

DEVELOPMENT OF CRITICAL THINKING WITH METACOGNITIVE REGULATION

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ABSTRACT

In this research the author defines critical thinking as the set of skills and dispositions which enable one to solve problems logically and to attempt to reflect autonomously by means of Metacognitive regulation on one's own problem-solving processes. In order to develop their critical thinking, it is important for students to be able to use this rubric and assess themselves. The author focuses on providing Metacognitive regulation to help with self-assessment. Metacognitive regulation consist of two aspects: a critical thinking rubric as criterion and evidence of the problem-solving process. Comparison of achievement levels in the above critical thinking rubric, and content analysis of the reasons for a particular level of achievement in critical thinking, suggest that Metacognitive regulation with this critical thinking rubric as the criterion, and evidence of the problem-solving process, could enhance students' critical thinking ability.

KEYWORDS

Critical Thinking, Metacognitive regulation, Self-assessment, Critical thinking rubric, evidence of the problem-solving process

1. INTRODUCTION

The development of students' ability to work together to solve problems is an important factor in education. The ATCS21 (Assessing and Teaching 21st Century Skills) Project proposes ways of thinking; tools for working; ways of working; and ways of living in the world as the skills needed for the 21st century. According to ATCS21, critical thinking is one aspect of ways of thinking. A number of researchers such as Dewey (1910), Glaser (1941), and Ennis (1985) define critical thinking as reflective and logical thinking. The Association of American Colleges and Universities (AACU) defines critical thinking as a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.

In this research the author defines critical thinking as the set of skills and dispositions which enable one to solve problems logically and to attempt to reflect autonomously by means of Metacognitive regulation on one's own problem-solving processes. Metacognitive regulation is the regulation of cognition and learning experiences through a set of activities that help people control their learning (Flavell, 1979). AACU also provides a rubric known as a value rubric as a critical thinking assessment tool. In order to develop their critical thinking, it is important for students to be able to use this rubric and assess themselves.

The author focuses on providing Metacognitive regulation to help with self-assessment. The important thing is reflection based on evidence of the problem-solving process. The critical thinking rubric, while a useful criterion, is not in itself enough. Metacognitive regulation consist of two aspects: a critical thinking rubric as criterion and evidence of the problem-solving process. Metacognitive regulation with a critical thinking rubric as criterion and evidence of the problem-solving process would enhance students' critical thinking. The purpose of this study is to identify the effectiveness of such Metacognitive regulation.

2. METHOD

24 university students took part in the study. Cooperative problem-solving methods such as the knowledge-constructive jigsaw method were selected as materials. The research project consisted of the knowledge-constructive jigsaw method and Metacognitive regulation. In order to evaluate the results, the lesson was carried out twice.

2.1 Knowledge-Constructive Jigsaw Method

In the first term, students held a discussion on the subject of introducing non-Japanese workers into Japan. Four types of different information were provided separately: depopulation in Japanese society; disadvantages and difficulties of employing non-Japanese workers; an overseas case study; and trends among non-Japanese workers in selecting an employment destination. After reading these different types of information individually, the students discussed the following topic: “Should Japan bring in more foreign workers?”

2.2 Metacognitive Regulation

The entire discussion was audio- recorded and a lesson protocol was developed to be used in subsequent Metacognitive regulation and reflection. Several studies exist on critical thinking rubrics (Griffin, et.al 2012, Beyer 1985, Miyake 2014, VALUE project). On the basis of these studies, students were asked to carry out self-assessment using the following critical thinking rubric(Gotoh2006;2011)

- I pay attention to the information source (who wrote it).
- I pay attention to the information destination (who reads it).
- I pay attention to the information purpose (agenda).
- I assume information from an opposing point of view.
- I pay attention to information period (when it was produced).
- I pay attention to inconsistencies and missing information.
- I pay attention to gaps in the argument.
- If necessary, I reserve judgment.
- If necessary, I make a conditional judgment.

Self-assessment was carried out while listening to the audio recording of the discussion and reading the lesson protocol. Students were asked to self-assess their critical thinking ability on three levels: achieved, partly achieved, failed. They were also asked to note their reasons for assigning these levels.

In the second term, students discussed the introduction of English lessons in Japanese elementary schools. Four types of different information were provided: trends in elementary school English education overseas; parents' opinion; case study of an English learner; and relationship between language and culture.

Self-assessment was carried out using the above critical thinking rubric.

3. RESULT

3.1 Comparison of Achievement Levels in Critical Thinking Rubric

In order to compare achievement levels in the critical thinking rubric during the first and second terms, the following scores were awarded: achieved (3points), partly achieved (2points), failed (1point).

Figure 1 shows a comparison of achievement levels in the critical thinking rubric.

T-test (paired) results show a significant difference in eight items between the first and second terms. I pay attention to the information source (who wrote it), I pay attention to the information destination (who reads it), I pay attention to the information purpose (agenda), I assume information from an opposing point of view, I pay attention to information period (when it was produced), I pay attention to inconsistencies and missing information and I pay attention to gaps in the argument.

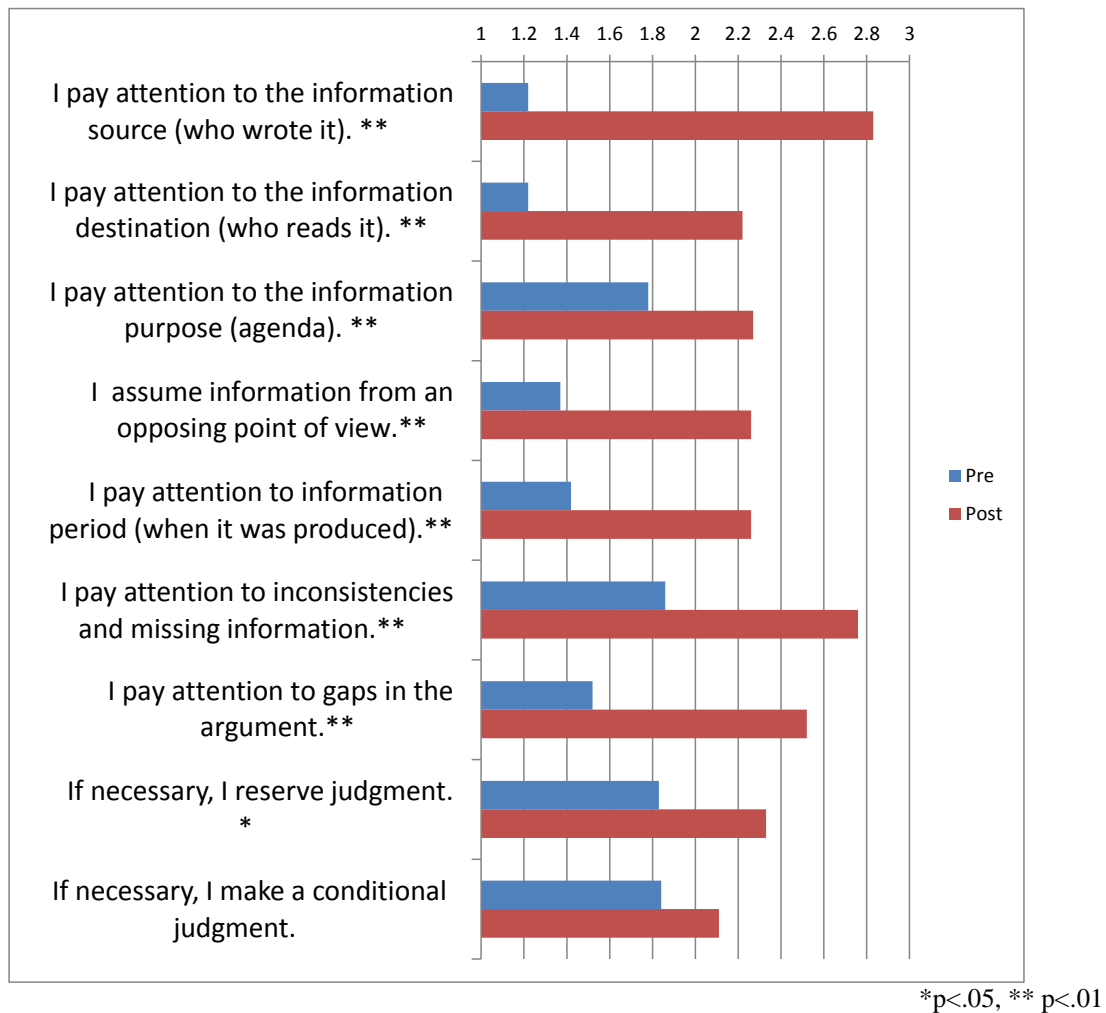


Figure 1. Comparison of Achievement Levels In Critical Thinking Rubric

3.2 Contents Analysis of Reasons for Different Levels of Achievement in Critical Thinking

In the first term, the reasons mentioned in self-assessment concerned a lack of awareness of critical thinking. Thanks to Metacognitive regulation, students realized that they do not pay attention to the reliability of information. Some students wrote “I trusted the information completely and was not suspicious about it.” I tried to make a judgment based only on the given information, and did not consider the information agenda.”

In the second term, the reasons for self-assessment concerned the fact that students had acquired critical thinking ability. Some students wrote “I paid attention to whether or not there was information other than the information I had obtained, and also to the agenda of the information.” “If necessary, I was able to reserve judgment.”

4. CONCLUSION

Comparison of achievement levels in the above critical thinking rubric, and content analysis of the reasons for a particular level of achievement in critical thinking, suggest that Metacognitive regulation with this critical thinking rubric as the criterion, and evidence of the problem-solving process, could enhance students' critical thinking ability. On the other hand, self-report isn't an objective assessment, and it's not clear whether the reporting is an accurate self-improvement assessment, or mere awareness with no change in meaningful behavior. It is important to compare students' performance with self-report. In future, differences among individuals will also be taken into consideration. In particular, the difference in the problem-solving process between those who have an aptitude for critical thinking and those who do not, is not yet known. Using a critical thinking disposition scale, the author intends to extract two types of students and compare problem-solving processes, Metacognitive regulation and reflection, and self-assessment, between these two types.

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