

Metacognitive Awareness for Ensuring Learning Outcomes among Higher Secondary School Students

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Abstract: *Metacognitive skills prepare students for lifelong learning and those skills are developed during childhood. Teens tend to have relatively strong Metacognitive abilities compared to young children. Just as teens are still developing cognitively, however, they are also continuing to experience Metacognitive developments. Developing Metacognitive Awareness is an important part of helping learners become more effective and, importantly, more autonomous. According to Flavell (1979), Metacognitive Awareness consists of both Metacognitive knowledge and Metacognitive regulation. The development of Metacognitive knowledge starts in kindergarten and continues to develop beyond adolescence over the entire lifespan (Alexander & Schwaneflugel, 1996; Artelt, Neuenhaus, Lingel, & Schneider, 2012; Baker, 1989; Hasselhorn, 2006; Schneider & Lockl, 2006) as long as educational processes continue to challenge the learner (Veenman et al., 2006). Aim of the present study was to determine the extent of Metacognitive Awareness among Higher Secondary School Students and to examine whether there exist any significant difference in the mean scores of Metacognitive Awareness based on Gender and Locale. In accordance with this purpose the investigator applied Metacognitive Awareness Inventory (Schraw & Dennison, 1994) to 100 Higher Secondary School Students (50 boys and 50 girls) in Malappuram district of Kerala. From the study, it was realized that the majority of the Higher Secondary School Students have an average level of Metacognitive Awareness. The mean scores of Metacognitive Awareness for girls is higher than that of boys and also shown that urban school students' mean scores of Metacognitive Awareness are higher than that of rural school students. The study reveals 13 percentage of students are with High Metacognitive Awareness, 76 percent of students with Average Metacognitive Awareness and 12 percentage of students having Less Metacognitive Awareness based on Gender and Locale. There is significant difference exist between the mean scores of Metacognitive Awareness based on Gender and Locale.*

Keywords: *Metacognition, Metacognitive Awareness, Metacognitive knowledge, Metacognitive regulation, Higher Secondary School Students.*

I. Introduction

Education allows us to discover ourselves, our environment and our world; and to make educated choices about our future. Educators can condition students to be thoughtful and reflective learners and knowledge seekers. In our classes, we want to close the gap between actual and projected abilities of students by supporting them become more aware of learning as a process, so that they know how specifically they are learning. This kind of 'thinking about thinking' is called Metacognition, or, as we like to phrase it, 'learning through engagement'. Metacognitive skills develop during childhood which prepare students for lifelong learning. Teens tend to have relatively strong Metacognitive abilities compared to young children. Just as teens are still developing cognitively, however, they are also continuing to experience Metacognitive developments. Developing Metacognitive Awareness is an important part of helping learners become more effective and, importantly, more autonomous. If learners are conscious of how they learn then they can identify the most effective ways of doing so. Metacognitive instruction empowers learners by giving them an understanding of how they think. Research shows that Metacognitive skills can be taught to students to improve their learning (Nietfeld & Shraw, 2002; Thiede, Anderson, & Therriault, 2003). Metacognitive practices increase students' abilities to transfer or adapt their learning to new contexts and tasks (Bransford, Brown, & Cocking; Palincsar & Brown, 1984; Scardamalia et al., 1984; Schoenfeld, 1991). Metacognitive practices help students become aware of their strengths and weaknesses as learners, writers, readers, test-takers, group members, etc. A key element is recognizing the limit of one's knowledge or ability and then figuring out how to expand that knowledge or extend the ability. Those who know their strengths and weaknesses in these areas will be more likely to actively monitor their learning strategies and resources and assess their readiness for particular tasks and performances (Bransford, et al, 1984). Metacognition plays an important role in communication, reading comprehension, language acquisition, social cognition, attention, self-control, memory, self-instruction, writing, problem solving, and personality development (Flavell, 1979). Metacognition allows people to take charge of their own

learning. It involves awareness of how they learn, an evaluation of their learning needs, generating strategies to meet these needs and then implementing the strategies. (Hacker, 2009).

II. Review Of Literature

Bigozzi & Vezzani (2005) investigated the effects of individual writing on Metacognitive Awareness concerning scientific concepts. They found that individual writing enhances the use of Metacognitive terms and the frequency of use regarding terms, which distinguish appearance from reality. Jagadeeswari & Chandrasekaran, (2013) explored the Metacognitive Awareness among Higher Secondary Students. The findings of the study reveals that the Metacognitive Awareness level among Higher Secondary Students was found to be high and there was significant difference in the Metacognitive Awareness based on their Gender and Type of School Management. Further it was found that there was no significant difference in the Metacognitive Awareness based on their Residential Locality and Family Income. Jayaprabha and Kanmani (2013) adopted a quasi-experimental design to study about “Metacognitive Awareness in Science Classroom of Higher Secondary Students” and they have noted that cooperative learning could be adopted regularly in classroom to enhance Metacognitive awareness of higher secondary students. Jaleel and Premachandran (2015) studied Metacognitive Awareness of Secondary School Students. Finding shows that there is no significant difference in the Metacognitive Awareness of secondary school students based on their locale, gender and type of management of the school.

Metacognition

Flavell (1979) coined the term, metacognition as a regulatory system that includes knowledge, experiences, goals and strategies. Metacognition is a broadly defined concept incorporating any knowledge or cognitive process that refers to, monitors or controls any aspect of cognition. Many psychologists and professional educators interpret the term metacognition in different ways and studied its importance in improving learning and performance outcomes.

Metacognitive Awareness

According to Flavell (1979), Metacognitive Awareness consists of both Metacognitive Knowledge and Metacognitive Regulation. Metacognitive knowledge is one’s knowledge of the cognitive process in relation to three variables that affect the outcomes of the cognitive enterprises, namely, person variable (beliefs about oneself or others as a cognitive processor), task variable (understanding of the nature and demand of tasks), and strategy variable (perceptions about strategies and strategy use that facilitate learning).

Elements Of Metacognitive Awareness

According to Flavell (1979), Metacognitive Awareness consists of both metacognitive knowledge and metacognitive regulation. Metacognitive knowledge is one’s knowledge of the cognitive process in relation to three variables that affect the outcomes of the cognitive enterprises, namely, person variable (beliefs about oneself or others as a cognitive processor), task variable (understanding of the nature and demand of tasks), and strategy variable (perceptions about strategies and strategy use that facilitate learning). Metacognitive knowledge refers to acquired knowledge about cognitive processes, knowledge that can be used to control cognitive processes. Research indicates that learners who are skilled in metacognitive self-awareness are more strategic and perform better than those who are unaware (Rivers 2001; Schraw & Dennison, 1994). Metacognitive knowledge about strategies means knowledge about effective methods of learning. According to Paris, Lipson, and Wixson (1983) the knowledge about different kinds of strategies can in turn be divided into declarative, procedural, and conditional strategy knowledge. Declarative strategy knowledge is the awareness of strategies, that is, the awareness that a certain strategy exists. Procedural knowledge describes how a strategy works effectively, and conditional knowledge helps to understand which strategies are useful for solving a certain task.

The development of metacognitive knowledge starts in kindergarten and continues to develop beyond adolescence over the entire lifespan (Alexander & Schwanenflugel, 1996; Artelt, Neuenhaus, Lingel, & Schneider, 2012; Baker, 1989; Hasselhorn, 2006; Schneider & Lockl, 2006) as long as educational processes continue to challenge the learner (Veenman et al., 2006). 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, 1987; Paris, 2002; Veenman et al., 2006). Researchers distinguish between metacognitive knowledge and metacognitive regulation (Flavell, 1979, 1987; Schraw & Dennison, 1994). Metacognitive knowledge refers to what individuals know about themselves as cognitive processors, about different approaches that can be used for learning and problem solving, and about the demands of a

particular learning task. Metacognitive regulation refers to adjustments individuals make to their processes to help control their learning, such as planning, information management strategies, comprehension monitoring, de-bugging strategies, and evaluation of progress and goals. Flavell (1979) further divides metacognitive knowledge into three categories:

- **Person variables:** What one recognizes about his or her strengths and weaknesses in learning and processing information.
- **Task variables:** What one knows or can figure out about the nature of a task and the processing demands required to complete the task—for example, knowledge that it will take more time to read, comprehend, and remember a technical article than it will a similar-length passage from a novel.
- **Strategy variables:** The strategies a person has “at the ready” to apply in a flexible way to successfully accomplish a task; for example, knowing how to activate prior knowledge before reading a technical article, using a glossary to look up unfamiliar words, or recognizing that sometimes one has to reread a paragraph several times before it makes sense.

III. Need And Significance

For all age groups, Metacognitive Awareness is crucial for efficient independent learning, because it fosters forethought and self-reflection. Good Metacognitive thinkers are so good intentional learners. The use of Metacognitive strategies ignites one's thinking and can lead to more profound learning and improved performance, especially among learners who are struggling (Swanson, 1990). Studies Shows the relationship between learning and Metacognition. That Pintrich (2002) asserts that “Students who know about the different kinds of strategies for learning, thinking, and problem solving will be more likely to use them” (p. 222), notice that the students must “know about” these strategies, not just practice them. As Zohar and David (2009) explain, there must be a “conscious meta-strategic level of Higher Order Thinking” (p. 179). Metacognitive practices help students become aware of their strengths and weaknesses as learners, writers, readers, test-takers, group members, etc. A key element is recognizing the limit of one's knowledge or ability and then figuring out how to expand that knowledge or extend the ability. Those who know their strengths and weaknesses in these areas will be more likely to “actively monitor their learning strategies and resources and assess their readiness for particular tasks and performances” (Bransford, Brown, & Cocking, p. 67). According to Flavell (1985), as individuals develop, they accumulate a great deal of knowledge as a result of life experiences. This knowledge can be thought of as “knowing that” knowledge, also referred to as *declarative knowledge* or “knowing how” knowledge, and referred to as *procedural knowledge*. One of the types of declarative knowledge that individuals acquire is knowledge about their own and others' cognitive processes, also known as Metacognitive Awareness. Flavell (1979) says that, as one's ability to understand, control, and manipulate his own cognitive process to maximize learning. The more students are aware of their thinking processes as they learn, the more they can control such matters as goals, dispositions, and attention. Self-awareness promotes self-regulation. If students are aware of how committed (or uncommitted) they are to reaching goals, of how strong (or weak) is their disposition to persist, and of how focused (or wandering) is their attention to a thinking or writing task, they can regulate their commitment, disposition, and attention (Marzano et al., 1988). Wang, Haertel, and Walberg (1990) revealed Metacognition to be a most powerful predictor of learning. Metacognition includes a critical awareness of (a) one's thinking and learning and (b) oneself as a thinker and learner. Initially researchers studied its development in young children (Baker & Brown, 1984; Flavell, 1985). Adolescent learning, however, is not merely about building on prior knowledge, getting students excited about a topic, reassuring them that they are capable of the work, or keeping them on-task (Perkins 1992; Sizer 1996).

Metacognition plays a critical role in successful learning, it is important to develop in students, and to do this teachers, parents and the students themselves should play their respective roles to develop the Metacognitive Awareness. Hence the present study was need of the hour and was chosen by the researcher especially for the higher secondary school students. Metacognitive Awareness would enable them to do well academically, decide career and achieve their future goals. It enables learners to successfully cope with new situations. It ensures positive academic outcomes for students.

IV. Variable Selected For The Study

The criterion variable selected for the study was Metacognitive Awareness of Higher Secondary School Students. Classificatory variables used for the study were Gender and Locale.

V. Objectives Of The Study

Objectives of the present study are:

- To study the extent of Metacognitive Awareness among Higher Secondary School Students for the total sample and relevant subsamples based on Gender and Locale.

- To study whether there exists significant difference between mean scores of Metacognitive Awareness of Higher Secondary School Students based on Gender and Locale.
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VI. Hypothesis Of The Study

The study was designed to test the following hypotheses:

- There will be significant difference between the mean scores of Metacognitive Awareness among Higher Secondary School Students based on Gender and Locale.

VII. Methodology

Methodology of the present investigation is as follows.

Sample for the Study

The present study follows survey as design. The study was conducted on a sample of 100 Higher Secondary School Students in Malappuram District of Kerala. Out of these 50 are Boys and 50 are Girls. The Sample was selected by using Stratified Random Sampling technique giving due representation to Gender and Locale.

Tool Used for the Study

For the present study the investigator adopted the Metacognitive Awareness Inventory (Schraw & Dennison ,1994)) and used. The inventory consists of 52 items under two major Dimensions of Metacognitive Awareness i.e., Knowledge about Cognition and Regulation of cognition. Knowledge about Cognition includes Declarative Knowledge, Procedural Knowledge, Content Knowledge and Regulation of cognition. Regulation of cognition includes Information Management Strategies, Debugging Strategies, Planning, Comprehension Monitoring and Evaluation. In the Inventory, each statement have two options 'true' or 'false' in which the participants were asked to tick in appropriate box.

Statistical Technique Used for Analysis

For the present study the investigator determined the extent of Metacognitive Awareness based on the mean difference analysis is used to test the significant difference between the mean scores of Metacognitive Awareness for the classificatory variable Gender and Locale. Percentage analysis is also used to determine the level of Metacognitive Awareness among higher secondary school students.

VIII. Results And Discussion

The analysis of the study lead to the following findings. Summary of Mean Difference Analysis and extent of the Metaconitive Awareness of higher secondary school students are summarized and discussed in this section.

Percentage Analysis

As per the objective of the study the classification of the sample into High Metacognitive Awareness (HMA) group, Average Metacognitive Awareness (AMA) group, Low Metacognitive Awareness (LMA) group were done on the basis of conventional procedure of σ distance from the mean. Students with a score of mean $+\sigma$ and above were treated as students with High Metacognitive Awareness group, those with scores of mean $-\sigma$ and below were treated as students with Low Metacognitive Awareness group and those having scores in between mean $\pm \sigma$ and mean were came under Average Metacognitive Awareness group. Percentage Analysis is used to find out the percentage of students under the above three groups. The data and results are shown in TABLE 1.

Table 1: data and Results of Percentage of Students in Three Levels of Metacognitive Awareness.

| Variable | Level | Number of students | percentage |
|-------------------------|---------|--------------------|------------|
| Metacognitive Awareness | High | 13 | 13 % |
| | Average | 71 | 71 % |
| | Low | 16 | 16 % |

Table 1 reveals that out of 100 higher secondary school students, 13 students (13 percentage) have High Metacognitive Awareness, 71 students (71 percentage) have Average Metacognitive Awareness and 16 students (16 percentage) have Low Metacognitive Awareness.

Mean Difference Analysis

Results of Mean Difference Analysis of Metacognitive Awareness of Higher Secondary School Students based on subsample Gender is presented in TABLE 2.

Table 2: Comparison of Mean Scores of Metacognitive Awareness of Higher Secondary School Students between Boys and Girls

| SI. No. | Category | N | Mean | Standard Deviation | t-value | Level of significance |
|---------|----------|----|-------|--------------------|---------|-----------------------|
| 1. | Boys | 50 | 27.68 | 1.55 | -19.988 | 0.01 |
| 2. | Girls | 50 | 36.14 | 2.55 | | |

Table 2 indicates that the mean scores of Metacognitive Awareness obtained for Boys and Girls Higher Secondary School Students are 27.68 and 36.14 respectively. Here the calculated value of 't' is 19.98 which is above the table value set for significance at 0.01 level. Since the calculated value of 't' is greater than table value it can be inferred that there exist a significant difference in the Metacognitive Awareness between Boys and Girls students .

Results of Mean Difference Analysis of Metacognitive Awareness of Higher Secondary School Students based on subsample Locale is presented in TABLE 3.

Table 3: Comparison of Mean Scores of Metacognitive Awareness among Higher Secondary School Students between Urban and Rural.

| SI. No | Category | N | Mean | Standard Deviation | t-value | Level of significance |
|--------|----------|----|-------|--------------------|---------|-----------------------|
| 1. | Urban | 50 | 36.14 | 2.55 | -19.988 | 0.01 |
| 2. | Rural | 50 | 27.68 | 1.55 | | |

Table 3 shows that the mean scores of Metacognitive Awareness obtained for Urban and Rural Higher Secondary School Students are 36.14 and 27.68 respectively. Here the calculated value of 't' is 19.98 which is greater than table value set for 0.01 level of significance. Since the calculated value of 't' is higher than the table value it can be inferred that there exist a significant difference in the Metacognitive Awareness between Urban and Rural Higher Secondary School students .

IX. Major Findings

Result of the present study indicates that most of the Higher Secondary School Students in Malappuram district of Kerala having an average level of Metacognitive Awareness. 13 percentage of students are with High Metacognitive Awareness, 76 percent of students with Average Metacognitive Awareness and 12 percentage of students having Low Metacognitive Awareness. It is revealed that there exist significant difference between mean scores of Metacognitive Awareness based on Gender and Locale. Findings also revealed that there exists significant difference between mean scores of urban and rural of higher secondary school students.

X. Conclusion And Suggestion

Metacognitive Awareness is very important in adolescent learning. This can be developed in oneself. Students, who are aware of their own cognitions or thoughts processes, will be more responsible of their own learning processes. That is, they are able to direct their learning in the proper ways to build understanding. They know when to use strategies and how to use them. Teachers should also place more attention on the empowerment of higher secondary school students' Metacognitive Awareness through the implementation of appropriate learning strategies, because the contributions of Metacognitive Awareness facilitate students' academic success. If learners are conscious of how they learn then they can identify the most effective ways of doing so. Teacher must include relevant Metacognitive and support activities by considering students' differences in skills, thought and preferences. It enables students to be more mindful of what they are doing (or learning) and why, and of how the skills they are learning might be used differently in different situations. One of the most effective and easiest ways to develop Metacognitive Awareness is simply talking with learners about how they do things in the classroom. Teacher should provide innovative teaching methods and learning activities that arouse and develop the Metacognitive Awareness level of students.

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