The Use of Metacognitive Strategies to Develop Research Skills among Postgraduate Students

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Abstract

Identifying a research problem is the most challenging aspect in teaching research skills at the postgraduate level. This action research project aimed to identify a suitable intervention to help students identify research problem in education setting and help them to write a sound research problem statement for their project. The study involves 51 postgraduate students in a research methodology course. The intervention was designed based on student-centered activities that include the use of metacognitive strategies through cooperative learning, online learning and interactive learning activities. This paper reported the findings of the first cycle of the study. The findings showed students improvement in identifying research problems in education setting and able to identify important elements in writing a research problem statement. It can be concluded that active learning approach using metacognitive strategies able to improve students' skills in planning, monitoring and evaluating the process of identifying a research problem and writing the problem statement of their research project.

Keywords: research skills, research problem, active learning, metacognitive reflection

1. Introduction

Developing postgraduate students' research skills is one of important aspect that needs to be address especially in a research-intensive university. This is because Research skills are a key factor in determining student's success especially at masters and doctoral level. No doubt a lot of books and study guides related to research skills exist either in hard copies or in online form in the Internet, but students still facing difficulties to develop these skills. The development of postgraduate students as a researcher raised many issues and interest by many researchers (James, 2012; Starke-Meyerring, 2011; Switzer & Purdue, 2011; Zuber-Skerritt, 1987). These researchers argue for the systematic development and integration of students' research skills in postgraduate program. Zuber-Skerritt (1987) suggested the use of workshop model for developing skills in dissertation research and writing among postgraduate students. Most Higher Institution Education program for postgraduate studies around the world includes a research methodology course to help students develop the research skills needed. At Faculty of Education, UKM, a research methodology course is offered at Masters level, meanwhile doctoral students could take the course as an audit.

However based on the researchers own experience in teaching research methods courses for postgraduate students, teaching and developing research skills is still a challenging task. After going through the methodology research course, the students still faced difficulties and the supervisors reported the students' weaknesses to embark into the research project. One problematic area faced by students is in identifying a research problem and writing a good problem statement. This paper reports an action research project aimed to identify the effect of an intervention designed using metacognitive strategy to help students identify research problem in education setting and help them to write a sound research problem for their project.

1.1 Metacognitive Strategies

One of the most important principles in educational psychology related to teaching and learning is that teachers should facilitate students' knowledge construction process (Slavin, 2012). This idea comes under constructivist theories of learning, which claim that no matter what teachers does; student is constructing their own knowledge. Therefore, this theory proposed the used of active learning techniques to aide students' knowledge construction process. It focuses on the use of learning strategies that promote engagement and deep learning among students.

Metacognitive strategy is one of application of active learning that emphasis on students reflecting on the learning process to achieve the learning objectives (Saemah et al, 2011a). This is in line with suggestion from the first principle of learner-centered psychological which claim that successful learners are actives, goal directed, self-regulating and assume responsibility for their own learning (APA, 1997). In other words, it is important to help students to be aware of their own learning process, starting with the goal of learning in mind; and use it to plan how to achieve them, monitor it and evaluate the achievement of the learning objectives.

Zuber-Skerritt (1987) proposed the use of metacognitive strategies in helping students to review their personal construct on the research process, which is term as "learning conversation". It is proposed that this learning conversation help the students to focus on the processes of research that can be used to handle their research related task and becoming more confident and motivated to carry out their project. Based on the benefits of metacognitive strategies to students learning, this study aimed to identify suitable intervention to help student learns important research process needed in conducting their research project.

Metacognition is popularly known as 'thinking about thinking' or 'cognition about cognition'. It refers to a person's knowledge about their own learning and thinking process (Flavell, 1979). Such knowledge is used to monitor and regulate cognitive processes during learning and thinking activities. In the context of learning, awareness of the processes used in learning and thinking plays an important role in the development of students' research skills. The use of a metacognitive approach is recommended by educational psychologists to provide opportunities for students to learn about their learning process, thereby helping them to acquire the intended knowledge and skills.

Making students aware of their thinking process during implementation of a cognitive process will help them to learn the procedural knowledge involved. Beyer (1987) suggested the use of metacognitive reflection strategy to make the students thinking visible. In this strategy, students are asked to reflect on their thinking process after completing a learning task. The outcome of this process is the cognitive procedure employed during the implementation of the task. This procedure can be evaluated in terms of its effectiveness in achieving the intended learning outcome. Using cooperative learning technique, students can compare their cognitive procedures and develop the most effective procedure for future use. It is suggested that the use of metacognitive strategies will help students learn the learning process and eventually learn the skills for future used (Saemah et al., 2011a). In this study, it is hypothesized that the use of metacognitive strategies will guide students' learning process in acquiring the intended research skills.

2. Method

The study involves 51 postgraduate students in a research methodology course. The participants of the study consists of 12 males and 39 female postgraduate students, 28 of them are below thirty years old, 13 are between 30-39 years old and 10 participants are more than 40 years old. The participants reported that 45 % of them do not have experience in conducting any research project before.

This study was conducted using action research project involving the following steps in action research: analyzing the problem; planning appropriate strategies and interventions to address the problem; observation; and reflection on the results (Kemmis & McTaggart, 1988; 2005). Action research method is appropriate to be adopted in this study as the study involves effort to improve practice by the practitioner (Carr & Kemmis, 1986).

2.1 Data Collection

This study was conducted within a research methodology course for postgraduate students at Faculty of Education, UKM. A total of 51 students enrolled in a class conducted by the authors and co-authors were involved in the study. The students were taught using an active learning technique namely a metacognitive strategy, online discussion and cooperative learning. Two set of instruments were used to collect the data namely: 1) Research skills questionaire and 2) Online reflective questionaire. Research skills questionaire were conducted prior and after the intervention. The students were also asked to complete the online reflective questionaire after the intervention.

2.2 The Intervention

The intervention was designed based on theory of active learning and deep processing using metacognitive strategies which is implemented using cooperative learning, online learning and interactive learning activities.

The activities in the intervention includes:

i)   Activity 1: Developing a procedure to identify a research problem

Students work in group to identify educational issues in their area of interest. Prior to this activity, they were asked to do a literature search at the library. Each group were asked to pick one issue and find the answers on the following questions:

      a.   What is the issue being address in the study?

      b.   What is the importance of the issues?

      c.   What are the questions arising from the issue?

      d.   What is/are the gap in knowledge?

      e.   What are the proposed study/studies arising from the issue?

After the discussion, the students were asked to reflects on the procedure to identify a research problem (Metacognitive reflection activity 1)

ii) Activity 2: Online discussion on the meaning of research problem and examples of research problem in education setting.

Using blog, students were asked to participate in online discussion provided by the instructor. They were asked to post their meaning of a research problem and also to respons to peer posting in the blog.

iii) Activity 3: Developing a checklist for the elements in writing statement of a research problem.

Using two research based articles (one quantitative research and one qualitative research) students were guide to identify components of a research problem statement and come up a check list on the components.

    iv) Activity 4: Writing a research problem statement

Each students was asked to write their own research problem statement.

Each students were to evaluate other students work using the check list

    v) Activity 5: (Metacognitive reflection Activity 2)

Based on peers evaluation and the checklist, students improve their statement of their research problem

Each students were also asked to do metacognitive reflection on the procedure they used to produce a statement of a research problem for future use.

In summary, metacognitives strategies were implemented through cooperative and individual learning using an interactive lecture and online discussion to guide students learning process. Two activity involve metacognitive reflection which aimed to help students construct their procedural knowledge about "how to identfy a research problem" and "how to write a statement of a research problem". The aims were to develop student research and writing skills specifically in identfying a research problem and writing the problem statement of the research.

3. Results

Findings from online questionnaire survey reflected the contribution of the intervention in developing the intended research skills. In term of confidence level in identifying a research problem, 76 % of the students reported that they are confidence and 14% very confidence. Meanwhile, 76% of the students reported that they are confidence and another 10% stated that they are very confidence in writing their problem statement.

The findings also showed that after the intervention, students are able to identify a research problem in education setting and able to identify important elements in writing a research problem. Feedback from online reflective questionnaire reflected their appreciation of the activities in the module. The students reported positive responses on the online discussion about the meaning and the examples of research problem in education setting. Several students mentioned that their understanding on the meaning of 'research problem' was facilitated by group discussion that provides a supportive learning environment.

Among responses from the students are:

"…The discussion board helps me to improve my understanding through my peers questioning and critic on my posting …"

"… other participants views help me to correct my perception and understanding …"

"…I learn through: ideas from other participants, synthesizing other peoples' ideas, compare and contrasting other peoples' ideas, analyzing other people's ideas… and improving my own ideas and conception…"

" among the impact of online discussion is: it involves deep processing as I read and make references before posting my ideas…

Data from students' online reflection showed that 92% of the respondents manage to discuss on how to identify a research problem in their area of specialization meanwhile, 84% of the respondents were able to list down the procedure (step by step) for writing the statement of the research problem. This achievement reflected the benefit of the metacognitive reflection activity in the intervention. In particular, students benefited from the practical exercises and the reflection metacognitive activities that make them aware of the cognitive procedure involved in implementing the task.

5. Discussion

Finding of the study supported the use of active learning to help students develop their research skills. The use of metacognitive strategies and online discussion provide useful platform for knowledge construction and skills development in the context of the study. Through metacognitive reflection activity, students were guide to be aware of the learning process and the cognitive procedure used in implementing the task. Consequently, they were able to come up with the effective procedure for future used. These findings are parallel with the notion of the benefit of metacognitive strategy in developing students study sills (Beyer, 1987; Zuber-Skerritt, 1987; Saemah et al, 2011a). In this context, students learn the procedural knowledge that can be used in planning and monitoring of the implementation of the cognitive task involved.

Through metacognitive reflection activity, students are guided to reflect on the procedure they used during the implementation of the activities. As suggested by Beyer (1997), the importance of metacognitive reflection activities is to help students aware of their own thinking process thus identifying the procedure or steps in implementing the task. The identification of these steps is useful for future use. The use of cognitive and metacognitive factors in these strategies is in accordance with suggestion from learner-centered psychological principles to support and improve students' learning (APA, 1997).

The used of online discussion provide a supportive environment for students to exchange of ideas and think deeply of the materials being discussed. Online discussion allows the students to reflect and engage in deep thinking compared to face-to- face discussion. This is because in this platform, students have more time to think and look for references before giving opinion in the online discussion (Saemah et al, 2011b). It means that this approach provides opportunities for deep processing of information thus promoting deeper understanding of the subject. It can be concluded that providing an active learning environment and appropriate intervention is necessary to help students develop the intended knowledge and skills. The use of active learning and deep processing with scaffolding that help students be aware of the process involved through metacognitive reflection activities benefited the students' learning process.

6. Conclusion

The aims of identifying a suitable intervention to develop postgraduate students' research skills through action research methodology have been achieved. It can be concluded that active learning strategies based on metacognitive strategies able to improve students' skills in planning, monitoring and evaluating the process of identifying a research problem and writing the problem statement of their research project. To sum up, at the postgraduate level, the intervention seems to be an effective medium to help students develop the intended research skills. It can be concluded that student centered learning play important roles in encouraging a deep learning thus facilitating students' development of knowledge and skills.

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