

ENHANCING STUDENTS' RETENTION OF LEARNT MATERIALS BY PRIOR PRESENTATION OF BEHAVIOURAL OBJECTIVES

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This study aimed at investigating the effect of prior presentation of behavioural objectives of a lesson on students' retention of learnt materials. A quasi experimental pretest – posttest – control group design was used for the study. A total of four groups (comprising 208 senior secondary one SSI – students) from four different schools were taught for 6 weeks. Three of the groups were prior-presented with objectives on two broad topics in Biology (“Basic Ecological Concepts” and “Functioning Ecosystem”) at different time intervals before each lesson while the control group was taught without prior knowledge of behavioural objectives. The test instrument, Biology Achievement Test (BAT), comprised of a 50 item multiple choice questions, and was administered one week before the teaching as pretest and 3 weeks after the teaching as retention test. The data collected was analysed by Analysis of Covariance (ANCOVA) and Scheffe’s pairwise comparisons at 0.05 alpha level. Results indicated a significant enhancement in retention of learnt materials.

INTRODUCTION

Behavioural objectives of a lesson are usually written by teachers to clarify the intent of instruction and specify the desired changes the teacher hopes to bring about in the behaviour of the student due to the teaching/learning process. They also guide the teacher on the materials and methods of instruction that may be most effective in bringing about the desired changes (Onogwere, 2000).

Behavioural objectives may serve the purpose of motivating the learners. “When a list of behavioural objectives are made available to students, students will be able to focus their energies. By working through the list of objectives, they will have a more accurate idea of what is expected of them” (Uche and Umoren, 1998). Motivation has a tendency to increase meaningful learning, which makes for longer retention (Okoro, 2002). According to Chaugan (1978:228), “an animal is stirred to action when it has a demand for a particular goal”. Guat and Teh (1987) discovered that prior knowledge of objectives enhanced relevant learning. Also, Rughubir (1979) reported that “receiving instructions with prior knowledge of learning outcomes enhanced retention of learnt materials for a longer time”. Learning of science in schools has been beclouded with numerous limitations resulting in consistently poor performance of students in Senior Secondary Certificate Examination (SSCE) (Ajagun, 2000).

Ojerinde (1998) attributes this “discernible decline” to a number of factors, which may be related to the teacher, the student himself, the parent, the environment, government and examination bodies. Part of this problem may also be attributed to the fact that the learner always, do not know what he

is expected to learn and is therefore left dissatisfied and frustrated. This is because he does not know where he is going, how to get there, nor will he know when he has arrived (Onogwere, 2000).

OBJECTIVES OF THE STUDY

To find out if students will learn and retain more when prior presented with behavioural objectives than when not prior presented.

To find out if the time interval between when objectives are presented and the lesson presentation affects the effectiveness of the objectives.

STATEMENT OF HYPOTHESES

There is no significant difference in retention of learnt materials between students' prior presented with behavioural objectives and those not prior-presented.

The time interval between presentation of behavioural objectives and lesson presentation does not significantly affect students' retention of learnt materials

SIGNIFICANCE OF THE STUDY

Given the persistently poor performance of students in Senior Secondary Sciences, and the continuous quest for improvement of methods of teaching/learning, this study is significant in that it directs attention to an effortless, priceless aspect of teaching procedure (prior presentation of objectives) that is capable of improving science learning, but is grossly ignored in schools.

THEORETICAL FRAMEWORK

Mathison (1985) advances a number of theories based on experimental research to explain the facilitating influence of prior-presentation of objectives on student achievement and retention of learnt materials:

The restructuring theory holds that information is structured in different ways in long-term memory to aid retention.

The accessibility theory holds that prior-knowledge increases the accessibility of knowledge and consequently reduces the load on the working memory so that more information per unit can be processed.

The selective attention theory holds that attention is diverted selectively at passages relevant to prior knowledge, which are subjected to deeper level of processing.

The retrieval aid theory claims that prior-knowledge and access to relevant cognitive structures increases retrieval in the case recall of learnt materials (Dorchy, 1990).

Prior knowledge of objectives influences achievement and retention by:

Direction of the information.

Information processing in working memory

Storage in the long-term memory.

Retrieval of information from long-term memory (Park, 1993:78).

Behavioural objectives act as the pellet of food in the Skinner box experiment, stimulating the student to learn.

METHODOLOGY

Research design

The quasi-experimental pretest–posttest–control group design was employed as illustrated below:

O ₁ X ₁ O ₂	Prior presentation of objectives	2 days
O ₃ X ₂ O ₄	Prior presentation of objectives	1 day
O ₅ X ₃ O ₆	Prior presentation of objectives	immediately
O ₇ – O ₈	Control (no presentation of objectives)	

Where O₁ O₃, O₅ and O₇ were pretest for the various groups and O₂, O₄, O₆ and O₈ were posttest taken for retention.

Sampling procedure and sample

The sample consisted of 208 out of an estimated population of 15,000 SSI students in Cross River State of Nigeria. Four different schools in Calabar were purposively selected and separately assigned to different treatments to avoid contamination. Intact classes from the schools used were randomly assigned as experimental or control groups.

During the pretest, students were assigned numbers by which they were subsequently identified. At the end of the teaching and administration of the post test, these numbers were also used to select 52 students from each group by balloting, which formed the subjects of study.

Research instrument

The research instrument was developed by the researchers and comprised 50 multiple choice questions set according to the content specified for teaching and the set behavioural objectives.

The instrument was validated by fellow Biology teachers, and its reliability index determined by split half was 0.83.

Procedure

This study was carried out during the second term of the 2004/2005 academic session. Experimental and control group students were taught two broad topics “Basic ecological concepts” and “functioning ecosystems” for a period of six weeks. Students in the experimental group were shown behavioural objectives at different time intervals. Experimental group I, II and III were shown objectives two days, one day and immediately before the lesson respectively. The usual class teachers for these students were used as research assistants after due co-ordination. Before the commencement of the teaching, the research instrument was administered as pretest to the subjects of the study. Three weeks after completion of the teaching, the same instrument was administered again as retention test.

Data analysis

The data collected was analyzed by Analysis of Covariance (ANCOVA) with pretest as covariate, as well as Scheffe's pairwise comparisons.

FINDINGS

The first hypothesis was tested using analysis of covariance on retention scores with pretest scores as the covariate. (See Table 1.)

Prior presentation of Behavioural objectives	N	\bar{X}	SD	ADJ. MEAN \bar{X}
2 days before	52	44.35	8.32	46.08
1 day before	52	45.69	6.99	47.36
Immediately before	52	53.60	11.88	53.55
Control	52	45.25	8.80	43.50
Total	208	47.22	9.84	47.62

Table 1: Descriptive statistics of retention scores

From the descriptive statistics, those who were shown objectives immediately before the lesson retained learnt materials more than the rest of the groups ($\bar{X} = 53.60$). Those who were shown 1 day before the lesson retained next to those shown immediately before ($\bar{X} = 45.69$). The control group (those taught without being shown objectives) came next ($\bar{X} = 45.25$) while those shown objectives 2 days before the lesson retained least of learnt materials ($\bar{X} = 44.35$). When the means were adjusted for the covariate (pretest), the trend changed, with those shown objectives immediately before the lesson still coming highest ($\bar{X} = 53.55$) followed by those shown 1 day before ($\bar{X} = 47.36$) and then those shown 2 days before ($\bar{X} = 46.08$) with the control group coming least ($\bar{X} = 43.50$). (See Table 2)

Source of variation	SS	Df	MS	F	F _{crit}	Sign
Covariate	2613.42	1	2613.42	36.45*	3.80	.000
Main Effect (PPOO)	2098.90	3	699.93	9.76*	2.650	.000
Explained	4712.32	4	1178.08	16.43*	2.41	.000
Residual	14553.70	203	71.69			

Total	19266.0 2	207				
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Table 2: Analysis of covariance of effect of prior presentation of behavioural objectives on students' retention of learnt materials, with pretest as covariate

The result of the analysis of covariance (ANCOVA) showed that the differences caused by the prior presentation of behavioural objectives was significant ($F = 9.76$; $P < .05$) at 3 and 203 degrees of freedom. The null hypothesis was thus rejected

The second hypothesis of this study was to answer the question when is the best time to present objectives to students in order to have maximum enhancement of retention? The hypothesis, which stated that the time interval between when objectives are presented and the lesson presentation does not significantly affect students' retention of learnt materials, was tested by the Scheffe's pairwise comparisons of adjusted retention means. (See Table 3) Results showed that:

PPOO (I)	PPOO (J)	MEAN DIFFERENCE	STD ERROR	t	t _{crit} at 0.05
2 Days	1 day	-1.28	2.23	0.57	1.96
	Immediately	-7.47*	2.13	3.51*	1.96
	Control	2.58	2.25	1.15	1.96
1 day	2 days	1.28	2.25	0.57	1.96
	Immediately	-6.19*	1.70	3.64*	1.96
	Control	3.86	1.84	2.10*	1.96
Immediately	2 days	7.47*	2.13	2.10*	1.96
	1 day	6.19*	1.70	3.51*	1.96
	control	10.05*	1.70	5.91*	1.96
Control	2 days	-2.58	2.25	1.15	1.96
	1 day	-3.86*	1.84	2.10*	1.96
	immediately	-10.05*	1.70	5.91*	1.96

Table 3: Pairwise comparisons of retention means by prior presentation of objectives (PPOO)

Students who were shown objectives immediately before the lesson retained learnt materials significantly more than those who were shown 2 days before ($t = 3.51$, $p < .05$), 1 day before ($t = 3.64$; $P < .05$) and the control group ($t = 5.91$; $P < .05$).

Those who were shown objectives 1 day before the lesson retained significantly more than the control group (those taught without prior presentation of objectives) ($t = 2.10$ $P > 0.05$). Although they retained more than those shown objectives 2 days before the lesson, the difference was not significant ($t = 0.57 > 0.05$)

Those shown objectives 2 days before the lesson were not significantly different from the control ($t = 1.15$; $P > 0.05$) (though they retained higher) nor were they significantly different from those shown 1 day before ($t = 0.57$; $P > 0.05$) (though they retained less)

These findings lead to the rejection of the null hypothesis.

DISCUSSION

The result of this study showed a significant enhancement of retention of learnt materials by prior presentation of behavioural objectives. This finding corroborates Rughubir's report in 1979 that 'receiving instructions with prior knowledge of learning outcomes enhanced retention of learnt materials for a longer time'. The literature is replete with results that show that prior presentation of behavioural objective aids retention of learnt materials.

While it is not possible to eliminate forgetting, "we take steps to lessen it" (Chaugan, 1978). Prior presentation of objectives was intended to reduce rote learning which, according to Okoro (2002) is more prone to decay. In other words it was to encourage meaningful learning, which enhances retention. This study result contradicts Draper's claim (2001) that showing learner's objectives before the lesson may lead to "shallow" learning which leads to short retention". A plausible explanation for this result may be that the students were motivated by the objectives to learn as asserted by Uche and Umoren (1998).

From the results, although prior-presentation of objectives significantly enhanced retention, the longer the time interval between the objectives presentation and the lesson presentation, the lower the retention. A plausible explanation of the result is that those who were shown objectives 2 days and 1 day before the lesson would have forgotten the objectives even before the lesson. Thus they could not bring them to bear on the lesson as much as those who were shown immediately before the lesson, and hence, the significantly lower performance. This finding lends credence to Gagne's recommendation (Whittingham, 2001) that the 2nd event in learning/teaching should be to inform learners of the objectives "early in each lesson". He specifies that for each lesson, after introduction, the next step is to inform learners of what they are expected to learn from the lesson before the actual lesson delivery (which is what happened in the 3rd experimental group)

CONCLUSION

From the findings of this study, it could be concluded that prior-presentation of behavioural objectives significantly enhances student's retention of learnt materials. Also the time interval between behavioural objectives presentation and lesson presentation is significant in retention. The longer the time lapse, the less the retention and vice-versa.

RECOMMENDATIONS

Teachers should endeavour to write their behavioural objectives as well as make them available to students (preferably immediately) before the lesson.

Principals and schools supervisors should urge and prevail on teachers to show learners objectives before the lesson

Trainers of science teachers should emphasize the significance of showing learners objectives and ensure strict compliance during teaching practice

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