

# EFFECTS OF SPECIFIC RETRIEVABLE IMAGES (SRI's) ON ENCODING AND RETRIEVAL BEHAVIOUR AMONG SENIOR SECONDARY SCHOOL STUDENTS

BY

M. E. INYANG - ABIA  
FACULTY OF EDUCATION  
UNIVERSITY OF CALABAR  
CALABAR.

## ABSTRACT

Available data from the study indicated a statistical difference between the students exposed to the SRI's and those who were not ( $t = 6.88$  and  $5.6$ ,  $df = 83$ ) for the rural and urban samples respectively. There was also significant difference between the performance of the male and female students who were exposed to the SRI's ( $t = 2.14$ ;  $df = 83$ ). The need to introduce formal courses on memory improvement and intensive use of specific visuals have been identified as measures to improve performance of learners.

## INTRODUCTION

What is learnt matters but how much is remembered matters more. Remembering depends, to a large extent, on encoding and storage strategies of the individual. The adage "Fast bound is fast found" cannot be more true here. The basis of human knowledge, effectiveness and success in business, industry, academics or private life is memory. Ability to recall facts, faces, methods, tactics, places or names among others at proper time is usually highly rewarded in various ways by the society. It also reinforces the individual concerned. On the other hand, forgetting can sometimes be very embarrassing, if not frustrating.

Transfer of learning cannot be successful if what was learnt in the past and in a different situation cannot be recalled for application in the new situation. Creativity too depends upon memory. McKee (1972: 157) says that when "memory items which are potentially available may not be accessible or retrievable at a given moment..." for use. In such a case, the learner is at a disadvantage. Gagne (1977) agrees that the prerequisite skills which are the components of the new skills must be mastered. In learning verbal information, he agrees that the learner must be able to store complex ideas in meaningfully organized manner. These cognitive strategies are internally organized skills used by learners to manage their process of attending, learning, remembering or thinking. They are the recall of relevant information and intellectual skills.

In spite of the importance attached to recall and emphasis on cognition, formal education hardly directly teaches strategies for encoding, retrieval or productive thinking. Yet the applicability of these strategies is very generalizable. Gagne (1977:36) points out that improved strategies of attending applies to all subjects irrespective of contents and that

generality of application would be true of strategies of encoding .... memory search, .... retrieval and .... thinking.

Some people appear to learn faster and remember more and longer. Intelligence apart, one can attribute that superiority to better encoding and retrieval strategies developed and employed for the required task. Gagne sees these people as having better learning, thinking and retrieval strategies. More often than not, people who have better intellectual strategies personally develop them on trial and error and as needs arise. They learn these strategies incidentally. Learners with such strategies certainly do perform better in related tasks than those without. And it takes some form of creative ability to develop appropriate encoding and retrieval strategies.

Those strategies can be helpful in multiplying learning power through independent thinking because according to Dirkes (1978:817) "when productive thinking and independent learning become accomplished goals for classroom instruction students use ideas in new ways ...." It is also important to note that how the learners channel their ideas into learning opportunities is an expression of creativity. Nevertheless Getzles and Jackson (1962) point out that the most creative student may not always be the most intelligent. But creative thinking has significant contribution towards academic success (Feldhusen, Treffinger, Van Monfrans and Ferrus: 1971) and career success (MacKinnon: 1966, Wallach and Wing: 1969).

In relation to encoding behaviour, Gagne (1977) and Gagne and Briggs (1979) suggest that although concrete visuals may ease encoding functions, cues in the form of previously learnt associations or organized structures can also be helpful. They agree that adequate practices with examples and non-examples can be very useful for the mastery of the strategies.

Well encoded materials are easily retrieved. And for materials to be adequately encoded for retrieval and transfer they must be "picturized." "Unpicturized" materials cannot provide adequate cues for effective retrieval. Retrieval, according to Gagne, is facilitated by events which provide cues for the enhancement of recall and transfer of learning .....

## The Problem

It is the contention of this writer that if learners are effectively and formally taught some encoding strategies using the Specific Retrievable Images (SRI's) their retrieval ability and performance can be increased. The purpose of this paper is therefore to



- (a) investigate the above contention using SRI's
- (b) discuss educational implications and
- (c) suggest some recommendations.

### Hypothesis

- Based on the above it is hypothesized that there is no significant difference in (1) the performance of students exposed to SRI's and those who are not.
- (2) the performance of students in urban schools and those in rural schools who are exposed to memory improvement strategies through the SRI's.
  - (3) the performance of male and female students who are exposed to the SRI's

### Subjects

The 170 participants in the study were drawn from four classes in two mixed schools, one in urban area, the other, rural. They were all from class one of the senior secondary level. The selection of the schools was based on assessability. Students of the SSS I were selected for the study because they are supposed to belong to the academic branch of the 6-3-3-4 system where the study could have much relevance.

The sample consisted of 82 girls with average age of 16.2 years ranging between fourteen and 18 years. The 88 boys had average age of 16.8 years; the range was 14.5 to 19 years. The sample from the rural area (78 of them) tended to have a slightly higher average age (16.7 years) than that from the urban (15.9 years)

### The Instrument

Four instruments were developed for the study by the researcher. The first consisted of ten specific retrievable images (SRI's) from which mental cues could be developed. These were adapted from Furst's (1977) Memory and Concentration section on lectures. These images were the pictures or drawings of tea (in a cup, Noah, May Pole, ray, law (policeman's right palm), jaw, key, fee (money), pea and zero.

The second instrument consisted of three sets of ten-item progressive test put on the back of discarded calendars. The tests were for pre-and post-instruction administration. The first test: The shopping list consisted of ten phrases such as: city shortcake biscuit, ~~seaman's~~ dog food, second-hand weather coat and Newman's ~~egg~~ among others. The second test consisted of command expression with

1. Go to the post office at 8.10 a.m.
2. Return the library books at 12.35 p.m.
3. See the doctor at 2.00 p.m. etc. The third test

consisted of ten pictures of unfamiliar people mobilized from post-cards and magazines. Half of them were females; they were given both foreign names, local names and a combination of these, but none bore more than two names and a title (Mr, Miss, Chief, Sister, Dr, Prof. etc). For example the fictitious name included things like Prof. Tanker Dolmer, Chief Fineface Oloibire, Miss Clariza Laugh etc.

The third instrument was a two-item questionnaire. Item one needed a "Yes/No" response on whether the respondents would like more information on how to improve their memory. The other question was an open-ended one on reason why such information was required.

The fourth instrument was a short lesson (treatment on memory improvement with emphasis on the use of key letters and their related words as are listed on instrument one described above. The major focus of the lesson was on two association techniques: exaggeration and motion.

### Procedure

The instruments were personally administered by the researcher to the subjects within the first two weeks of 1986/87 school year. The responses were collected back on the spot. The three sets of test (pre-post) were administered prior to and after the treatment under relaxed atmosphere but within specific time limits - ten minutes maximum for each test was allowed. Respondents were to study each list for three minutes before it was taken away; they were then asked to reproduce the list in correct order within the remaining seven minutes. Their responses were collected back immediately before the next set of test was administered. This procedure was carried out for both the pre-text and the post-text administration.

The treatment administered on both the control and the experimental groups were almost similar except that the control group missed the pictorial SRI's. Both groups received detailed explanation of the rudiments of memory improvement techniques. Instead of the SRI's in pictorial form the control was told to "try and picture" the images in their mind. Care was taken to emphasize the use of exaggeration and motion as two strategies that facilitate encoding and retrieval behaviour. A variety of examples were given too. A sentence memory aid for the SRI's was taught: The novice must remember longer; just keep forming pictures zealously (First: 1977). The relationship between the foundation words/pictures with the first letters of the memory aid words was established.

To the control group the key words were only written on the board without their corresponding pictorial images. The sentence memory guide was abridged to the key words and verbally emphasized. They were encouraged to form mental pictures (instead of being exposed to the SRI's in the form of pictorial images).

A session lasted for about two and half hours. Because of the novelty of the exercise and the variety of activities involved boredom was not observed. The



post-test was administered immediately after the "lecture". The responses were also collected back immediately before the two-item questionnaire was administered and collected back too.

### Data Analysis and Results

Percentage was used for determining the rate of increase between exposure and non-exposure to the SRI's incorporated in the lecture on memory improvement and as expressed in pre-post tests scores.

Responses from the two-item questionnaire indicated that all students (100% sampled) would like to know more about memory improvement. From the open ended questions emerged three major categories: Improved performance at school and examinations, problem of remembering and interest in memory studies, as major reasons why they would love more information on memory improvement.

Insert Table 1 about here

Table 1: Comparison of Pre-post Performance

Group	N	Pretest	Post test	%
		X	X	
Rural Students	85	7.12	14.73	106.8
Urban Students	85	7.4	14.85	100.67

In this study difference in student performance in the post-test was attributed to exposure and non-exposure to the SRI's. Table one shows the comparison between their pre-post instructional performance. Whereas their pre-test universal mean rises to 14.73 and 14.85 for them respectively. That shows an increased performance of 106.8% and 100.67% respectively following exposure to memory improvement lecture.

Independent t-test was used for analysing the post-test data based on the null hypothesis earlier specified. This enabled a comparison of the performance of the groups. Table 2 shows the t-test analysis of performance of learners exposed to SRI's and

Table 2: Comparison of Performance of the Experimental and Control Group.

Group	Variable	X	N	SD	t - ratio
Experimental	Rural	16.68	40	2.98	6.88*
Control	"	12.68	38	2.10	
Experimental	Urban	16.2	45	2.5	5.6*
Control	Rural	13.55	47	2.0	
Experimental	Rural	16.68	40	2.98	0.799*
Experimental	Urban	16.2	45	2.5	

df = 83

\* Significant at  $P < 0.01$

\*\* Insignificant at  $P > 0.05$

Insert Table 2 about here

those not exposed. Significant difference ( $t = 6.88, t = 5.6, p < 0.01, df = 83$ ) was observed within these two groups of students. The null hypothesis one was rejected because it was not confirmed by available data. This finding supports Gagne (1977) and Weaver and Rollinger (1969) that positive contributions can be made in support encoding and retrieval behaviour by SRI's generated within the inclusion of pictures as accompaniments to orally presented instruction.

The second null hypothesis was confirmed by the available data. It was upheld because no significant difference was observed in the performance of the students from rural and urban schools who were exposed to the SRI's ( $t = 0.799, p > 0.05, df = 83$ ). Although the control group was not exposed to the SRI's, it is interesting to note the high rate of improved performance as a side-effect of the experiment. This probably results partly from the association of the specific retrievable words with the other variables of the test and partly because of the effect of repeated exposure to the test.

Table 3 compares the performance data of the students by sex. No significant difference was observed between the performance of male and female students in the control and experimental groups of schools in both areas in the experimental group in urban.



Table 3: Comparison of Performance between Male and Female Students.

Group	Variable	X	N	SD	df	t - value
Experimental Rural)	Male	15.7	18	2.88	39	1.87*
	Female	17.4	22	2.85		
Control (Rural)	Male	12.6	20	1.94	37	0.26*
	Female	12.8	18	2.66		
Experimental (Urban)	Male	15.9	21	2.38	44	0.813*
	Female	16.5	24	2.57		
Control (Urban)	Male	10.1	29	2.08	46	6.1***
	Female	13.6	18	1.80		
Experimental (Universal)	Male	15.8	39	2.62	83	2.14**
	Female	16.9	46	2.02		
Control (Universal)	Male	11.4	49	2.01	74	3.8**
	Female	13.2	36	2.23		

\*Insignificant  $P > 0.05$

\*\*Significant  $P < 0.05$

\*\*\*Significant  $P < 0.01$

Insert Table 3 about here

Their t - values were 1.87, 0.26 and 0.813; their corresponding df = 39, 37 and 44 respectively, each at  $p = 0.05$ .

A very significant difference was however observed in the urban control group  $t = 6.1$   $p = 0.001$ ,  $df = 46$  and universal experimental and control groups where  $t = 3.8$ ,  $p = 0.05$  and  $df = 74$ ,  $t = 3.8$ ,  $p = 0.05$  respectively.

The female students were in each group observed to perform better than their male counterparts. This, coupled with the significant difference in the universal control and experimental groups point to the fact that there is a significant difference in the way male and female students learn and retain information. The null hypothesis there was therefore rejected. This finding seems to be one of the root causes of the conclusions reached at by other researchers that female students perform significantly better than their male counterparts particularly in the literacy subjects.

## DISCUSSION

The findings of this study greatly emphasize the need for integrating into formal education direct teaching on memory, improvement how to think and how to encode information to facilitate retrieval improvement. There is a growing need to introduce, at least in the General Studies Programme (GSS) of the various universities of this country for undergraduate students, a course: "Memory Improvement". If the idea that cognitive strategies lie at the root of all performance (cognitive, affective and psychomotor) then the need for formal learning of better cognitive strategies, rather than learning them incidentally, cannot be overemphasized.

Another very important implication here is the need for communicators to always supplement their verbal messages with specific visuals. This finding applies equally to teachers and guidance counsellors. Empathy, active listening, affective responses and most other interactive techniques currently adopted by guidance counsellors are merely based on verbal and non-verbal communication behaviour. The guidance counsellors need to integrate visual and other "communicators" into counselling sessions to be more effective. The reason as given by Gagne: 1977, Heinich, Molenda and Russell: 1982, Percival and Ellington: 1984 is that specific visual images are a very important type of memorial for encoding, storage and retrieval of information. It is also added here that these specific images reinforce the existing encoding and retrieval schemes.

The image-making function of visuals therefore improve with increasing specificity of the image. Images formed and

as a result of seeing a particular visual has a greater specific retrievability than description of the feature or phenomenon concerned. In other words, the more specific the retrievable images, the better the encoding function and the more the retrieved behaviour resembles the original. In this direction communication specialists and Educational Technologists (Cronkhite: 1976, Romiszowski: 1981, Davis, Alexander and Yelon: 1974, Heinich, Molenda and Russell: 1982) agree that the addition of visuals to oral and print information enables the target of information to encode the events depicted as specific retrievable images. That means specific visuals enable the formation of concrete images which are encoding devices and therefore provide the mental cues for effective retrieval behaviour. In this way the learners (or communications target audience) can benefit more and perform better.

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