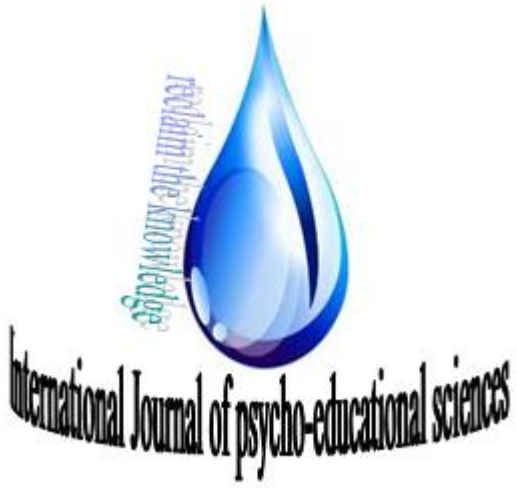

The effectiveness of a metacognitive Strategy Training program in Improving Reading Comprehension Skills of Learning Disabled Grade-Five Students

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Abstract

This study describes an action research project designed to improve reading comprehension skills of fifth grade learning disabled students. A total of 60 students identified with LD were invited to participate. The sample was randomly divided into two groups; experimental (n= 30 boys)and control (n= 30 boys). ANCOVA and Repeated Measures Analyses were employed for data analysis. Findings from this study indicated the effectiveness of the program employed in improving reading comprehension skills in the target students. On the basis of the findings, the study advocated for the effectiveness of the metacognitive strategy training program in improving the reading skills of Learning disabled students.

Keywords. metacognitive strategy training program, learning disabilities. Primary Education, Reading comprehension skills.

Introduction

Metacognition (Flavell 1979; Kuhn 2000 ; Veenman 1993 ; O'Neil and Abedi 1996, Mourad Ali, 2009,2010) refers to two aspects, namely the students' self-awareness of a knowledge base in which information is stored about how, when, and where to use various cognitive strategies and their self-awareness of and access to strategies that direct learning (e.g. monitoring difficulty level, a feeling of knowing). This awareness is developmental and lies on a continuum. Proficient readers use one or more metacognitive strategies to comprehend texts. There are three main aspects of metacognition: metacognitive knowledge, metacognitive monitoring, self regulation and control (Pintrich, Wolters and Baxter 2000). The first group consists of cognitive learning strategies which the learner uses to regulate the process of knowledge acquisition. These include, for example, elaboration strategies such as the building of links to prior knowledge, or memory strategies such as note taking. The second group consists of metacognitive control strategies. Central here are activities like the planning and monitoring of learning activities, the evaluation of learning outcomes and the adaptation to varying task demands and (unexpected) difficulties, for example, an increase in directed efforts. In addition to these two groups, which are dominant in research and crucial for the learning process, a third group of strategies in the model developed by Pintrich and Garcia (1994) is dedicated to resource management. These strategies are concerned with the control of the general conditions associated with learning, for example, time management and management of the learning environment.

The following two key questions students need to ask themselves are crucial in terms of metacognitive awareness and knowledge:

1. What do I want out of this? (What are my motives?)
2. How do I propose going about getting there? (What are my strategies?)

(Biggs & Moore 1993).

Another important metacognitive model set forth by Winne and Hadwin (1998) has four basic stages: task definition, goal setting and planning, enactment, and adaptation. Their model suggests that the learner generates a perception of what the task is and the available resources, constructs a plan for addressing the task, enacts study strategies, and makes changes to his or her cognitive structure based on perceptions of performance. Pintrich (2000) synthesized the work of a variety of self-regulation theorists into a general framework which includes:

(a) forethought, planning and activation;
(b) monitoring;
(c) control; and
(d) reaction and reflection.

Pintrich's model suggests that the learner develops perceptions of the task demands, engages in metacognitive monitoring, selects and implements cognitive strategies that are appropriate for the task demands, and evaluates task performance while reflecting on the effectiveness of the cognitive strategies. These models all suggest an interaction between personal factors and situational factors such as task and test demands, the coordination of goal setting and metacognition, the use of cognitive learning strategies, and self reflection.

Metacognition and reading

Research in the area of reading has also begun to focus on the role of metacognition. While previous research has focused on strategy use, researchers are examining readers' awareness of strategies during the reading process - their metacognitive awareness. Metacognition is a relatively new label for a body of theory and research that addresses learners' knowledge and use of their own cognitive resources (Garner, 1987). Metacognitive knowledge or awareness is knowledge about ourselves, the tasks we face, and the strategies we employ (Baker & Brown, 1984). Knowledge about ourselves may include knowledge about how well we perform on certain types of tasks or our proficiency levels. Knowledge about tasks may include knowledge about task difficulty level. For example, in the area of reading, we may know that familiar-topic material is easier to understand than unfamiliar material; explicit sentences assist us in tasks that require reduction of texts to their gists. About strategies, we may know that verbal rehearsal and elaboration of material assist in retrieval, or that prediction of article content based on titles improves comprehension, and so forth. Metacognitive awareness therefore, also involves the awareness of whether or not comprehension is occurring, and the conscious application of one or more strategies to correct comprehension (Baumann, Jones, & Seifert-Kessel, 1993).

Researchers (Bazerman, 1985; Pressley & Afflerbach, 1995) demonstrate that successful comprehension does not occur automatically. Rather, successful comprehension depends on directed cognitive effort, referred to as metacognitive processing, which consists of knowledge about and regulation of cognitive processing. During reading, metacognitive processing is expressed through strategies,
which are "procedural, purposeful, effortful, willful, essential, and facilitative in nature" and "the reader must purposefully or intentionally or willfully invoke strategies" (Alexander & Jetton, 2000, p.295), and does so to regulate and enhance learning from text. Through metacognitive strategies, a reader allocates significant attention to controlling, monitoring, and evaluating the reading process (Pressley, 2000; Pressley, Brown, El- Dinary, & Afflerbach, 1995).

Poor readers are less aware of effective strategies and of the counterproductive effects of poor strategies, and are less effective in their monitoring activities during reading. Brown and Palincsar (1985) suggested that an effective reading instruction program should require the identification of complementary strategies that are modeled by an expert and acquired by the learner in a context reinforcing the usefulness of such strategies. Adult and college readers who show evidence of metacognitive deficiencies may be considered as unaware and incapable of monitoring their mental processes while reading. Unskilled reading comprehension is one aspect to show the importance and need for training (Cohen, 1986). Unskilled readers can become skilled readers and learners of whole text if they are given instruction in effective strategies and taught to monitor and check their comprehension while reading. With respect to this point, Al Melhi (2000) has found that some differences do exist between skilled and less skilled readers in terms of their actual and reported reading strategies, their use of global reading strategies (such as underlining guessing, reading twice and etc), their metacognitive awareness, their perception of a good reader, and their self-confidence as readers. Training in metacognitive language

learning strategies help learners develop their reading skills and raise their language proficiency levels (Palincsar, 1986; Green & Oxford, 1995; Carrell, Gajdusek & Wise; 1998).

So the present study seeks to test the following hypotheses

1-There are differences in post – test scores mean between control and experimental groups on reading comprehension skills, in favor of the experimental group.

2- the programme is effective, is this effect still evident a month later.

Method

Participants

60 students participated in the present study. Each student participant met the following established criteria to be included in the study: (a) a diagnosis of RD by teacher's referral. Neurological scanning results indicated that those individuals were neurologically deficient (b) an IQ score on the Mental Abilities Test (Mosa, 1989) between 90 and 118 (c) reading performance scores at least 2 years below grade level (d) absence of any other disabling condition. Students were randomly classified into two groups: experimental (n= 30 boys) and control (n= 30 boys).

The two groups were matched on age,IQ, word recognition and reading comprehension. Table 1.shows means, standard deviations,t- value, and significance level for experimental and control groups on age (by month) ,IQ , word recognition and reading comprehension (pre-test).

Table 1. *means, standard deviations, t- value , and significance level for experimental and control groups on age (by month),IQ, word recognition and reading comprehension (pre-test).*

Variable	Group	N	M	SD	T	Sig.
Age	Experimental	30	132.24	1.96	-.121	Not sig.
	Control	30	132.41	2.01		
IQ	Experimental	30	111.34	4.45	-.221	Not sig.
	Control	30	111.89	4.24		
Word recognition	Experimental	30	6.21	3.00	-.547	Not sig.
	Control	30	6.67	3.52		
Reading comprehension	Experimental	30	6.82	2.65	-.539	Not sig.
	Control	30	6.54	2.32		

Table 1. shows that all t-values did not reach significance level. This indicated that the two groups did not differ in age , IQ , word recognition and reading comprehension (pre-test) .

Instrument

a. Word recognition test.The test was developed to assess reading disabled children 's skills in word recognition . It was based on the features of word recognition realized by Mourad Ali (2005, 2006, 2007a) , and Mourad Ali's Basic Reading Skills Test (2007b) . The test consists of (22) items assessing word recognition , with score ranging from 0-1 on each item and a total score of 22. The test has demonstrated high internal consistency with Cronbach's α ranging from 0.83 to 0.87.

b. Reading comprehension test. The test was developed to assess reading disabled children 's skills in reading comprehension . It was based on the features of comprehension skills recognized by Mourad Ali (2005, 2006, 2007a) , and Mourad Ali's Basic Reading Skills Test (2007b) . The test consists of (22) items assessing word recognition , with score ranging from 0-1 on each item and a total score of 22. The test has demonstrated high internal consistency with Cronbach's α ranging from 0.86 to 0.89.

Setting

The study took place in a primary school in Baltim sector, Kafr El Sheik Governorate, Egypt. The target students were taught in " Technology Room ".

Procedure

Screening : 60 students participated in the present study. Each student participant met the following established criteria to be included in the study: (a) a diagnosis of RD by teacher's referral. Neurological scanning results indicated that those individuals were neurologically deficient (b) an IQ score on the Mental Abilities Test (Mosa, 1989) between 90 and 118 (c) reading performance scores at least 2 years below grade level (d) absence of any other disabling condition. Students were randomly classified into two groups: experimental (n= 30 boys) and control (n= 30 boys).

Pre-intervention testing : All the sixty students in grade five completed Cognitive Reading Comprehension Test, which assesses reading disabled children 's skills in reading comprehension. Thus data was reported for the students who completed the study .

General Instructional Procedures: Experimental – group students were taught in the " Technology Room " at EL Waheba primary school after the school day ended . The instructor gave students an idea about the metacognitive training and how it is useful in helping them achieve their lessons in different school subjects in general , and in reading skills in particular . In each class hour they were taught two metacognitive strategies and they applied them to the passages.

Design and Analysis

The effects of implementing the metacognitive training program on students' reading comprehension skills were assessed using pre- post- and follow –up testing.

Results

Table 2. shows data on ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in reading comprehension test. The table shows that the (F) value was (128.009) and it was significant value at the level (0.01).

Table 2. *ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in comprehension test*

Source	Type 111 sum of squares	df	Mean square	F	Sig.
PRE	1.725	1	1.725		
GROUP	217.276	1	217.276	128.009	0.01
ERROR	317.340	57	5.567		
TOTAL	1067.933	59			

Table 3. shows T. test results for the differences in post- test mean scores between experimental and control groups in reading comprehension test. The table shows that (t) vale was (11.67). This value is significant at the level (0.01) in the favor of experimental group . The table also shows that there are differences in post- test mean scores between experimental and control groups in comprehension test in the favor of experimental group .

Table 3. *T- test results for the differences in post- test mean scores between experimental and control groups in comprehension test*

Group	N	Mean	Std. deviation	T	Sig.
Experimental	30	13.50	1.10	11.67	0.01
Control	30	6.43	3.12		

Table 4. shows data on ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in word recognition test. The table shows that the (F) value was (246.608) and it was significant value at the level (0.01).

Table 4 . ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in word recognition test

Source	Type 111 sum of squares	df	Mean square	F	Sig.
PRE	10.148	1	10.148		
GROUP	401.575	1	401.575	246.608	0.01
ERROR	92.818	57	1.628		
TOTAL	648.983	59			

Table 5. shows that (t) vale was (17. 53). This value is significant at the level (0.01) in the favor of experimental group . The table also shows that there are differences in post- test mean scores between experimental and control groups in word recognition test in the favor of experimental group .

Table 5 . T-test results for the differences in post- test mean scores between experimental and control groups in word recognition test

Group	N	Mean	Std. deviation	T	Sig.
Experimental	30	13.200	1.349	17. 53	0.01
Control	30	7.166	1.315		

Table 6. shows data on repeated measures analysis for reading comprehension test. The table shows that there are statistical differences between measures (pre- post- sequential) at the level (0.01).

Table 6 . *Repeated measures analysis for comprehension test.*

Source	Type 111 sum of squares	df	Mean square	F	Sig.
Between groups	661.250	1	661.250		0.01
Error 1	105.611	58	1.821	363.148	
Between Measures	794.978	2	794.978	193.121	0.01
Measures x Groups	596.933	2	298.467	145.011	0.01
Error 2	238.756	116	2.058		

Table 7. shows data on Scheffe test for multi-comparisons in reading comprehension test.The table shows that there are statistical differences between pre and post measures in favor of post test , and between pre and follow up measures in favor of sequential test , but no statistical differences between post and sequential test .

Table 7. *Scheffe test for multi- comparisons in comprehension test*

Measure	Pre M= 6.76	Post M= 13.20	Sequential M= 12.86
Pre	--	--	--
Post	8.43*	--	--
Sequential	8.10*	.33	--

Table 8. shows data on repeated measures analysis for word recognition test. The table shows that there are statistical differences between measures (pre- post- sequential) at the level (0.01).

Table 8 . *Repeated measures analysis for word recognition test*

Source	Type 111 sum of squares	df	Mean square	F	Sig.
Between groups	1150.139	1	1150.139	348.305	0.01
Error 1	191.522	58	3.302		
Between Measures	1019.478	2	509.739	164.199	0.01
Measures x Groups	469.078	2	234.539	75.550	0.01
Error 2	360.111	116	3.104		

Table 9. shows data on Scheffe test for multi-comparisons in word recognition test.The table shows that there are statistical differences between pre and post measures in favor of post test , and between pre and sequential measures in favor of sequential test , but no statistical differences between post and sequential test .

Table 9. *Scheffe test for multi- comparisons in word recognition test*

Measure	Pre M= 5.76	Post M=13.50	Sequential M= 12.83
Pre	--	--	--
Post	8.73*	--	--
Sequential	8.06*	.66	--

Discussion

The main objective of the present study was to explore whether there were differences in post – test scores mean between control and experimental groups on reading comprehension skills. The study also examined If the programme was effective, if this effect was still evident a month later .

The results of this study show that the metacognitive program was effective in improving the reading comprehension skills of students in experimental group, compared to the control group whose individuals were left to be taught using traditional methods.

Participants of this study fall into the minimum IQ of 90, nevertheless, they have learning disability. Thus IQ score cannot account for learning disabilities. The results of the present study support that conclusion with evidence that students who participated in the study do not fall into the low IQ range, however they have learning disabilities. When designing a program based on metacognitive strategiy, they had statistical increase in reading comprehension skills. This goes in line with what Mourad Ali et al (2006) notes that there is one problem " students who are identified as learning disabled often cover any special abilities and talents, so their weakness becomes the focus of their teachers and peers , ignoring their abilities. Mourad Ali (2007a) , however , notes that " learning disabled , as well as gifted students can master the

same contents and school subjects ", but they need to do that in a way that is different from that used in our schools .

Experimental group gained better scores in comprehension tests than did control groups in post-tests though there were no statistical differences between the two groups in pre- test. This is due to the program which met the experimental group's needs and interests. On the contrary, the control group was left to be taught traditionally. This goes in line with our adopted perspective which indicates that traditional methods used in our schools do not direct students as individual toward tasks and materials , and do not challenge their abilities. This may lead students to hate all subjects and the school in general. On the contrary, when teachers adopt new methods (such as metacognitive strategy) that suits students interests and challenge their abilities with its various modalities .

This indicates that as Mourad (2009) sates " as we learn more about the scope and complexity of individual differences and how they affect academic progress, we become increasingly convinced that many individuals who do not read well do not because the instructional methods used to teach them does not complement preferred styles to learn, thus, we should seek strategies that help these students and match their strengths.

Worth mentioning is that students in the experimental group retained the learnt information for a long time even after the period of the program finished, and this indicates the training effect.

Implications

Metacognitive strategy training theory has some very important implications for both teachers and students. Teacher may have a preferred teaching style. He may regard this style as the best , but if he wants to innovate , he should use various teaching styles . Using various teaching styles and strategies will help meet the needs of the diverse students inside the classroom .These teaching styles and strategies should suit students' diverse abilities and attitudes. That is what Metacognitive strategy training does. It provides teachers with interesting styles that can be used with different students in different lessons.

Students with learning disabilities may have special abilities that do not emerge in the traditional educational system. By using metacognitive strategy training in the classroom , students will be able to display their strengths and interests.

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