regulative statements.

Table 4. Metacognitive Regulation Frequency and Example of Statement.

Criteria	Example Statement	Baseline (3 weeks) (Mean)	Intervention (13 weeks) (Mean)
Metacognitive Regulation			
Planning	"I will focus and pay more attention for my understanding about all materials, especially for X topic and for this week study, I'm planning to read some articles that I'll use to support my assignment due on next week." (participant 1) "I'm planning to finish all of my assignments this week so I have enough time to recheck them before I submit" (participant 3)	3 (1.0/week)	22 (1.69/week)
Monitoring/ controlling	"I think now I understand about main idea of article that I've read." (participant 2) "I'm using self assessment to check my understanding of material that I read today" (participant 3) "Today, I'm making link between prior knowledge in my memory with new information from an article by picturing a diagram." (participant 1) "I do regularly checking my memorizing about topic that I like because I don't want to loose it from my memory"(participant 1)	0	18 (1.38/week)
Evaluating	"I know my reading skills should be improved that's why I keep reading everyday in order to do practicing" (participant 2) "For me this article is quite tough to understand and I need to spend more time and make notes to grasp the main idea of this." (Participant 2) "I change my learning strategies to be more organized this semester" (participant 3)	2 (0.67/week)	18 (1.38/week)

Table above is presenting the frequency of metacognitive regulative statements from participants and example of the statements. From data, it is known that ratio of frequency metacognitive regulative statements have improved due to intervention programs. Ratio of frequency participants' metacognitive regulative statements (planning) have im-

proved from 3 times during 3 weeks with ratio 1.0/week to 22 times during 13 weeks with ratio 1.67/week. Similarly, ratio of frequency participants' controlling strategy statements have also improved from 0 in the first 3 weeks to 18 in 13 weeks interventions with ratio 1.38/week. It also occurred in participants' evaluating strategy statements, which improved from 2 (ratio 0.67/week) to 18 in 13 weeks (ratio 1.38/week). This shows that interventions have brought positive improvement in applying metacognitive regulation for participant in his learning activities.

DISCUSSION

This study aims to analyse participants' metacognitive knowledge, metacognitive regulation, correlation among them, and also effectiveness of intervention strategies in applying metacognitive regulation in participants' learning activities.

Metacognitive Knowledge

According to baseline data, it is identified that participants have good knowledge of cognition, including declarative, procedural and conditional metacognitive knowledge. This means that participants are already aware about their cognition well and they also know about their cognition process.

Either quantitative of qualitative baseline data show good evidence of participants' metacognitive knowledge, indeed, data after interventions reveal improvement of participants' metacognitive knowledge. These improvements have positive correlation with intervention packages since participant received some explicit intervention strategies that improve his knowledge about metacognition. By delivering new knowledge about metacognition and also applying metaco-

gnitive strategies, participants have become familiar in thinking about their cognition in his learning. Therefore, the frequency of metacognitive knowledge statements has improved as much as participants have delivered interventions about metacognition.

Metacognitive Regulation

However, good performance of participants's metacognitive knowledge does not automatically lead to metacognitive regulation. This condition can be identified from baseline data of metacognitive regulation, which shows that participants did not apply all aspects, which are included in metacognitive regulation in learning. Baseline quantitative data reveals that participants engage with low score in metacognitive regulation questions. Also, qualitative baseline data reveals that frequency of participants' metacognitive statements is low before he received intervention strategies.

This condition is predicted due to some aspects, such as lack of metacognitive awareness, unsupported environment, and lack of metacognitive skills. The participants' condition that lack of awareness can be identified explicitly from frequency of their statements on self reflective journals. Also, participants explicitly said that they never did such controlling since they feel that it is no need to do in their learning activities during first 3 weeks this semester (i.e.: "I feel that I have no enough time to check my understanding about all materials that I've been tough because I need to focus in doing my assignment anyway."). It is also identified that participants usually used their feeling in doing metacognitive regulation to control their understanding in learning activities. They never apply special strategies to control the process of learning because they believe that they have that strat-

egies naturally before receiving the interventions (i.e.: I realize that I never do checking my understanding after attending lectures in the classes. I just always do checking my understanding by using my feeling of confidence.").

However, in this case, it is found that participants' metacognitive regulation has improved due to intervention strategies that participant received for 13 weeks. The improvement of applying metacognitive regulation can be explained by improvement of score on the questionnaire and it can also be identified from frequency statements that indicate metacognitive regulation on his journal.

It is identified that participants' metacognitive regulation has improved since they received intervention procedures. This can be explained that guide learning leads participants to know more about the benefit of applying metacognitive regulation in their learning. This strategy is guided participants to trigger their metacognitive awareness by knowing more about metacognition and its implication in learning. The implication is that more knowledge about metacognition triggers participants to be more aware to apply the regulation. Moreover, explicit training strategy is also leading participants to apply metacognitive regulation by creating and following the steps in applying metacognitive regulation in his learning activities. By using this strategy, participants' is guided to transfer their metacognitive knowledge into metacognitive regulations, which are actions or real activities. In short, participants have been trained not only to have good knowledge of their cognition, but they have also been guided to do those strategies in learning processes.

Furthermore, the improvement of applying metacognitive regulation is also because of regular training in applying those

metacognitive regulation strategies in participants' learning activities. Since more practices lead to automatically work, it can be approved that in this case, the more participants doing regular practicing to apply metacognitive regulation, the more they are indicated to apply those strategies in their learning processes. Therefore, those intervention strategies have triggered participants' metacognitive awareness and metacognitive skills in applying metacognitive regulation.

In addition, by doing those intervention strategies, participants were provided good environments to apply metacognitive regulation. Guiding and explicitly teaching participants some steps in applying metacognitive regulation provided good environment to participants' metacognition. Also, by applying regular practicing in metacognitive regulation (esp. self assessment quiz), participants were providing their own environments to develop metacognitive skills and awareness in order to improve metacognitive regulation in learning. Therefore, by improving participants' metacognitive regulation, it is expected that participants' performances in learning are expected to improve because learning requires both metacognitive knowledge and metacognitive regulation to perform effective self regulated learning and achieving better performance.

CONCLUSION

In summary, it has been found that participants' good metacognitive knowledge does not lead automatically to good metacognitive regulation in learning processes due to lack of metacognitive awareness, metacogitive skills, and supported environments. Guide learning, explicit teaching, and regular practicing guide participants to apply and to follow some instructions of self-communication strategy in

order to improve metacognitive knowledge and metacognitive regulation to achieve better performance in learning activities. However, more complex research is needed to approve this study results.

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