

Exploring the Influence of Metacognition and Metaemotion Strategies on the Outcome of Students of IX Std.

Dr. P. Srinivasan*, M.A. Maria Pushpam

Department of Education and management, Tamil University, Thanjavur, India

*Corresponding author: seenuthilaka@gmail.com

Abstract The study examined the influence of metacognition and metaemotion strategies on the outcome of students of class IX. The participants were 80 IX Std. students from Matriculation Schools in Madurai city of Tamil Nadu. Experimental design was followed for the research with 40 students in experimental group and 40 students in Control group. The sample was selected through purposive sampling technique. The level of metacognition and metaemotion were measured through metacognition assessment scale and metaemotion assessment scale. The outcome of the students were measured through Student Outcome test constructed and standardised by the investigators. The results of the study showed that metacognition and metaemotion strategies influence the outcome of students of class IX positively.

Keywords: *metacognition, metaemotion, strategies, metacognition strategies, metaemotion strategies, students outcome*

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1. Introduction

Knowing is one fundamental faculty of a human person. The distinguishing mark of a human being is to be able to know about one's knowing. Emotion is a basic fabric of human existence. Therefore this study explores an interesting and growing field in educational psychology dealing with 'thinking about thinking' and 'feeling about feeling'. Thus come the terms 'metacognition' and 'metaemotion'. The present study deals with finding out the influence of metacognition and metaemotion strategies on student's outcome.

2. Metacognition

The word 'cognition' derives its meaning from the Latin root, *cognoscere* (con: together; *gnoscere*: to know). It means 'to conceptualise' or 'to recognise'. The prefix 'meta' can mean 'after', 'beyond', 'changed', 'higher' or 'alter' [4]. Metacognition, thus should refer to knowing beyond knowing. In other words, it means thinking about thinking or knowing about knowing. The term, Metacognition, was originally introduced by Flavell (1979). It refers to 'the individual's own awareness and consideration of his or her cognitive processes and strategies' [7].

The following are other definitions of metacognition:

"The knowledge and control children have over their own thinking and learning activities" as given by Cross and Paris (1988) [3].

Kuhn and Dean (2004) defined metacognition as an "Awareness and management of one's own thought" [9]

Martinez (2006) described it as "The monitoring and control of thought" [10].

3. Metaemotion

The word 'Emotion' comes from the Latin verb *emouvere* (*ex* 'out' and *mouvere* 'to move', meaning 'to move out, remove, agitate' [5]. So it follows that metaemotion refers to feelings about feelings; it is the set of secondary emotions that follow the primary emotion. This concept was first introduced by Gottman, Katz and Hooven (1996) in family therapy research [8]. They claimed that parents differ with respect to the way they feel and think about their own and their children's emotions, which in turn affects the way they approach emotions in everyday life [11]. Thus it refers to one's emotions about one's emotional experience or others' emotional experience.

Metaemotion refers to the idea that when an emotion is elicited, secondary emotions follow based on how the primary emotion is perceived or experienced.

Following are some of the other definitions of metaemotion:

Mitmansgruber and Beck (2009) defined metaemotion as “Emotional reactions about one’s ‘emotional self’ [12].

Bartsch, Appel & Storch (2010) described it as “Emotions that have other emotions as their appraisal object.” [1].

4. Strategies

A Strategy according to Oxford Dictionary is understood as, “a plan of action designed to achieve a long-term or overall aim.” Chamot, 2004 refers to Learning strategies as the conscious thoughts and actions that learners take in order to achieve a learning goal [2]. Therefore, as described by O’Malley and Chamot (1987), metacognition strategies are those that involve executive processes in planning for learning, monitoring one’s comprehension and production, and evaluating how well one has achieved a learning objective. [13].

The components of metacognition as given by O’Malley and Chamot are

- Planning
- Monitoring
- Evaluating

The components of metaemotion according to Wong Ming Yan (2010) include

- Awareness
- Acceptability
- Communication
- Causality
- Manipulation
- Coaching [14].

5. Student Outcome

A Student Learning Outcome (SLO) is defined as: particular levels of knowledge, skills, and abilities that a student has attained at the end (or as a result) of his/her engagement in a particular set of collegiate experiences [6]. With reference to Bloom’s Taxonomy, the three domains of cognitive, affective and psychomotor are used to measure the learning outcome of students.

6. Need and Significance of the Study

The growing trend in Educational Philosophy focuses more on the learning aspect and is appreciative of students who have acquired a good percentage of information, knowledge and understanding. But it is universally accepted that the acquisition of factual data is not an end in itself but that an individual who has received instruction, should show evidence of having understood it. Education is to bring out the best in a person. Therefore much focus is laid on the integral development of the person. While everyone is striving for academic success, importance has to be given to grow in the field of interest and thus apply learnt knowledge to practical situations. Most of the students should be able to think about their own thinking and the significant processes that influence their learning. Thus there is a dire need for students to acquire metacognition skills and apply them to their everyday life circumstances and in their learning.

Humans are emotional beings and life is essentially a relationship between a living organism and its surroundings. The teacher relates with the students, expresses a number of emotions and students in turn display an array of positive and negative emotions. The truth about emotions is that if one doesn’t express oneself in a responsible manner, he/she will find a way to express usually in an irresponsible way. Positive and negative emotions like joy, wonder, anger, fear, resentment, guilt, sadness and such feelings are all alright. There is nothing right or wrong about having those feelings. It’s how these are expressed that matters. A person who becomes skilled in monitoring, directing, manipulating and coaching his own and other’s emotions may acquire a well adjusted and pleasing personality.

Students need to be trained to have control over their thoughts and feelings and not be simply led by the wind. The period of adolescence is specially the time of rapid growth and development of the human person. And for the present study, students of IX std. are chosen as the target group. Since it is one of the most important transitional period from childhood to adolescence and the students too would appear for their public exams the next year. Hence positive outcome for this group is much imperative. Therefore the investigator would like to analyse to see if the use of meta-cognitive and meta-emotion strategies can have any influence on the outcome of the students for their good academic achievement and holistic growth.

Hence the present study is entitled as “Influence of Metacognition and Metaemotion strategies on the Outcome of Students of IX std..”

7. Hypotheses of the Study

The hypotheses of the study are as follows.

- The metacognition of IX std. students is high.
- The metaemotion of IX std. students is high.
- The Student Outcome of IX std. students is high.
- There is no significant difference between pre-test and post-test mean scores on the following variables of IX std. students of control group.
 - Metacognition
 - Metaemotion
 - Student Outcome
- There is no significant difference between pre-test and progressive test mean scores on the following variables of IX std. students of experimental group.
 - Metacognition
 - Metaemotion
- There is no significant difference between progressive test and post-test mean scores on the following variables of IX std. students of experimental group.
 - Metacognition
 - Metaemotion
- There is no significant difference between pre-test and post-test mean scores on the following variables of IX std. students of experimental group.
 - Metacognition
 - Metaemotion

- Student Outcome
- There is no significant difference between control group and experimental group in the post-test mean scores on the following variables of IX std. students.
 - Metacognition
 - Metaemotion
 - Student Outcome
- There is no differential effect of metacognition and metaemotion on the student outcome of IX std. students of experimental group.
- There is no significant correlation between the combined mean scores of metacognition and metaemotion and the mean score of student outcome of IX std. students of experimental group.
- There is no significant difference between male and female students in the combined mean scores of metacognition and metaemotion of IX std. students of experimental group.
- There is no significant difference between male and female students in the mean score of student outcome of IX std. students of experimental group.

8. Method

Experimental design was used for the present study in order to test the hypotheses. Equal number of students were chosen both in experimental group and control group. The two groups were pre tested and post tested on student outcome, metacognition assessment scale and metaemotion assessment scale. Additionally, the experimental group had progressive testing on both metacognition assessment scale and metaemotion assessment scale. The experimental group was treated with metacognition and metaemotion strategies whereas the control group was not given any treatment.

9. Sample

The investigator conducted the present study on a sample of 80 students of std. IX in the city of Madurai. 40 students from De Nobili Matriculation School, K.Pudur, Madurai, Tamil Nadu, South India formed the experimental group. 40 students from Seventh Day Adventist Matriculation School, Surya Nagar, Madurai, Tamil Nadu, South India formed the control group for the study. Purposive sampling technique was used in selecting the sample for the study.

10. Tools

Following are the tools used for the study:

- Students' Outcome test Part – I and II constructed and standardized by the Supervisor and Scholar. The final test was segregated into two parts as part I & II from the same blue print in order to have two different question papers for pre-test and post-test.
- 'Metacognition assessment scale' prepared and validated by Srinivasan, P. and Brindha, P., 2014.
- 'Metaemotion assessment scale' prepared and validated by Srinivasan, P. and Brindha, P., 2014.
- Metacognition and metaemotion strategies developed by the Supervisor and Scholar.

11. Procedure

The investigator sought prior permission from the Principals of the Schools and conducted students' outcome test part – I for both experimental group and control group. Following this, metacognition pre-test was conducted using 'Metacognition assessment scale' for both the groups. Metacognition strategies were taught through various individual and group activities to the experimental group alone. In the course of experimentation, progressive test on 'Metacognition assessment scale' was conducted for experimental group. At the end of experimentation, post test on 'Metacognition assessment scale' was conducted for both the groups. Similar method was followed for metaemotion. Finally, post test on Students' Outcome test Part – II was administered to both the groups to check the student outcome.

12. Descriptive Statistics

Descriptive analysis involves computing mean and standard deviation. They are used to determine the central tendency and dispersion of scores of all the students chosen as sample for the study. The computed values are used to describe the properties of a particular sample.

The following Table 1 shows descriptive statistics for the independent and dependent variables of metacognition, metaemotion and Student outcome on the post test scores of experimental group.

Table 1. Descriptive Statistics

S.No	Variable	N	Mean (M)		Standard Deviation (SD)	
			Control Group	Experimental Group	Control Group	Experimental Group
1	Metacognition	40	97.53	122.88	6.44	9.34
2	Metaemotion	40	91.63	121.63	8.23	10.70
3	Student Outcome	40	30.60	55.21	7.57	11.11

The mean value for Metacognition in the post test scores of experimental group is 122.88 is high compared to the mean value of the control group which is 97.53. The standard deviation of the experimental group is 9.34 and the control group is 6.44.

The mean value for Metaemotion in the post test scores of experimental group is 121.63 is high compared to the

mean value of the control group which is 91.63. The standard deviation of the experimental group is 10.70 and the control group is 8.23

The mean value for Student outcome in the post test scores for experimental group is 55.21 which is high compared to the mean value of the control group which is

30.60. The standard deviation of the experimental group is 11.11 and the control group is 7.57.

Differential analysis includes ‘t’ test. A ‘t’ test checks if the difference between the two variables or two groups are significant. In other words, it tests if there is significant difference in the mean scores of the two groups under consideration.

13. Differential Analysis

Table 2. Group wise N, M, SD and t values

Variable	Groups	Number of Students (N)	Mean (M)			Standard Deviation (SD)			t and Sig. (2 tailed) 0.05 level with df = 39			t value between two groups in the post test mean scores
			Pre test and Prog test	Prog test and Post test	Pre test and Post test	Pre test and Prog test	Prog test and Post test	Pre test and Post test	Pre test and Prog test	Prog test and Post test	Pre test and Post test	
Metacognition	Experimental	40	-11.35	-13.83	-25.18	9.78	8.36	9.12	-7.34 0.000	-10.46 0.000	-17.46 0.000	12.84 0.000
	Control	40	-	-	-0.55	-	-	4.85	-	-	-0.718 0.477	
Metaemotion	Experimental	40	-10.08	-20.30	-30.38	8.65	10.13	11.2	-7.37 0.000	-12.68 0.000	-17.15 0.000	13.46 0.000
	Control	40	-	-	-1.15	-	-	5.86	-	-	-1.24 0.222	
Students Outcome	Experimental	40	-	-	-25.43	-	-	8.24	-	-	-19.51 0.000	12.12 0.000
	Control	40	-	-	-2.28	-	-	4.72	-	-	-3.05 0.004	

The t statistics are summarized in Table 2.

From Table 2, ‘t’ value for the Metacognition and metaemotion score of control group between pre test and post test are -17.46 and -17.15 which are not significant at 0.05 level with df = 39. Therefore it shows that there is no significant difference between the two test scores in control group for both metacognition and metaemotion.

From Table 2, ‘t’ value for the Student Outcome score of control group between pre test and post test is -3.05 which is significant at 0.05 level with df = 39. It shows significant difference between the two test scores for Student Outcome.

From Table 2, ‘t’ value for the Metacognition and metaemotion score of experimental group between pre-test and progressive test are -7.34 and -7.37 which are significant at 0.05 level with df = 39. It shows significant difference between the two test scores.

From Table 2, ‘t’ value for the Metacognition and metaemotion score of experimental group between

progressive test and post test are -10.46 and -12.68 which are significant at 0.05 level with df = 39. It shows significant difference between the two test scores.

From Table 2, ‘t’ value for the Metacognition, metaemotion and Student Outcome score of experimental group between pre test and post test are -17.46, -17.15 and -19.51 which are significant at 0.05 level with df = 39. Therefore there is significant difference between the pre and post test scores in all the three variables of experimental group.

From Table 2, ‘t’ value for the Metacognition, metaemotion and Student Outcome score between experimental group and control group in the post test mean scores are 12.84, 13.46 and 12.12 which are significant at 0.05 level with df = 39. Therefore there is significant difference between the scores of experimental group and control group in all the three variables.

Table 3. Gender wise N, M, SD and t values

S.No	Scores	Gender	N	M	SD	t	Sig. (2-tailed)
1	Metacognition and Metaemotion	Male	30	239.37	18.91	-3.18	0.003
		Female	10	259.90	12.88	-3.85	0.001
2	Student Outcome	Male	30	51.28	9.93	-4.88	0.000
		Female	10	67.00	3.34	-7.49	0.000

From Table 3, ‘t’ value for the combined mean scores of Metacognition and metaemotion of experimental group between male and female students are -3.182 and -3.846 which are significant at 0.05 level with df = 39.

From Table 3, ‘t’ value for the Student Outcome score of experimental group between male and female students are -4.88 and -7.49 which are significant at 0.05 level with df = 39.

14. Correlation Analysis

Correlation Analysis is used to measure the degree of association or relationship between two variables. When a change in one variable is accompanied by a change in another variable, then the two variables are said to be co-

related and this mutual relationship is called correlation. To measure this correlation, Pearson product moment correlation method is used and it is summarized in Table 4.

Table 4. Summary of Correlation

S.No	Scores	N	r **0.01
1.	Metacognition and metaemotion	40	0.552**
	Student Outcome	40	

** Correlation is significant at the 0.01 level (2 - tailed).

From Table 4, the correlation value comparing the relationship between combined metacognition and metaemotion and the Student Outcome score of experimental group is 0.552 which is significant at 0.01 level with $df = 38$. It shows significant correlation

between combined mean scores of metacognition and metaemotion and Student outcome.

15. Linear Regression

Linear regression is an approach for modelling the relationship between a dependent variable 'y' and one or more independent variable denoted as 'x'. Therefore the relationship between the independent variables Metacognition and metaemotion and the dependent variable Student Outcome is sought using ANOVA. The following Table 5 shows the regression values for the dependent and independent variables.

Table 5. Summary of Regression

S.No	Variable	Unstandardised Coefficient (B)	Standard Error of B	Beta Coefficient (B)	't' value	'P' value
1.	Metacognition	0.372	0.412	0.313	0.902	0.373
2.	Metaemotion	0.260	0.360	0.251	0.724	0.474
3.	Constant	-22.154	20.271	-	-1.093	0.281

From Table 5, it is seen that the two variables of metacognition and metaemotion contribute to the Student Outcome.

From the above table, the multiple regression equation is

$$Y = -22.154 + 0.313X_1 + 0.251X_2$$

From the analysis of variance, the 'P' value is 0.001. This indicates that the regression model is statistically significant at 1% level. The R2 value, 0.305 shows that the proportion of the dependent variable (Student Outcome) variance can be attributed to, or explained by, variance in the independent variables (metacognition and metaemotion).

From the Table 5, beta coefficients of metacognition and metaemotion are 0.313 and 0.251 respectively. From these values, it is evident that the influence of metacognition on student outcome is more than the influence of metaemotion.

16. Findings of the Study

Following are the findings of the study

- The metacognition and metaemotion of IX std. students is very high and the Student outcome of IX std. students is high in the post test mean score of experimental group.
- There is no significant difference between pre-test and post-test mean scores on the following variables of IX std. students of control group
 - Metacognition
 - Metaemotion
- There is significant difference between pre-test and post-test mean scores on Student outcome of IX std. students of control group.
- There is significant difference between pre-test and progressive test mean scores on the following variables of IX std. students of experimental group.
 - Metacognition
 - Metaemotion

- There is significant difference between progressive test and post-test mean scores on the following variables of IX std. students of experimental group.
 - Metacognition
 - Metaemotion
- There is significant difference between pre-test and post-test mean scores on the following variables of IX std. students of experimental group.
 - Metacognition
 - Metaemotion
 - Student Outcome
- There is significant difference between control group and experimental group in the post-test mean scores on the following variables of IX std. students.
 - Metacognition
 - Metaemotion
 - Student Outcome
- There is differential effect of metacognition and metaemotion on the student outcome of IX std. students of experimental group.
- There is significant correlation between combined mean scores of metacognition and metaemotion and student outcome mean scores of IX std. students of experimental group.
- There is significant difference between male and female students in the combined mean scores of metacognition and metaemotion of IX std. students of experimental group.
- There is significant difference between male and female students in the student outcome mean scores of IX std. students of experimental group.

17. Conclusion

The above results confirm that the use of metacognition and metaemotion strategies influence the outcome of students in their cognitive, affective and psychomotor level. Therefore the components of metacognition and

metaemotion could be taught to students at school to improve their learning ability and be systematic in their approach to studies. It would also help them to handle emotional situations effectively which in turn would help them do better academically. Thus the above study validates that teaching metacognitive and metaemotion strategies to children influences positively their learning outcome.

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