Full Length Research Paper

Prior presentation of behavioural objectives and students' achievement in biology

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This study investigated the effect of providing students with the objectives of a lesson before the lesson delivery on their achievement at the end of the lesson. Two hypotheses were formulated to guide the study. The quasi-experimental pretest-posttest-control group design was used, with a total of 4 groups. All four groups were taught the same lessons using the same materials and methods. Three of the groups were shown objectives at various time intervals before the lesson, while 4th group was taught without prior knowledge of behaviour objectives. The test instruments (Biology Achievement Test) consisted of 50 multiple choice objective- reference questions that were administered before the commencement of the teaching as pretest and after completion of the teaching as post-test. The data collected was analyzed by Analysis of Covariance (ANCOVA) and the Schefe's Pairwise comparison. The results indicated a significant effect at 0.05 alpha levels. The implications are discussed and recommendations made.

Key words: Prior presentation, behavioural objectives, students' achievement in biology.

INTRODUCTION

Behavioural objectives usually form the starting point of the lesson plan for effective teaching. In fact, planning of the lesson involves primarily, the setting of objectives while every other component involves how to achieve the set objectives and how to know if the objectives have been achieved. Onogwere (2000) summarizes the lesson plan as processes to answer the questions: "Where am I going? "How will I get there?" "How will I know when I arrive?"

Behavioural objectives, therefore, act as destinations, specifying where one intends to go. Thus, Denga (1987) asserts that "a lesson without objectives is like a journey without destination". Inyang-Abia (1988) also emphasizes that "if you know what you want, you can always tell when you get it; you can also reject those ones you do not want".

These destinations (objectives) are usually prepared or determined by the teacher, and in most cases reserved for themselves, principals and schools inspectors, but never for the students. Draper (2001) however, asserts that "clearly defined objectives provide students with a

means to organize their own efforts towards the accomplishment of those objectives". Uche and Umoren (1998) also felt that "when a list of behavioural objectives is made available to students, students will be able to focus their energies. By working through the list of objectives, they will have more accurate idea of what is expected of them". Guat and The (2002) carried out an investigation to determine the effect of showing learners objectives and discovered that students who were shown objectives performed significantly better than those who were not shown.

STATEMENT OF THE PROBLEM

The performance of students in senior secondary sciences in Nigeria has remained consistently poor (Ajagun, 2000). In fact, a survey of the performance of candidates in school science in Nigeria over the years reveals a discernible decline (Ojerinde, 1998). This decline, of course, is in spite of the various improved instructional materials and strategies well advocated of. This phenomenon has remained a source of concern to science educators and educational experts (Nnaka and Anaekwe, 2004).

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It is possible that these various improved instructional materials and methods have failed to improve on the performance of candidates in sciences because they are expensive and are therefore not usually implemented. It is also possible that even where these materials and met-hods are used, they still fail to yield results because students are not usually told before the lesson what they are expected to learn.

The study therefore sought to answer the following questions:

1. Will students who are presented with behavioural objectives before the lesson achieve more than those nor presented?
2. When is the best time to prior present learners with behavioural objectives for maximizing achievement?

RESEACH HYPOTHESIS

The following hypotheses were formulated for testing:

1. There is no significant effect of prior presentation of behavioural objectives on students' achievement in Biology
2. The time interval between when behavioral objectives are presented and when the lesson is delivered does not significantly affect students' achievement in Biology.

METHODOLOGY

To test the above hypothesis, the quasi-experiment pre-test posttest-control group design was used. A total of 4 groups were used: the 1st group was shown objectives 2 days before the lesson, the 2nd group was shown objective 1 day, before the lesson, the 3rd group was shown objectives immediately before the lesson. The 4th group served as the control (was not shown objectives). See illustration below $0_1 x_1 0_2$ shown objectives 2 days before the lesson

$0_3 x_2 0_4$ shown objectives 1 day before the lesson
$0_5 x_3 0_6$ shown objective immediately before the lesson
$0_7 - 0_6$ not shown objectives control

The population of study comprised about 15,000 SS 1 students of Cross River State, Nigeria. The sample comprised 208 SS 1 students (52 in each group). Four schools in Calabar were purposively sampled for proximity and ease of coordination. Each school represented a group where intact classes were used.
To select the sample, numbers were assigned to students in the intact classes in each school during the pre-test. These numbers were then used to sample 52 sub-jects in each school by balloting, making a total of 208 subjects.

All the four groups were taught using research assistants which were the respective SS 1 biology teachers in the schools selected. The researcher prepared the lesson notes on the topics: "Basic ecological concepts" and "functioning ecosystem". The teachers were coordinated to minimize differences that may arise as a result of differences in lesson presentation. The teachers of the experi-mental groups were directed to show students the objectives accordingly.

Table 1. Means and standard deviations of achievement score by prior presentation of behavioural objectives (PPBO).

PPBO	N	MEAN (X)	STD	ADJ MEAN (X)
2. Days	52	47.85	9.80	49.80
1 day	52	52.90	10.21	54.69
Immediately	52	61.40	12.83	61.28
Control	52	52.73	12.31	53.17

These differences were then tested by ANCOVA. (See table 11)

The research instrument (Biology Achievement Test) comprised 50 multiple choice questions prepared accord-ing to the content and the set behavioural objectives. It was validated by showing it to expert biology teachers. Its reliability index was determined by the split half method to be 0.83 of the teaching to obtain pretest scores. The instrument was administrated one week before the com-mencement. At the completion of the teaching (6 weeks) the instrument was again administered to obtain achieve-ment scores. Each correctly ticked item attracted 2 marks.

ANALYSIS OF DATA

Hypothesis 1 was tested by analysis of covariance (ANCOVA) with pretest as the covariate. Hypothesis 11 was tested by Shefe's pairwise comparisons of the adjusted group means.

RESULT

Hypothesis 1: There is no significant effect of prior presentation of behavioural objectives of students' achie-vement in biology. The results of the analysis of this hypothesis are shown in Tables 1 and 2. From Table 1, it can be seen that the adjusted mean scores of students who were not shown objectives before the lesson was least (x 6. 90) while those who were shown objectives immediately before the lesson performed highest (x-61.28). Those who were shown objectives 1 day before the lesson performed next highest (x = 54.69) and those who were shown objectives 2 days before lesson came next to the least (with x = 49.80).

Results from Table 1 show that the main effect was significant (F–15.69; p<0.05). This implies that students who were not shown objectives. Consequently, the null hypothesis was rejected for the alternative.

Hypothesis 2

The interval between presentation of objectives and lesson presentation has nor significant effect on students' achievement in Biology. Since prior presentation of objec-tives was found to have significant effect on achievement, this hypothesis was to determine the best time to show learners objectives before the lesson.

This hypothesis was tested by Schefe's pairwise com-parison of adjusted mean scores of the different groups (Table 3).

Table 2. Analysis of Covariance (ANCOVA) of achievement scores by prior presentation of objectives with pretest as covariate

Source variation of	sum of squares	Df	mean square	F
Covariate	4285.35	1	4285.35	41.20*
Main effect	4897.12	3	1632.37	15.69*
Explained	9182.47	4	2295.6	22.07
Residual	21116.69	203	104.02	
Total	30299.16	207		

Significant at 0.05 alpha levels.

Table 3. Pairwise comparison of adjusted achievement means scores.

PPBO I	PPBO(J)	Mean difference	STD error	t
2 days	1 day	-4.89	2.77	1.77
	Immediately	-11.49*	2.64	4.35*
	Control	2.89	2.78	1.04
1 day	2 days	4.89	2.77	1.77
	Immediately	-6.60*	2.11	3.42*
Immediately	2 days	11.49*	2.64	4.35*
	1 days	6.60*	2.11	3.13*
	Control	14.38*	2.11	6.82*
Control	2 days	-2.89	2.78	1.04
	1 day	-7.79*	2.78*	3.42*
	Immediately	-14.38*	2.11	6.82*

Mean diff significant at 0.05 alpha level.

The results in Table 3 indicated that:

1. The mean of those who were shown objectives immediately before the lesson was significantly higher than: 2 days before (t = 4. 35, P > 0.05), 1 day before (t = 3.13, P < 0.05) and control (t = 6182, P> 0.05).
2. The mean of those who were shown objectives 1 day before the lesson was significantly higher than the control (t = 3.42, P < 0.05). Although it was also higher than those who were shown objectives 2 days those who were shown objective 2 days before, the difference was not significant (t = 1. 77 P > 0.05)
3. The mean of those who were shown objectives 2 days before the lesson was higher than the control, though the difference was not significantly (t = 1.04, P > 0.05).

This result indicated that the time lapse between when objective are presented and when the lesson is actually presented is significant at 0.05 alpha levels. Thus the null hypothesis was rejected.

DISCUSSION

The main objective in this study was to determine the effect of prior presentation of objectives on students' achievement in biology. From the results of the analysis as shown in Tables 1 and 2, students who were shown objectives before the lesson was presented performed significantly higher than those who were not shown objectives at 0.05 alpha levels. This is in agreement with Guat and Teh's findings in (2002). They discovered a statistically significant difference at 0.05 alpha level favouring students who were given objectives before the lesson. It is also in harmony with Ragbubirs (1979) reports that prior knowledge of learning outcomes enhances student's performance in achievement tests.

This finding implies that the students prior presentation with objectives, because they knew what was expected of them to learn, were more focused, able to organized their efforts and channel led their energies toward achieving the expected objective. Thus, they were able to achieve more than those who were not prior presented.

Having found out that showing learners objectives before the lesson enhanced their achievement, the next objective of this study was to find out when is the best time to present learners with behavioural objectives for maximum achievement. Results of the pairwise comparisons (Table 3) show that the shorter the time interval between presentation of objectives and actual lesson presentation, the higher the performance in achievement tests.

The fact that those who were shown objectives immediately before the lesson performed significantly highest corroborates with Gagne's proposal in his nine events of learning that the second event in a lesson is to show learners objectives "early in each lesson" (Whittingham, 2001). The significantly lower performance of the groups that were shown objectives immediately before the lesson suggest that the longer the time interval, the less the effect of the objectives.

A plausible explanation for this is that those who were shown objectives 2 days and 1 day before the lesson could have forgotten about the objectives before the lesson, and therefore could not bring them to bear on the lesson to be able to organize their efforts, unlike those shown immediately before the lesson.

Conclusion

This study reveals that the principles and effortless process of letting learners know the behavioural objectives of a lesson before the lesson significantly enhances achievement of students. It also shows that the best time to show learners the objectives is immediately before the lesson in order to have maximum enhancement of achievement.

RECOMMENDATION

Following the discoveries from this study, it is recommended that:

1. Teachers should endeavour to show learners objectives before the lesson (preferable immediately before).
2. Principals and schools inspectors should insist that teachers show learners objectives before the lesson, and also may include it in their routine checks. Teachers should ensure that their test items actually stem from the set objectives.
3. Trainers of science teachers should emphasis the significance of showing learners objectives

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