THE INVESTIGATION OF STUDENTS' METACOGNITION IN READING COMPREHENSION

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Abstract: The study aims to explore the metacognitive knowledge and regulation of students in senior high school. This study employed a case study design with 33 participants from a public senior high school in Bandung. The data that were obtained through questionnaire and interview. The findings showed that the students are aware of their cognition in reading process. Moreover, they also use all metacognitive regulation strategies in their reading activity although the frequency of metacognitive regulation usage varies. The students use comprehension monitoring the most in their reading activity. The finding also suggests that the least strategy used by the student is information management strategies (18% stated that they never regulate the information they read). The data from this study also show that there are differences of metacognition between high-, medium- and low-achiever students. The frequency of metacognitive regulation is higher in high- and medium-achiever students rather that low-achiever students. The low-achievers tend to focus on strategies when they face failure in comprehension while high- and medium-achievers maintain the use of strategies consistently from the planning stage before reading up to the evaluation stage after reading.

Keywords: Metacognition, Reading Strategies, Academic Reading, Reading Comprehension

Introduction

Reading is one of four language skills that expected to be acquired by students who learn English in school in Indonesia. The ability to read in English as a foreign language in Indonesia is fundamental for the students in secondary school. Reading skill is considered important because it will be the base for productive skills such as writing and speaking. As said by Brown (2001), reading activity will give the students model for them when they need to produce the language (in written or spoken text). That is why the students need to be skilful in reading to boost their ability in other language skills. Moreover, As Anderson (2003) has argued, the mastery of reading skill could help ESL/EFL learners achieve success not only in English learning but also in other content-based classes where English reading proficiency was required.

There are many factors that affect English reading proficiency as foreign

language such as learning motivation, social environment, prior experience, and reading strategies (Onovughe & Hannah, 2011). The use of reading strategies is regarded as being conducive to successful reading comprehension despite the complex nature of the reading process, which invokes both the L2 reader's language ability and reading ability (Alderson, 1984; cited in Zhang, 2009).

Onovughe and Hannah (2011) argue that certain strategies are used by students to repair comprehension failure, including reading slowly and carefully, controlling the reading rate, rereading, pausing to reflect on the reading, and reading text aloud. Many recent studies have shown that reading strategies and the awareness to use them become one of the most important factors that affect the readers' comprehension.

The awareness to use cognitive strategies in order to achieve comprehension is defined as metacognition. According to Flavell (1979), metacognition is an individual's knowledge about the cognitive processes and his or her ability to manage the use of those strategies to maximize their learning process.

In terms of reading, metacognitive awareness involves readers' knowledge of strategies for processing texts, the ability

to monitor comprehension, and the ability to adjust strategies as needed (Auerbach & Paxton; cited in Zhang & Wu, 2009). Anderson (2004) also states that metacognition in reading involve behaviors such as predicting, self-questioning, paraphrasing, summarizing, rereading to clarify meaning and retelling.

In the field of reading, metacognitive strategies are those activities that make students aware of their thinking as they do reading tasks. (Meniado, 2016). During the process of reading a text, metacognition is related to three factors: (a) reflection on the ongoing reading process (e.g., comprehension monitoring), (b) the strategic activities triggered by this reflection, and (c) the metacognitive knowledge base from which these activities are derived (Artelt and Schneider, 2015; cited in Ariani, 2015).

According to Baker and Brown (1987), some of the metacognitive skills involved in reading include clarifying the purpose of reading, focusing attention to important parts of the passage, monitor comprehension and taking actions when comprehension fails, and also continuously engaged in self-questioning to make sure that the purpose of reading and comprehension is achieved. In other words, the readers who are metacognitively aware will know what to

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do when they don't know what to do (Temur & Bahar, 2011).

According to the theory of metacognition proposed by many researchers in metacognition field (Flavell, 1979; Baker & Brown, 1984; Jacobs & Paris, 1987; Schraw & Dennison, 1994; Schraw & Moshman, 1995), the metacognition process is divided into two parts, which is metacognitive knowledge and metacognitive regulation.

- **Metacognitive Knowledge**

Metacognitive knowledge refers to what individuals know about themselves cognitively, about different strategies that can be used for learning and problem solving, and about the demands of a particular learning task. Knowledge of cognition refers to what individuals know about their own cognition or about cognition in general. It usually includes three different kinds of metacognitive awareness: declarative, procedural, and conditional knowledge (Baker, 1987). Declarative knowledge refers to knowing "about" things. Procedural knowledge refers to knowing "how" to do things. Conditional knowledge refers to knowing the "why" and "when" aspects of cognition.

- **Declarative Knowledge**

Declarative knowledge includes knowledge about oneself as a learner (What one recognizes about his or her strengths and weaknesses in learning) and about what factors influence one's performance. Declarative knowledge also includes individuals' conceptions, and also their beliefs of task structures, their cognitive goals, and their own personal abilities (Schraw, 1998).

- **Procedural Knowledge**

The procedural knowledge refers to knowledge about the execution of procedural things (Schraw & Moshman, 1995). It includes one's ability to choose strategy in learning.

- **Conditional Knowledge**

Conditional knowledge refers to knowing when and why to apply various cognitive actions (Schraw & Moshman, 1995).

- **Metacognitive Regulation**

While metacognitive knowledge is very consciousness-focused, metacognitive regulation is executive in nature, working on the basis of the metacognitive knowledge and referring to people's management of their cognitive processes to ensure realization of learning goals. This management involves planning, monitoring, evaluating, and

manipulating the cognitive processes to obtain optimal learning outcomes (Flavell, 1979; Veeman et al., 2006).

In short, metacognitive regulation of cognition refers to a set of activities that help learners control their learning (Schraw & Moshman, 1995). Metacognitive regulation are sequential processes that one uses to control cognitive activities, and to ensure that a cognitive goal (e.g., understanding a text) has been met. These processes help to regulate and oversee learning, and consist of planning and monitoring cognitive activities, as well as checking the outcomes of those activities (Brown, 1987).

In line with other researchers, Schraw and Dennison (1994) referred to the second component of metacognition as Regulation of cognition. They follow earlier models (e.g., Brown & Baker, 1987; Baker, 1989) to divide the category into five skills as follows: *Planning, Information management strategies, Comprehension monitoring, Debugging strategies* and *Evaluation*.

- **Planning**

    Planning involves the selection of appropriate strategies and the allocation of resources that affect performance. Planning involves "the selection of appropriate strategies and the allocation of resources that affect one's learning performance" (Schraw & Moshman, 1995, p. 354).

- **Monitoring**

    Monitoring refers to one's awareness of comprehension and task performance (Schraw & Moshman, 1995). This skill can be best conceptualized through the process of performing a specific task and how well it is controlled at regular intervals to check if the learning happens or not. According to Anderson, good language learners are able to recognize when they do not understand and stop to do something about it, which can be reflected from the monitoring of cognition.

    The monitoring process includes three categories which are information management strategies, comprehension monitoring and debugging strategies. The information management strategies included the skills and strategy sequences used to process information more efficiently (Schraw & Dennison, 1994). Meanwhile, comprehension monitoring includes the assessment of one's learning

or strategy use. The debugging strategies, on the other hand, are the strategies that are used to correct comprehension and performance errors (Schraw & Dennison, 1994).

- **Evaluation**

Evaluation refers to appraising the products and regulatory processes of one's learning. Evaluating skills may also include re-evaluating one's goals and conclusion upon the completion of a task. Good language learners must be able to evaluate the efficacy of what they are doing.

The significant role of metacognitive strategies awareness in reading comprehension has been widely acknowledged (Alexander & Jetton, 2000; Guthrie & Wigfield, 1999; Pressley, 2000; Sheorey & Mokhtari, 2001). The researchers state that metacognition, which includes strategic awareness and monitoring of the comprehension process on the part of the language learner, is a significant aspect of successful reading (Sheorey & Mokhtari, 2001).

Moreover, Pammu et al. (2013) assert that understanding learners' reading strategies also accounts for the improvement of proficiency in reading. As also stated by Sheorey and Mokhtari

(2001), in order to improve reading proficiency and to design reading development program we need to understand the learners' reading strategies.

Based on the facts, this study intended to investigate the metacognitive knowledge and regulation of the students in senior high school. It is considered important to be explored because as Macaro (2001; cited in Cahyono & Widiati, 2006) suggests, the teachers can be better in understanding the students' learning needs and adjust teaching procedures if they have more information about their students, in this case is their metacognition.

Moreover, this study intended to look at the differences of metacognitive strategy usage between the low-achiever, medium-achiever and high-achiever students. The main reason for the investigation is to observe which metacognitive skills are chosen by the three groups and whether there are some differences in the choice of the metacognitive strategies based on the students' achievement.

Methodology

To answer the research questions, this study adopted exploratory case study design which aims to capturing "things or people as they are, without trying to alter anything" (Zainal, 2007). Since this study aimed to describe the characteristics and condition of a certain group at a specific time and investigate the relationships of different variables, the descriptive data presentation method was used (Mitchel & Jolley, 2013).

The data were collected from interview and a questionnaire modified from Survey of Reading Strategies (SoRS) and Metacognitive Awareness Inventory (MAI).

One-phase triangulation was used in this research to obtain complementary of many data sources. One-phase design is the type of the triangulation, where the two types of data are collected in the same time frame, and are given equal weight. Typically, it involves the concurrent but separate collection and analysis of the two types of data, which are then merged, perhaps through data transformation, or perhaps at the interpretation-of-results stage (Creswell & Clark, 2007).

The research took place at one of the public high schools in Bandung. The research was held on English class. The participants of this study are 33 second-graders of senior high school. To gain data on the interview, the purposive sample was used. The researchers intentionally selected 15 participants from the site to cover the high-, medium- and low-achiever students, taken from their achievement in English subject. This sampling method is chosen in order to target those who can provide the best information to achieve the objective of the study (Creswell, 2003).

Data Presentation and Discussion

- **Students' Metacognitive Knowledge**

The findings and discussions are elaborated based on the two purposes formulated earlier. The thirty-three students that have filled the questionnaire were classified into three different group according to metacognition frequency, which are High, Medium and Low. The findings from the questionnaire suggest that the students are aware of metacognition in their reading. The result shows that 15% students are highly aware of their cognition and 73% of them have medium awareness of their cognition process in reading. However, there are still 15% of the respondents that is reported to have low metacognitive knowledge.

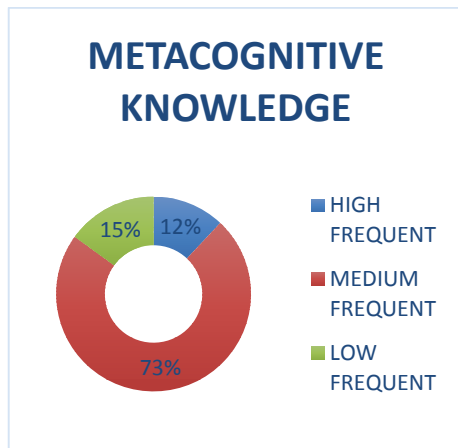Figure 1 represents the metacognitive knowledge of the students.

Figure 1 Metacognitive Knowledge of the Students

Overall, the declarative knowledge is the highest among the three metacognitive knowledge categories. Its shows that the students are able to predict their own abilities and aware of their own strengths and weaknesses in learning. However, the students are less knowledgeable of which strategies to use when reading. From the data, it can be seen that 21% of the respondents cannot choose which strategies to use in their reading process. This is due to the fact that reading strategies instruction in class is still low. Hence, the students only use the strategies that they know, which is very limited.

- **Students' Metacognitive Regulation**

Similar with the findings of the awareness of metacognition, the result of the questionnaire also shows that the students' regulation of their learning is also ranging from low to high, dominated by 70% of medium frequency users. As can be seen from figure 2, from 33 students, only 6% considered to have low frequency of metacognitive regulation.
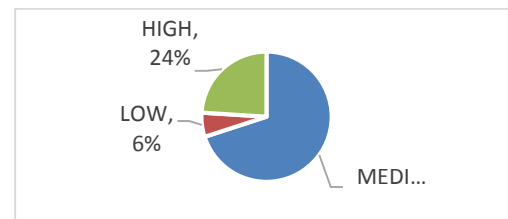

Figure 2 Students' Metacognitive Regulation

Before the students read, they reported that they use some planning to be more ready and focus to understand the text throughout (McNamara, 2007). Firstly, students admit that they set purpose in their mind before they begin reading. It means that they set the goal and end result of their reading. The next regulation item in the planning process that the students admit use the most (96%) is previewing the reading material, such as looking at the text structure, text length and the title of the text to help them activate their previous knowledge. The next metacognitive regulation process that the student use is information management strategies. This category involves 14 items, containing information strategies on how the students store and process information that they get from the

text more efficiently. However, the students show low frequent use in some of the items in this category. 12% students reported that they never take notes, underline or highlight information on the text. They also stated that they rarely use typographical features in the text to make them understand the text more. However, although overall result showed that the least used metacognition regulation is information management strategies, the most frequent use metacognitive regulation items are also from the information management strategies category, which are guessing the meaning of unknown words and phrases and slowing the reading pace when encounter important information, that almost reach 100% usage, meaning the students almost always use it every time they read. On the other hand, it is also proven that the least frequent used regulation is the part of information management strategies, *"I create my own examples to make information more meaningful"* which only used by 27 out of 33 students. The students admitted in the interview that they rarely make example on their own because they think the activity will take long time and slowing their reading pace.

Although the students rarely use strategies in managing information that they read from the text, it can be seen that the students are concern about their reading comprehension. This statement is confirmed by the fact that comprehension monitoring is one of the high-frequent use categories. The data on table 4.2 shows that the one of the highest frequent used students' metacognitive regulations is comprehension monitoring category with only 4% respondents that report that they never use the comprehension monitoring regulation in their reading process. In monitoring their comprehension, the students focus on the speed of their reading to maintain their comprehension of the material and they frequently stop in the middle of the reading process to check whether they have understood the text. Moreover, the students stated that they check their comprehension when they are faced with new information from the text and they also regularly ask themselves on how far they understand the material that they read.

The highest frequent metacognitive regulation is the next category, which is debugging strategies. Debugging strategies are the strategies that the students use to repair their failure in comprehension. The items in this category are considered to be highly-used by the students, due to the fact that 95% of the respondents use it in their reading. The finding is in line with Zhang's research

which proved that within the category of problem-solving strategies, 82% were reported of frequent usage, indicating that students were generally conscious of their comprehension process and were able to take actions when comprehension breaks down.

The last category on the metacognitive regulation is evaluation. The evaluation category includes students' evaluation of their reading process. Generally, the evaluation process of the students is not too high because 52% of them admit that they never summarize what they have read. However, they usually do reflection and also self-assessment of how good they have understood the text after reading.

- **Metacognitive Knowledge between High-, medium-, and Low-achiever Students**

High-, medium- and low-achievers show a very high awareness of metacognition (metacognitive knowledge). Almost all of the respondents have knowledge of metacognitive regulation strategies to be applied in their reading. However, the frequency from low-, medium- and high-achievers differs. According to the data, the high- and medium-achiever students' frequency of metacognitive knowledge is higher than

low-achiever students' knowledge of metacognition. The high-achievers and medium-achievers tend to be more aware of the learning strategies and when to use them in the reading process than the low-achievers do. This is similar with Sheorey & Mokhtari (2008) research that suggested a positive relationship that was established between reading ability and strategy use, proving that more proficient readers report greater use of strategies.

- **Metacognitive Regulation between High-, medium-, and Low-achiever Students**

The students from high-, medium- and low-achievers constantly use the metacognitive regulation in their reading process although the frequency between high-, medium- and low-achievers differ. The frequency of metacognitive regulation in high- and medium-achievers are higher that the low-achievers' metacognitive regulation. It can also be seen that the highest used metacognitive regulation by all group of achievements are debugging strategies, which is highest used by the medium-achiever students.

It can be seen that the high- and medium-achievers are using the regulation more frequently compared to low-achiever students. To understand the

differences more clearly, each regulation category usage will be explained.

The data shows that 100% students plan their reading. However, the frequency of their planning activity is higher in high-achievers and medium-achievers than in low-achievers. The high- and medium-achievers reported that 43% of them frequently do planning process in their reading like setting goal, previewing reading material and managing time to read. Meanwhile, only 23% respondents from low-achiever group that admit they plan their reading before beginning reading. 63% of the low-achievers reported that that rarely plan their reading process and usually start reading directly without any prior preparation.

From the information management strategies that contains 14 strategies on how the students manage the information on the text to make them comprehend the text more, it can also be seen how different the high-achievers, medium-achievers and low-achievers use the strategies. 60% students from low-achiever level stated that they never make their own example after reading the text and 20% others stated they rarely make example on their own, meanwhile 60% medium-achiever and high-achiever students reported that they always make their own example to

make information more meaningful. However, although the previous item shows a very huge differences in the information regulation, the students from high-achievement, medium-achievement and low-achievement level agreed that they always use pictures and tables in text to help them understand the text more. This is in line with statement from Cohen (1998), that state imaging helps readers form visual images on the content of the text at hand.

In monitoring their comprehension, the high-achievers seem to be more frequent checking their comprehension in the middle of reading the text. Moreover, they also look for strategies to use to maintain their comprehension, for example: adjusting reading pace, reading aloud, etc. Meanwhile, the low-achievers tend to monitor their comprehension less. This data is also in line with the interview data which shows that the low-achiever students rarely check their comprehension because they usually focus only on the part of the text that they understand. More specifically, the high-achiever students tend to choose the strategies depending on the material. Two respondents stated that they will check their comprehension in the middle of the text if the text is considered long, but if the text is short they will check comprehension at the end of their reading.

It is proven that the comprehension monitoring is very low in low-achiever students, based on the fact that 80% of the low-achievers admitted that they rarely monitor their comprehension. The result of the questionnaire is in line with the interview that revealed the students from low-achievers almost never monitor their comprehension during reading and they rather evaluate their comprehension after they read all of the materials.

Meanwhile, the students from medium-achievements are the highest users of comprehension monitoring, with 57% of them agreed that they constantly check their comprehension during the reading process.

Debugging strategies, the strategies that used the most by the students with high-achievement and low-achievement, is used similarly by both group.

However, 40% the students from low achiever group stated that they never change their reading strategy although they fail in comprehending the material. It is congruent with the student that stated that they never change strategy in reading. When asked *"Kamu suka ganti strategi ketika membaca?"* (Do you change your strategy during reading?) the student answered: *"Nggak. Sama aja semua strateginya kalau baca. Saya lihat yang*

bagian ngertinya aja." (No, I use the same strategy every time I read. I only read the part that I understand). It shows that the low-achiever students rarely look for other ways to comprehend the text. If the certain strategy they use fail, they do not try to look for other strategy to repair their failure. Instead, they move on and only focus on the things that they understand. This finding is in agreement with Zhang, (2013) who found out that the low proficiency students preferred not to use the strategies that took time to do. They might realize that they did not have much time to stop and think while doing the test within the time given.

On the evaluation category, performance and strategy effectiveness is analyzed after the reading. From the evaluation, it can be seen that the high-achievers and medium-achievers always try to summarize what they have read while the majority of the low-achievers rarely summarize what they read. This fact confirmed by the statements from interview where all of the high-achiever respondents admit that they summarize the material, at least on their mind. Meanwhile, because a lot of low-achievers do not comprehend the whole text, they do not usually summarize the material they read. After that, the high-achievers usually reflect on their strategies they use on

reading and think of a better way to comprehend the text even after they done reading. Meanwhile, low-achievers rarely do any reflection and review of the reading strategies. These findings were in line with Anderson's study (2002) which proven that the poor students did not evaluate the success or failure of strategy use.

Conclusions

This research intended to investigate the metacognition of the high school students in reading comprehension activity and analyze the different use of the metacognition between high-, medium- and low-achiever students.

After conducting questionnaire to 33 students and interview 15 students that includes 5 high-achievers, 5 medium-achievers and 5 low-achievers, the data analysis was conducted and conclusions are drawn.

Based on the questionnaire and interview result, the highest metacognitive knowledge of the students is the knowledge about their intellectual strengths and weaknesses. It means that when reading, the students are able to predict their comprehension level of the text and also able to identify what they can and cannot do. On the other hand, the

students are aware of their cognition during reading.

In regulating the reading process, the students showed high frequent use of comprehension monitoring category, which showed that almost all of them use the strategies in the reading process. Almost all items in these categories are used by the students in the reading process. In addition, the use of debugging strategies is also the highest among 5 categories of metacognitive regulation.

The least frequent used regulation is information management system. 18% of the students stated that they never make their own example to increase their understanding. 70% of the students said that they rarely see the organizational structure of the text to help them learn.

To answer the question about the differences of the metacognition among students of low-, medium- and high-achievement in their reading, it can be concluded that all of the respondents use the metacognitive regulation in their reading process constantly. However, the frequency of the regulation is higher in high- and medium-achiever students rather than in low-achiever students.

The high-achievers and medium-achievers tend to focus on all of the regulatory category. However, the students with low-achievement mostly

focus on debugging strategies and show lower level of comprehension monitoring. It means that the low-achievers usually look for strategies only when they are fail in comprehending the material, while the high-achievers and medium-achievers pay attention to their strategies throughout the reading process to maintain their comprehension

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