Meta Cognition and Learning Styles: A Need for Academic Achievement

Adam Paul. Patteti,
Principal, MANUU, CTE, Nuh (Mewat), Haryana, India

Abstract

Metacognition is thinking about thinking, knowing "what we know and what we do not know." It is about management of the thinking .the Metacognitive strategies are 1.Connecting new information to former knowledge.2.Selecting thinking strategies deliberately 3. Planning, monitoring and evaluating thinking process.
Objectives of the Study: (a) To study the relation between Meta cognitive awareness and learning style. (b) To study the relation between Meta cognitive awareness and academic achievement. **Methodology of the Study:** A descriptive, correlation research design will be used to study the objectives that examine relation between Metacognitive awareness and selected variables learning styles and academic achievement. The findings regarding relation between Metacognition and academic achievement may motivate them to develop and use Metacognition skills and strategies in education contexts. This would help in promoting self regulated learning and academic competency of the student.

Relevance of the study. Educators acknowledge that there are individual difference learning methods of students and such differences in learning methods are referred to as learning styles.

KEYWORDS: Metacognitive Awareness, Learning Styles, Academic Achievement, Secondary School Students.

Introduction

Meta-cognition is thinking about thinking, knowing "what we know and what we do not know "It is about management of the thinking." The meta-cognitive strategies are: 1. Connecting new information to former knowledge 2. Selecting thinking strategies deliberately and 3. Planning, monitoring and evaluating thinking process. Meta-cognition is an individual's knowledge of their own cognitive processes and their ability to control these processes by organizing, monitoring and modifying them as a function of learning. It refers to the ability to reflect upon the task demand and independently select and employ the appropriate reading, writing, math or learning strategy.
Meta-cognition is an important aspect of student learning. It involves self regulation, reflection upon an individual's performance strengths, weaknesses, learning and study strategies. Meta-cognition is the foundation upon which students become independent readers and writers. It also underlies student's abilities to generalize math problem solving strategies.
Educators acknowledge that there are individual difference learning methods of students and such differences in learning methods are referred to as learning styles. (Garg, 2011).
Learning styles are based on the assumption that different individuals receive, perceive and process information in different ways (Felder and Silverman, 1988).
Felder (1993) poses the following four questions and derived answers represent the four dimensions of the F-SLS model.

- **Perception**: what type of information does the student preferentially perceive? Sensory or Intuitive.
- **Input or receiving**: Through which mode does student most effectively receive external information? Visual or Verbal
- **Processing**: How does student prefer to process information? Actively or Reflectively
- **Understanding**: How does the student progress toward understanding? Sequentially or Globally.

The FSLSM describes the learner on these four dimensions: Sensing –Intuitive, Active –Reflective, Visual –Verbal, Sequential -Global. No learning style should be considered as preferable or superior to another. Each learning style has its own unique strength and weakness (Fedler & Brent, 2005). The preferences within a dimension are descriptive. Further learning styles seem to be less fixed, changeable and are influenced by external factors such as the context, course, times and experiences. (Felder and Silverman, 1988).

Learning does not take place in void, and neither does Meta-cognition. We need to know a lot more about how individual differences and contextual factors interact with Meta-cognition and its various components. (Veenmen, et.al. 2006). Stemberg (1998) also pointed out that Meta-cognition interacts with many other aspects of the student: abilities, personality, learning styles and so on. Further, Veenman, et.al., (2006) pointed out that Meta-cognition need not be studies in isolation, instead its relation with other individual differences need to be investigated.

Studies on Meta-cognition and learning Styles

Phakiti (2003) investigated the relationship of cognitive and meta-cognitive strategy. Rysz (2004) provided evidence of meta-cognitive awareness and self monitoring were letter able to report on understanding probability and statistics concepts. Bigozzi and vezzoni (2005) investigated the effects of individual writing on meta-cognitive awareness concerning scientific concepts.

Mason and Nadalan (2005) found that overall students meta-cognitive competence in significantly corrected with their achievement in subjects. Coutinho (2006) concluded that students with good Meta-cognition land to be successful students.

The present study is a correlation study between meta-cognitive awareness and selected variables such as leading styles, academic achievement in meta-cognitive awareness.

Objectives of the study

1. To study the relation between Meta cognitive awareness and learning style.
2. To study the relation between Meta cognitive awareness and academic achievement

Hypothesis :

1. There is no significant correlation between meta-cognitive awareness and learning styles in the students under study.
2. There is no significant correlation between meta-cognitive awareness and academic achievements in 10th class students of Mewat district of Haryana

Methodology

A descriptive, correlation research design will be used to study the objectives that examine relation between meta-cognitive awareness and selected variables learning styles and academic achievement.

Simple random technique will be used for selecting **s**ample. Sample consists of 300 tenth class students enrolled in English medium schools affiliated to Haryana Board and CBSE during the study period in Mewat district of Haryana.

Tools used for the study

Meta-cognitive Awareness Inventory (MAI), Index of learning styles will be used to measure the variables. Pearson's product moment correlation coefficient will be used to test correlations of meta-cognitive awareness with learning styles and academic achievement. On the basis of the findings the conclusions of the will be drawn.

Analysis of data

Objective 1: To study the relation between Meta cognitive awareness and learning style

There is no significant correlation between meta-cognitive awareness and learning styles in the students under study

Table 1: Correlation between Learning Styles and Meta-cognitive Awareness

Learning style	Knowledge about cognition	Regulation of Cognition	Meta-cognition Awareness
Active	0.035	0.086	0.073
Reflective	-0.035	-0.086	-0.073
Sensation	-0.004	-0.046	0.031
Intuitive	0.004	0.046	-0.031
Visual	0.151**	0.141**	0.154**
Verbal	-0.151**	-0.141**	-0.154**
Sequential	0.062	0.091	0.087
Global	-0.062	-0.091	-0.087

*** Correlation significant at 0.1 level*

Observation and Interpretation

Obtained correlation values are given in Table 1 and these values indicate that Visual learning style is positively correlated (r=0.154) with meta-cognitive awareness and its components. These correlations were also found to be statistically significant. All other dimensions of learning styles, i.e., active-reflective, sensing intuitive and sequential-global learning styles were observed to have negligible and insignificant correlation with meta-cognitive awareness and components. These results indicate the visual-verbal dimensions of learning style may have a contributory role than dimensions of learning style in Meta-cognitive Awareness.

Previous studies have shown that verbal style is associated with left brain orientation and visual learning style is associated with right brain orientation. In the light of these observations we can speculate that visual learning style and right – brain orientation are positively associated with Meta-cognition. This also means the verbal learning and left brain orientation are negatively associated with Meta-cognition. This observation can be taken to support the view of the facilitative role of right brain thinking in creativity and emotional intelligence. The table 1 show that, out of eight learning styles studied, correlations are significant for only two learning styles (visual and verbal). It means visual learning styles has more contributory role in Meta-cognitive Awareness than verbal learning style.

Thus, null hypothesis-1 stated as there is no correlation between meta-cognitive awareness and learning styles in standard ten students is almost accepted.

Discussion

The reason for the findings may be that the learning styles in it are very crucial in context with the content of curriculum and the students enrolled. It may differ

according to the context. For example Mokhtar (2001) found that the student's learning styles differed with the study groups. Analysis of the study showed that the males were more auditory and visual learning styles than auditory and visual learning styles than auditory and tactile than the boarding school students and boarding school students were more visual. Low correlation was observed between meta cognitive awareness and learning style. In the present study too there is no correlation observed between major dimensions of learning styles inventory.

Fox (2000) explored the learning habits and styles of a group of Samoan learners or English who have moved beyond formal primary and secondary schooling and are required to use English for both general communication and academic purposed. The finding denoted the "student did not by and large develop Meta-cognitive awareness though they did have the same". The students showed a preference for a single sensing/ thinking learning style. The researcher concludes that the results obtained are influenced by social and cultural settings. The present study also does not show any correlation with meta-cognitive awareness and learning styles.

Learning styles have gone through much discussion and controversy. Menaker and Coleman (2007) in the review Learning style: Where is empirical evidence", says that there is lack of empirical evidence on learning styles and there is no single theory which unites the LS. Further they suggests "While it is likely that learners differ in many ways, there is question as to whether these style differences are stable across all situations or whether they vary according to task and environment; and how or if addressing these styles has an impact on learning", Manaler and Coleman's observation require to be considered.

Felder and Spurlin (2005) conclude the learning styles (LS) reflect preference and tendencies or students; they are not infallible indicators of strengths or weakness in either the preferred or the less preferred categories of a dimension. LS has two applications 1) to provide guidance to instructors on diversity of learning style within their classes and o help them design instruction that addresses the learning needs of all their students. 2) to give individual students insights into their possible learning strengths and weaknesses.

Objective 2: To study the relation between meta-cognitive awareness and academic achievement.

Null Hypothesis 2: There is no significant correlation between meta-cognitive awareness as measured by Meta-cognitive Awareness Inventory and Academic achievement as measured by cumulative percentage of marks (P) obtained in 9th standard annual examination.

Table 2: Correlation between Academic Achievement and Meta-cognitive Awareness

	Knowledge about cognition	Regulation of cognition	Meta-cognitive Awareness
Academic Achievement	0.185**	0.261**	0.251**

Observation and Interpretation

The result depicted in table 2 indicates that there are positive correlation between academic achievement and Meta-cognitive Awareness and its components. These correlations were found to be statistically significant.

Academic Achievement shows a little more degree of correlation with Meta-cognitive Awareness and Regulation Cognition and least with Knowledge about Cognition.

These results indicate that students with high and low academic achievement are respectively having high and low levels of Meta-cognitive Awareness. These results led us to reject the null hypotheses that there would be no significant correlation between scores obtained on Meta-cognitive Awareness and academic achievement of class ten students.

Observation and Interpretation:

There is positive correlation observed between academic achievement and meta-cognitive awareness. Academic achievement shows high correlation with meta-cognition, and its subcomponents. Based on the results, the null hypothesis 2 is accepted.

Discussion

Meta cognition is not equated with learning or development but it is the conscious and deliberate regulation of learning and development (Papaleontiou-Louca, 2003). Further it is a concept essential for successful learning because it helps the individual to manage their cognitive skills (Schraw and Dennison 1994, Schraw 1998) and it is necessary "for concepts of every day reasoning and those assessing scientific thinking and social interactions (Scheneider 2008). Metacognitive mechanism can help in mastering a new body of text material (Nelson and Narens 1994) and thus assist in the performance of a student which is normally reported as the academic achievement.

Research studies have shown that there is positive between academic achievement and meta-cognitive awareness. For example Rahaman, et al. (2010) in his study has reported that "highly meta-cognitive aware science students performed well on the class test". A positive correlation between Meta-cognition and academic achievement has also been reported by Landline and Stewart, (1998); Young and Fry, (2008); Mevarech, and Amrany, (2008); Kusumoto, (2009); Dixit (2011); Shokrpour, Zareli, Zahedi and Rgatbakshi, (2011).

In the revised taxonomy of learning four general knowledge categories are: Factual, Conceptual, Procedural, and meta-cognitive (Marzano, 2001). The new addition is meta-cognitive knowledge. This can be represented by categories such as students' knowledge of general strategies for learning and thinking, their knowledge of cognitive task as well as when and why to use these different strategies and the knowledge of self in relation to cognitive and motivational components of performance. These strategies can be used across subject domains and in varying situations such as complex cognitive processes. And students can use them to plan, monitor and regulate their learning and thinking (Pintrich, 2002).

Conclusion

There is no correlation between meta-cognitive awareness and learning styles in standard ten students. There are positive correlation between academic achievement and Meta-cognitive Awareness and its components. The findings regarding relation between Meta-cognition and academic achievement may motivate them to develop and use Meta-cognition skills and strategies in education contexts. This would help in promoting self regulated learning and academic competency of the student.

Recommendations

The findings and the limitations of the research gives certain directions that future research is recommended on the following lines:

- The present study was conducted on class tenth students. A replication of the across grade will be more helpful in understanding of Meta-cognition especially in India.
- More aspects of Meta-cognitive Awareness such as monitoring and evaluation can also be investigated especially with respect to gender differences.
- The comparison between various educational streams or specialized subjects can also give better insight about the meta-cognitive knowledge and regulation patterns possessed by the students.

REFERENCES

Ali, R.M. & Kor, K.L. (2007) Association between Hemisphericity, Learning Styles and Mathematics, *Science & Technology Education*, 3(2), 127-131.

Dixit, M.N. (2011) Readiness towards the use of Meta-cognition and its relationship with academic achievement of higher secondary schools. *SPIJE* (1). Doi: 1037/0022-3514.90.2.334

Felder, R.M., & Silverman, L.K.(1988). Learning and Teaching Styles in Engineering Education, *Engineering Education*, 78(7), 674-681. retrieved from http://www.ncsu.edu/felderpublic/ Papers/LS-1988.pdf.

Garg, Mamta (2011) "Peeping into the learning world of secondary Teacher Trainees: Can their Academic success be Predicted?, *Australian Journal of Teacher Education.* Vol.36:Iss.12, Article 8. retrieved from http://ro.ecu.au/ajte/vol36/iss12/8

Lai, E.R. (2011) Meta-cognitive: A literature review. *Research Reports*, (April). Pearson Education, Inc.

Mc Cabe,J.(2010). Meta-cognitive Awareness of learning strategies in undergraduates Published online. *Springer* DOI 10.3758/s13421-010-0035-2