Impact of Meterepresentational Processing Strategies on Students' Reading Comprehension Performance

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Abstract—Within the framework of reading comprehension pedagogy, text processing abilities help students to deeply process and understand text materials across contexts. The present study compares the impact of metarepresentational strategies on students' English reading comprehension. The study used two sampled groups of 150 each: controlled and metarepresentational groups. Controlled group were taught the conventional strategies of reading comprehension while metarepresentational strategies group were treated with metarepresentational strategies. Twelve weeks were used for the treatment after administering a pre-test. A Post-test was administered and the results were compared with the pre-test result using t-test. The results indicated that metarepresentational comprehension processing strategies had impact on students reading comprehension performance. Thus, the study recommends formal instructional inclusion of the metarepresentational strategies in Senior Secondary School reading comprehension curriculum.

Keywords—Meterepresentational, Processing Strategies and Comprehension Performance.

I. Introduction

IN present day knowledge society and knowledge economy, the role of English language and communication skills is becoming more positively obvious. Text comprehension is one important aspect of language and communication skills. To a large extent, children and adults learn in and out of school from written texts. Human life is generally dependent on reading and comprehension of reading materials, for its growth and sustainability. This is evident considering the fact that the complexity of knowledge presentation (written) is increasing day by day. Therefore, high subject matter knowledge of a text, deep comprehension of text material and high level text processing capacity are required to address present day knowledge presentation and comprehension complexity. This poses a great challenge to individual students regardless of age.

As demanding as this task, failure to appropriately process and comprehend reading materials may have serious consequences. On the personal level, the reader may not

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capture the meaning intended by the writer all together, or be presented by strongly biased or unreliable information. On level of the society, reader's ability to correctly understanding and achieve coherent meaning as intended by the writer may be necessary for genuine participation in political, social, religious, and economic discourse and solution. More importantly, in the field of education, the consequences may be even worse. The failure of student to comprehend information from a text into a coherent meaningful representation of intended idea may lead to poorer learning in the individual and may adversely affected society in the long run. In essence one of the most critical challenges to a knowledge society is to cultivate human capital with capacity to comprehend communicated information in different context. In this regard, insight is needed into the processes underlying text comprehension. This is why the present study aspires to examine the impact of metarepresentational processing strategies on text comprehension performance of students.

Metarepresentation refers to the ability to figure out or represent a particular state of affairs and what the writer thinks by representing that state of affair via written texts. It is the process of reflecting what a writer means by the use of the writer's texts. In text comprehension, in order for the writer and reader to assess their mutual background knowledge, the two must be able to represent each other's thought, that is, they must be able to metarepresent. Metarepresentation is seen as a picturing of an intended meaning: a higher – order representation with a lower – order representation embedded within it (Wilson, 2002).

II. Review of Related Literature

Whereas there is a long productive line of research on individuals trying to understand a text, (Perfetti, 1992, Grassear, Singer & Trabasso, 1994, Kinstch, 1986, Frayal, 2008), this research line is based on "metacognitive island" alone. Empirical link between metacognitive capacity and reading comprehension has not been established as the sole comprehension booster. Metarepresentation researcher (Wilson, 2002, Noh, 2001, Recanati, 2000, Grice, 1975) have sharply accentuated meaning achievement processes on a more pragmatic plane. metarepresentational processing strategies insight was left out. Thus, the present study seeks to examine

impact of metarepresentational processing strategies capacities on students' reading comprehension. Proust (2007) reported different function of metacognition and metarepresentation in comprehension but did not empirically state their individual impact on comprehension. Hence, the higher order processes associated with comprehension has not been well understood.

However, there is mounting evidence that readers' metacognitive and abilities pay important role in reading comprehension (Olaofe and Masembe, 2006, Garcia, 2004) metarepresentational processing strategies were left out. Since the inaugural lecture of Hill (1992), the need for exploring and developing tools that would adequately cater for comprehensive reading processing needs of students has not been met. Impact of metarepresentational processing strategies undertaken by the present study could enrich research in reading comprehension processing. It could broaden research agenda in text comprehension and metarepresentation and provide new understanding of what it takes to be a competent reader in the twenty-first century.

III. METHOD

A. Population for the Study

The population of this study comprised all the 726 senior secondary school students. Three hundred students were sampled (Krejeie and Morgan, 1970; Feldt, 1973; Nworgu, 1991; Gay, 1992). The number was divided into two equal groups. One group was the controlled group and the other was the experimental.

B. Procedure for Data Collection

The following procedure was followed in collecting data for the study.
1. The three hundred sampled students were divided into two equal groups (150).
2. One group (150) was the controlled group the other the experimental group.
3. The experimental groups were treated with three metarepresentational processing strategies of reading comprehension twice in a week for twelve weeks.
Below is an illustration of meterepresentational strategies of reading comprehension taught the students during the study.
The three strategies are:
i. Surface meaning understanding strategy which concerns understanding syntactic meaning of expression in the text. For example Aminu is a soldier. At the surface level, some students took it to mean Aminu is a member of the army, where Aminu may not necessarily be a soldier but a hard working person.
ii. Deep meaning understanding strategy which concerns a deeper layer meaning processing by doubting the surface meaning. For example, this strategy would required the doubting of Aminu being a soldier by proof.
iii. Complex meaning understanding strategy which further requires processing of the surface and deep meaning to arrive at the deepest meaning. For example, Aminu in the sentence

above, would be understood as being not a soldier but having the qualities of a soldier: hard working.

The procedure for training the subjects on the strategies was cognitive Academic Language Approach- CALLA (Chamot & O'malley,1994) this procedure includes Preparation, Presentation, Practice, Evaluation and Expansion. Below is an illustration of how each of the seven strategies above would be used using the CALLA procedure.

Preparation

The subjects were introduced to the idea of reading comprehension strategy. This can be done by using the subjects' background knowledge such as discussing the sentence Aminu is a lion. The discussion would lead to a conclusion that Aminu is not an animal but a brave man.

Presentation

One metarepresentational strategy such as complex meaning understanding strategy was presented by getting the students to apply to realize what surface meaning is. A passage from Intensive English Course book was used in guiding the students how they can use complex understanding strategy in text comprehension. For example, the passage with the topic "Life in the army" can be used. In the passage, the narrator indicated being posted to Ibadan to take over 2 area command. Processing the meaning of this expression using complex meaning understanding strategy would go beyond the linguistic meaning of the narrator's being transferred to Ibadan but possibly promoted. One way of getting the students to achieve complex understanding is by indicating the situation regarding the expression in the text which is "posting to takeover a higher command". This indicates promotion and the mental state of happiness and zeal on the part of the narrator. This means that getting the students to use "situation" in a text expression to figure a mental state; for example, mood of the narrator and implication of the situation. In the present example cited, S (situation) implication M (mental state) serves as a tool in achieving complex meaning comprehension.

Practice

The teachers used different expression in the passage to analyze meaning beyond syntactic level (word arrangement). This was done by using the question tool to achieve deep meaning of a text expression. For example, in, The man ticked the bucket. The question tool: is this the interpretation (literal) the writer might have thought would be relevant enough to me (reader) in this context? The answer would determine the acceptability of the surface meaning of an expression in a text.

Evaluation

The teacher encouraged the students to evaluate their reading comprehension process as they used the particular strategy taught and practiced by them. This was done by giving them probing question such as how do you know …., Why…., closed question such as what is… and self-evaluation as they see the marks they are able to obtain as they answer the question.

Expansion

The subjects were encouraged to apply the strategies in new context independently.
4. At the end of treatment (week twelve), a post-test was administered, the two groups- control and experimental. The

two groups were given one and same reading comprehension test using a passage. The questions on the passage captured the four levels of reading comprehension stated by Williams (1990), literal response, interpretive response, inferential response and critical responses from the subjects. Literal meaning response captures metacognitive ability through linguistic meaning while interpretive, implied and critical responses metarepresentational ability through pragmatic/contextual meaning.

5. The answer scripts of the two groups (controlled and experimental) were marked using William's (1990) four levels of reading comprehension. Each script was marked based on its response to literal, interpretive, implied and critical meaning demand as marking scheme content.

6. The controlled group embarked on their normal reading comprehension lesson twice in a week for twelve weeks.

7. Two teachers were used as research assistants responsible for the treatment of the two treatment groups respectively. These research assistants were first trained on the treatment administration before the study commenced.

IV. DATA PRESENTATION AND ANALYSIS

Table I presents the overall scores of the metapresentational processing strategies treatment group in phases.

Table I indicates that metarepresentational processing strategies group started poorly in their reading performance at phase I (57.3 total average score), before treatment. Improvement in reading comprehension performance was observed at phase II, when the metarepresentional processing strategies treatment began (59.1 total average score). Further reading improvement was equally observed at phase III when the treatment continued (141.8 total average score). This means that metarepresentational processing strategies treatment had impact on students' reading comprehension performance.

TABLE I
SUMMARY OF METAPRESENTATIONAL PROCESSING GROUP'S
READING COMPREHENSION PERFORMANCE
METAPRESENTATIONAL GROUP

Level	Score Range	Phase I			Phase II			Phase III		
		No	Avg Score	%	No	Avg. Score	%	No	Avg. score	%
Zero	0	62	0.0	41.3	26	0.0	17.3	-	-	-
Low	1 – 33	82	13.5	54.7	107	11.8	71.3	53	23.7	35.3
Middle	34 -66	6	43.8	4.0	17	47.3	11.4	93	46.3	62.0
High r	67 – 100	-	-	-	-	-	-	4	71.8	2.7
Total		150	57.3	100	150	59.1	100	150	141.8	100

Table II presents comparative performance of metarepresentational and control groups across phases.

Table II revealed that significant difference exited between the performance of the control and metarepresentational groups in favour of metarepresentational group. Phase III of metarepresentational group was higher than phase I and II (-29.86000 and -25.20000) respectively. It means that the hypothesis that stated that there was no significant difference between the reading comprehension performance of students taught using metarepresentational and conventional processing strategies was not confirmed.

TABLE II
A SUMMARY OF THE COMPUTATION OF SCORES
OBTAINED BY METAREPRESENTATIONAL AND CONTROL
GROUP IN PHASES

(I) Phases Conventional (J) Phases Metarepresentational	Mean Difference (I – J)	Std – Error	Sig.	95% Confidence Level	
				Lower Bound	Upper Bound
Phase III	-23.42000*	1.44061	.000	-35.8126	-29.0274
Phase I	-29.86000*	1.44061	.000	-332526	-264674
Phase II	-25.20000*	1.44061	.000	-28.5926	-21.8074

* The mean difference is significant at the .05

Table III presents summary of metarepresentational and conventional processing strategies that students used in reading comprehension.

V. OVERALL FINDINGS

There is significant difference between the reading performance of students taught using metarepresentational and conventional comprehension processing strategies in favour of metarepresentational processing strategies students.

a. Difference between metarepresentational processing strategies group in reading comprehension and conventional group exist in their scores at phase levels (metarepresentational groups' score at phase II: 59.1, at phase III: 141.8 and conventional phase II: 8.0, phase III: 46.0).

b. Metarepresentationaal reading comprehension processing strategies group had fewer number of low scores at the end of the treatment (phase III) compared to the conventional group (from 107 phase II, to 53, phase II and III to 96 respectively see Table 4.03). Middle scores of metarepresentational group increased (from 17 to 93 while only few (4 students) managed to fall within the middle range score (34 to 66%) among the conventional group. Metarepresentational group had 4 high range scores (71%) whereas conventional group had none. This confirms that significant difference exist between students taught using metarepresentational processing strategies and conventional reading comprehension, in favour of metarepresentational.

c. Computation of scores of metarepresentational and conventional groups butressed that significant difference existed between the reading performance of students taught using metarepresentational processing strategies and conventional ways of reading comprehension (-29.86000 and -25.20000 see table 4.32).

d. Movement of metarepresentational group's low achievers (1 to 33%) to middle range score (34 to 66%) suggests clear difference between metarepresentational and conventional group. The conventional group did not have such significant movement. Deep understanding processing strategy instigated the change in metarepresentational group's reading comprehension performance which (the strategy) conventional group did not have. Read, below, a low achiever in metarepresentational group at phase II.

Question: Why do you like this passage (on sugar)?
Answer: The writer has knowledge, and well experience in

medicine.

The respondent processed the passage using deep understanding strategy to work out a critical answer.

This is total deviation that resulted from inability to employ appropriate comprehension processing strategy.

Answer: I use sugar anyhow and is sweet.

TABLE III
SUMMARY OF METAREPRESENTATIONAL AND CONVENTIONAL PROCESSING STRATEGIES THAT STUDENTS USED IN READING COMPREHENSION

Reading Comprehension Skill	Metarepresentation Processing Strategies	Sample Data	Conventional	Sample Data
Critical	Complex Understanding Strategy	Q: From what you have read, do you think the disease can be cured?	Direct copying from text	
		Ans: Yes the disease can be cure because doctors treat old people that suffer the sickness with giving them tablet and ask them to eat small carbohydrate food.		*Ans: In either case, however, it is necessary for the patience to monitor his urine regular to know how well he us responding.*
Inferential	Deep meaning understanding strategy	Q: Why is it difficult for doctors to diagnose the disease in children?	Guessing the answer	
		Ans: The disease is difficult, it confuses doctors to find		*Ans: The illness diagnose among the elderly while treated.*
Interpretive	Deep understanding strategy of processing reading comprehension	Q: Why is it difficult for doctors to diagnose the disease in children?	Guessing the answer	*Ans: The disease is dangerous.*
		Ans: The disease is difficult, it confuses doctors to find.		
Literal	Surface understanding processing strategy of reading comprehension	Q: State two factors that facilitate success.	Guessing the answer	Ans: Determination
		Ans: Man's will to succeed		

VI. IMPLICATION/ CONCLUSION

1) Metarepresentational strategies for reading comprehension processing have proved to be a reality in enhancing students' reading comprehension performance. Formal instruction in metarepresentational processing strategies for reading comprehension helped students performed better in reading comprehension.

2) Any metarepresentational processing strategy for reading comprehension to be taught must be carefully planned and executed. It should identify the proficiency level of students before exposing the students to the processing strategies. Teachers should encourage students to apply appropriate metarepresentational processing strategies as a life-long skill in reading comprehension.

3) Most of the studies reported so far on the effect of metarepresentational strategies on reading comprehension based on other findings on test administered immediately after instruction. A repeated test and continuous strategy instruction, as done in the present study provided another dimension to their findings.

VII. LIMITATION OF THE STUDY AND AREA OF FURTHER RESEARCH

The present study mainly concerned itself with cognitive processing of text material. Emotional, motivational and other affective variable could not be prevented entirely. Again multimodal effects involving pictures could equally not be ruled out. However, the finding showed significant differences in performance between the control and experimental reading comprehension strategies groups. This clearly indicated that the treatments were effective over accident events. All the same, over generalization based on a single study such as this one, limited to twelve (12) weeks, cannot be made.

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