

## THE EFFECT OF COGNITIVE STRATEGY INSTRUCTION INTERVENTION PROGRAMME ON THE READING COMPREHENSION AND METACOGNITION OF MIDDLE SCHOOL STUDENTS

Dr. Malati Panga

Hislop College, Civil Lines Nagpur – 440 001



**Abstract :** The purpose of the study was to study the effect of the cognitive strategy intervention programme on the reading comprehension and metacognition of middle school students and to identify factors that facilitated or impeded the effect. This paper focuses on the analysis of the quantitative data that was procured during the training programme and based on the findings made, implications are drawn accordingly.

**Key words:** Cognitive Strategy Intervention Programme; Metacognition; Zone of Proximal Development

**Introduction :** The present paper addresses improving middle school students' reading comprehension and metacognition by implementing a cognitive strategy instruction intervention programme. With this intent in mind, a comprehensive cognitive strategy intervention programme was designed and developed for middle school students. This research is an empirical study which aims to move from theory to intervention in equipping middle school students with reading strategies required for deep comprehension.

The definition of reading comprehension used for this paper is the one given by the RAND Reading Study Group (Snow, 2002:11) - "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language.". *Cognitive strategies* are described as conscious and deliberate thoughts or behavioral actions used by a reader to process a text and to handle the challenges of reading obstacles. (McEwan (2004), Graesser, A.C. (2007). The two component conceptualization of *metacognition* of Flavell (1979) has been used in the present study- 1) Knowledge of cognition 2) Regulation of cognition.

**Overview of the problem :** Reading should receive a special focus in our second language teaching situation. Students should be able to read for pleasure and for profit, for academic purposes and for their career. However, it has been noticed that as students make a transition from *learning to read* to *reading to learn* in middle school, there is still a relatively strong bias towards text-driven or bottom up processes. The

importance of skilful use of appropriate comprehension strategies is often overlooked in our education system. The purpose of the present study was to address this lacuna and to bridge the gap between research and practice. The study is an attempt to address this critical need in our education system and to provide middle school students with a cognitive strategy training program based on empirically supported and theoretically grounded reading strategy research.

**Overview of the cognitive strategic intervention program :** The cognitive strategy instruction intervention programme was designed with a view to increasing the metacognition and reading comprehension of middle school students. The features of instruction that the researcher followed for effective strategy instruction were as follows:

- 1) Based on the research done by Pearson, Roehler, Dole and Duffy(1992), the study chose to focus on teaching the following repertoire of strategies to the students: 1) activating background knowledge 2) Inferring 3) Monitoring-clarifying 4) questioning 5) visualizing-organizing 6) summarizing.
- 2) Scaffolding was central to this program and it fit well with Vygotsky's (1978) concept of zone of proximal development (ZPD) which says that learning takes place within the zone where challenge and support are in balance so that the learner is able to achieve success and increase mastery.
- 3) Collaborative learning was followed in the classroom with practices such as peer discussions, peer teaching and reciprocal teaching. A combination of whole class, small group and individualized instruction was followed by the researcher.
- 4) Strategy instruction was direct and the students were told about purpose and benefit of the strategies they were being trained in. Thus students were taught not just the "what" and

“how” of strategies but also “why” of strategy use.

- 5 Strategy instruction was integrated with regular instruction in both language and content subjects.
- 6 Motivational constructs were included in the instructional program in order to have students’ active participation in the meaning making process.

**Hypothesis for the study :** Quantitative evidence has been used to test the hypothesis- *An explicit, systematic and supportive instruction of cognitive strategies can bring about an improvement in reading comprehension and metacognition of middle school ESL learners.* Based on work done by Pressley (2002) and the proficient research synthesized by Pearson, Roehler, Dole and Duffy (1992), it was hypothesized that when a repertoire of cognitive strategies is taught to the students explicitly and directly, their ability to comprehend the text and monitor their own understanding of the text also increases.

**Research Design :** The participants of this study included 15 students of eighth grade of Maharashtra State Board selected randomly. The study was based in a class in a private English medium secondary school in Nagpur. As the purpose of the study is to study the impact of the cognitive strategy intervention programme on the reading comprehension and metacognition of students, a case study approach was adopted. The cognitive strategy intervention program was carried out for 100 hours in the course of three months. The measures of the pre- intervention test and post-intervention test of multiple text comprehension were compared using a paired t-test. The two tailed “t” test was used by the researcher to compare the effect of the cognitive intervention training program on the reading comprehension of low, middle and higher level students. The students were categorized on the basis of their scores in the pre intervention reading test.

**Findings of the Quantitative Analysis:**

**Effect on Reading Comprehension :** The following table shows the average scores of pre intervention and post intervention reading comprehension tests.

Pre intervention score      Postintervention score

|          | Me Interntion score | Pot intervention score |
|----------|---------------------|------------------------|
| Mean     | 27.33333            | 34.8                   |
| Variance | 102.75556           | 149.0933               |
| S.D.     | 10.13684            | 12.21038               |

Null Hypothesis: There is no significant difference between the average scores of pre and post tests.

Alternative Hypothesis: The average score of post test is more than that of pre test. p-value= 1.2742E-06<0.05  
 Conclusion- Accept alternative hypothesis i.e. the average score of post test is more than that of pre-test.

It is found that the post intervention reading comprehension score ( M=34.8 SD = 12.21038) is significantly higher than the pre intervention reading comprehension score (M= 27.33333, SD = 10.13684), p-value = 1.2742E-06<0.05.

The scores show that the intervention program had a significant effect on the reading comprehension of middle school students as shown statistically using paired “t” test. In the test it was observed that the average score in reading comprehension of the students in post- training test was more than that of pre training test.

**Comparison of the effect of the intervention on the reading comprehension of different proficiency level students :** Two tail “t” test was used to compare the effect of the training program on the high, middle and low level students categorized according to their performance in the pre- training test of reading comprehension. In all the cases, t-test for difference of mean was used after verifying equality of variances using F-test. Null hypothesis : There isn’t significant difference between the mean values of improvement score in the first group and in the second group.

Alternative hypothesis: Mean improvement score in the first group is greater than mean improvement score in the second group.

**Medium versus low proficiency groups** Calculated value of t: 3.7843  
 Degrees of freedom: 8  
 p-value: 0.00268 (which is less than 0.05)

Conclusion: Null hypothesis is rejected at 5% level of significance i.e. on the basis of the available data we can

say that mean improvement score in the medium group is greater than the mean improvement score in the lower group.

**Medium versus high proficiency groups**

Calculated value of t: 1.2216

Degrees of freedom: 8

p-value: 0.1283 (which is greater than 0.05)

Conclusion: Null hypothesis is accepted at 5% level of significance i.e. on the basis of the available data we can say that there is no significant difference between the mean values of the improvement score in the medium proficiency group and in the high proficiency group.

**High vs. low proficiency groups**

Calculated value of t: 2.236

Degrees of freedom: 8

p-value: 0.0279 (which is less than 0.05)

Conclusion: Null hypothesis is rejected at 5% level of significance i.e. on the basis of available data we can say that mean improvement score in the higher group is greater than mean improvement score in the lower group.

**Effect on Metacognition:** The following table shows the mean scores of pre intervention and post intervention metacognition tests.

| Pre intervention |          | Post intervention |
|------------------|----------|-------------------|
| Mean             | 15.13333 | 24.06667          |
| Variance         | 14.51556 | 7.662222          |
| S.D.             | 3.809929 | 2.768072          |

Null Hypothesis: There is no significant difference between the average scores of pre and post tests.

Alternative Hypothesis: The average score of post test is more than that of pre test.

p-value= 4.8208E-09<0.05

Conclusion- Accept alternative hypothesis i.e. the average score of post test is more than that of pre-test.

It is observed that in the post intervention administration of the metacognitive strategy inventory, participants scored significantly higher (M = 24.06667, SD=2.768072) compared to the pre intervention score (M = 15.13333, SD = 3.809929), p- value = 4.8208E-09<0.05. Similarly, it

is observed that the intervention program also had a significant effect on the metacognition of middle school student as again shown statistically using paired “t” test.

**Conclusion :** The cognitive strategy intervention programme had a positive effect on the reading comprehension of the middle school students as it was found out through paired “t” test that the average mean of post intervention reading comprehension test was significantly more than that of the pre intervention reading comprehension test. This is in keeping with research which has shown that intervention designed to improve comprehension have been successful. (McNamara, 2004). The empirical findings show that interventions designed to improve reading comprehension are successful even when the subjects are middle school students in an ESL context.

It was observed that the medium and high level students exhibited significant gains in reading comprehension compared to the low level students. The positive effect on the medium and high level students was found to be almost the same. It can be inferred here that struggling readers’ comprehension cannot be improved by teaching them strategies that good or experienced readers use. This is because these students are struggling with comprehension at the word level or below and are not able to engage in the proposed strategic behaviors. The cognitive resources of these struggling students is all used up in tackling with their difficulty in decoding or interpreting the sentence itself, leaving them little room for strategies of higher order. These findings suggest that comprehension strategy interventions are likely to be particularly effective if the interventions are tailor made according to the needs of the students instead of following the “teach poor readers to behave like good readers” fallacy. If students are struggling with comprehension at the decoding or fluency level or due to lack of vocabulary, then instructional interventions should focus on developing their smooth, automatic decoding abilities as well as vocabulary levels. The training had a more positive effect on the medium and higher level students as their fluent reading skills allow them to focus their cognitive resources in the proposed strategic behaviors. This strategic behavior furthermore facilitates the understanding and memory of the textual material.

The training program also had a positive effect on the metacognition of the middle school students as the average mean of the students in the post intervention administration of the metacognitive strategy inventory was found to be more than that of the pre intervention administration. It was however observed that the

training program had maximum positive effect on the medium level students, followed by low level students. The high level students did not show the same rate of improvement because they were already using most of the metacognitive strategies even before the intervention.

**Pedagogical implications of the findings of quantitative analysis:** As the empirical findings support the benefit of cognitive strategy intervention programme in helping middle school students' reading comprehension and metacognition, such intervention programs should be developed and adopted along with the core curriculum of the middle students in order to foster reading comprehension and metacognition among them. However the differences in the extent of improvement among students suggest that the intervention programme should be adaptive and tiered to meet the needs of the students struggling at various stages of cognitive processes involved in reading comprehension. Successful comprehension entails a highly integrated set of activities that involves both lower level decoding abilities (e.g. Perfetti, 1985) and higher level integration abilities. It is essential to select or design interventions that address the underlying causes of difficulties struggling readers face rather than fall victim to the "one size fits all" fallacy. These less skilled readers may benefit from more extensive training as it would allow them more time to master lower level strategies such as decoding. This would provide them with a stronger foothold to move on to higher level strategies. In contrast, the more skilled readers can be pushed to develop their critical reading skills with more challenging texts and with a widevariety of text genres.

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