INDIVIDUALIZED LEARNING METHOD, A STRATEGY FOR ACHIEVING VIABLE TECHNOLOGY EDUCATION AMONG FEDERAL UNIVERSITY OF TECHNOLOGY STUDENTS IN MINNA, NIGER STATE

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Abstract

The study examined individualized learning method on viable technology education among Federal University of Technology students in Minna, Niger State. Two research questions were raised and two null-hypotheses were tested at 0.05 level of significance. Two hundred and seventy (270) students drawn from three schools (Faculties) from Federal University of Technology, Minna were used as sample for this study. The design adopted was pretest posttest control group design. The experimental group was taught in individualized method using computer assisted instruction while control group was taught using lecture method. The major finding of the study showed that there were significant differences between individuals that were taught with computer assisted instruction. The result also revealed difference in the ability levels of student (high, medium and low) in both experimental and control groups. Based on the findings, it was recommended that computer assisted instruction should be used in individualized method to enhance low level learners especially in the higher institutions of learning.

Introduction

In individualized structured learning, students engage in wider study to cover a wider area and within the group, they also struggle in an effort to determine who is best and this gives room for more competition among students in the classroom. Individuals can succeed without the group. Students in independent structured classrooms work by themselves to accomplish goals unrelated to those of the other students or teacher. Here the individual is allowed to work according to his own pace; also in the group, students work together to attain their individual goals despite group work. In the individualized learning classroom structure, students interact with computer, discuss subject matter in a more convenient manner. A school of thought perceives computer-assisted instruction as an instructional methodology which provides opportunities for students to develop skills in an individualized and group manner (David, 1994).According to Benedict (1998), computer-assisted instruction promotes more positive attitudes towards the instructional experience than conventional methodologies. Students feel more relaxed, confident and comfortable working individually. Whiston (1998) reported that students are more likely to acquire critical thinking skills and cognitive learning strategies, such as learning how to learn in a small group or as individuals.

Individualized learning is the umbrella terms for a variety of educational approaches involving personal intellectual efforts by student or students and teacher together. Students work to attain individual goals that cannot be obtained by working in group or by working competitively. Computer-assisted instruction (CAI) designed for learning has been found to be effective but the question is how effective is individualized learning? Many researchers have indicated that using computer-assisted instruction for individualized learning improves students' learning and increases their academic achievement and problem-solving skills? Jack (2000) observes that putting students individually during learning is enough because the student needs a clear goal structure and free from anxiety in learning.

Many educationists and researchers (Deed, 2001; Umeh, 2004; Alexander, 2000) have recognized the potentials and effectiveness of computer-assisted instruction in teaching and learning process. Computer-assisted instruction can be used to enhance learning in individual students and make it more meaningful when properly used. Computer-assisted instruction can provide routine drill and practice and keep students on task, learning on their own with emphasis on knowledge acquisition to promote academic performance. Computer-assisted instruction offers educators the opportunity to provide a new approach to learning and this new approach would in turn assist students to work individually. According to Belty (2000) computer-assisted instruction promotes greater quantity and quality of daily achievements in problem solving and academic excellence. He went further to say that computer-assisted instruction is more task-related, student-student instruction and increases the perceived status of female students. There are many reasons to support the argument that using computer-assisted instruction (CAI) improves student learning in individuals.

Research Questions

The study sought answers to the following research questions:

1. What is the difference in the achievement of students taught using computer-assisted instructional package in individualized learning settings?

2. What is the difference in the achievement of high, medium and low achievement level students taught using computer-assisted instructional package in individualized learning setting and those taught with conventional method?

Research Hypotheses

Two null hypotheses were formulated and tested at 0.05 alpha levels.

HO_1: There is no significant difference in the mean achievement scores of students taught using computer-assisted instructional package in individualized learning settings.

HO_2: There is no significant difference in the achievement of high, medium and low level students taught using computer-assisted instructional package in individualized learning setting and those taught with conventional method.

Method

The method adopted for this research was pretest-posttest control group design. One experimental group and one control group were involved in the study. The two groups were pretested in the first week to determine their entry equivalence.

Two hundred and seventy (270) students drawn from three schools (Faculties) from Federal University of Technology, Minna were used as sample for this study. The sample was randomly selected using hat-draw method. The experimental group was taught in individualized method using computer assisted instruction while control group was taught using conventional. According to Daramola (1995), a simple random sampling technique is a sampling procedure in which each element in the population has equal chance of being selected from three schools of the institution.

RESULTS

Hypothesis One (HO_1)

There is no significant difference in the mean achievement scores of students taught using computer-assisted instructional package in individualized learning settings.

Table 1: Means and Standard Deviation of the Post Test Scores of the Experimental and Control Groups

Variable	N	$\bar{X}$	S. D
Individualized Group	90	73.978	6.534
Control Group	90	80.867	5.987

Table 1c shows the means and standard deviation of the individualized and control groups are 73.978, 80.867 and 6.534, and 5.987 respectively. To find if the differences were statistically significant, the ANOVA statistic was used.

Table 2: Shows the ANOVA Comparison of the Posttest Achievement Scores of Individualized and Control Groups.

Sources of Variation	Sum of Square	df	Mean square	F_{cal}	Sgn Level
Between Groups	4774.050	1	4774.050	79.243*	0.0001
Within groups	5158.011	178	28.978		
Total	**9932.061**	**179**			

* - Significant at 0.05 level of significance.

Table 1 shows the ANOVA comparison of achievement scores of the individualized and control groups. From the table, the calculated F value is 79.243 at 0.0001 level of significance (F_{cal}=79.243, df = 2,267, P<0.05). This indicated that there were statistically significant differences among the two groups. Therefore, hypothesis One was rejected.

Scheffe's Post hoc test on Individualized and Control Groups

Variable (i)	Variable (j)	Mean Diff	Sign Level	Remarks
Exp. Group	Exp. Group	-10.3000*	0.000	Sig.
Control	Control Group (Conventional)	3.411	0.000	Sig.

From table above there was significant difference in the mean achievement scores of individualized learning groups is not in favour of conventional method. Similarly, there was significant difference in the mean achievement scores of individualized and control in favour of individualized group. From the table, the individualized group performed better than the control group with a mean difference of -10.3000. Since ANOVA indicated that there were significant differences among the two groups, there was need to carry out the post hoc test in order to find out the direction of the differences. Table 1b shows the result of Scheff's post hoc test on the mean scores of the two groups.

Hypothesis Two (HO_2)

There is no significant difference in the achievement of high, medium and low achievement level students taught using computer-assisted instructional package in individualized learning setting and those taught with conventional method.

Table 3 Mean and Standard Deviation of the Post Test Scores of High Medium and Low Achievement Levels of Individualized and Control Groups

Variable	No. of Sample	Mean	Standard Deviation
High Ind.	30	77.200	6.359
Medium Ind.	30	73.500	6.084
Low Ind.	30	71.233	5.900
High Control	30	83.100	5.797
Medium Control	30	80.633	5.474
Low Control	30	78.733	6.085

The table above shows the mean and standard deviation of the post test of high, medium and low achievement level students in individualized and control groups. The table shows that there was difference in the mean scores of the two (2) groups. The mean score of the high individualized group was 77.200, the medium individualized group was 73.50, while the mean score of the low individualized group was 71.233. The table indicates that the high control and the medium control groups had the highest means of 83.100 and 80.633 respectively. This means that they performed better than the experimental individualized learning group.

Table 4: ANOVA Comparison of the Post Test Mean Scores of High, Medium and Low Achievement Levels for Individualized and Control Groups

Sources of Variation	Sum of Squa re	df	Mean squa re	F_{cal}	Sgn Level
Between Groups	2940.000	5	588.000		
Within groups	6173.200	174	35.478	16.574*	0.0001
Total	**9113.200**	**179**			

* - Significant at 0.05 level of significance.

The table shows that the calculated F value was 16.574 significant at 0.0001 level (F_{cal} = 16.574; df = 5,174; P<0.05). This indicated a statistically significant difference in the mean achievement scores of the groups. Therefore, hypothesis two was rejected.

Since ANOVA indicated that there was significant difference between the groups, there was need to find out the direction of the difference using the post hoc test.

Table 5: Summary of Scheffe's Post Hoc Multiple Comparison Table for High, Medium and Low Achievement Levels for Individualized and Control Groups

Variable (i)	Variable (j)	Mean Diff	Sign Level	Remarks
High Ind.	Medium Ind.	3.700	0.332	No. Sig.
	Low Ind.	5.967	0.012	Sig.
	High Control	-5.900	0.014	Sig.
	Medium Control	-3.433	0.421	Not. Sig.
	Low Control	-1.533	0.963	Not Sig.
Medium Ind.	Low Ind.	2.266	0.824	Not. Sig.
	High Control	-9.600	0.000	Sig.
	Medium Control	-7.133	0.001	Sig.
	Low Control	-5.233	0.046	Sig.
Low Ind.	High Control	-11.866	0.000	Sig.
	Medium Control	-9.400	0.000	Sig.
	Low Control	-7.500	0.000	Sig.
High Control	Medium Control	2.466	0.765	Not Sig.
	Low Control	4.366	0.156	Not Sig.
Medium Control	Low Control	1.900	0.909	Not Sig.

The table shows the summary of the Scheffe's post hoc on the achievement of high, medium and low achievement levels for individualized and control groups at post test. The table shows that there was no statistically significance difference between the mean achievement scores of students in the high individualized group and those in the medium individualized group. However, there was statistically significance difference in the mean achievement scores of students in the high individualized group and those in the low individualized group in favour of high individualized group. Also there was statistically significant difference in the mean achievement scores of students in the high individualized group and those in the high control group in favour of high and practice group. The results show that there was no statistically significant difference in the mean achievement scores of students in the high individualized group and those in the medium control group. Similarly, there was no statistically significant difference in the mean achievement scores of students in the high individualized group and those in the low control group. There was no statistically significant difference in the mean achievement scores of students in the medium individualized group and those in the low individualized group. There was a statistically significant difference in the mean achievement scores of the medium individualized group and high control group in favour of the high control group. Similarly, there was a statistically significant difference in the mean achievement scores of medium individualized and medium control group in favour of the medium control group. Also, there was a statistically significant difference in the mean achievement scores of the medium individualized group and the low control group.

Discussion of Results

The discussion is based on the research questions and the corresponding hypotheses. The results obtained from the test of the first hypothesis show there was significant difference in the mean achievement scores of individualized (79.243) and that of control group (80.867) in favour of the individualized group. Therefore, hypothesis one (1) was rejected. From the above result it is clear that the individualized group performed better than the conventional group. It could be as a result of the fact that the individualized gave answers to the questions by thoroughly thinking through.

There was significant difference in the performance of high, medium and low achievement learners in individualized learning and control groups when taught with computer-assisted instructional package. The results obtained from the test of the hypothesis indicated that there was no significant difference in the mean achievement scores of high individualized and medium individualized learners. Also there was no significant difference in the mean scores of medium and low individualized groups. From this result, it could be deduced that with computer-assisted instructional package there may be enhanced achievement of medium and low level learners. The result also shows that there was no significant difference between the high control and medium and low control. This could be as a result of repeated teaching and learning of a particular topic before evaluation. However, there were significant differences in the mean achievement scores of high, medium and low control and individualized groups in favour of control.

Summary of the Findings

The finding from hypothesis one indicated that there was significant difference in the performance of secondary school students taught using computer assisted instructional package in individualized learning settings and those taught with conventional method (control). It was indicated form the finding form the hypothesis two that there was significant difference in the achievement of high, medium and low achievement level students taught using computer assisted instructional package in individualized learning setting and those taught with conventional method.

Conclusion

Conclusion arising from the findings of this study indicates that instructional methods that teachers employ in teaching and learning have significant effects on students' achievement. If students are exposed to computer-assisted instruction strategies individually in which they constructively interact freely. Their performances in all courses could be enhanced.

Computer-assisted instructional package has been put to test in individualized learning and has been shown to be effective.

Recommendations

Computer-assisted instructional package was more effective in the individualized teaching and learning setting. It is, therefore, recommended that teachers should expose students to computer-assisted instructional packages in individualized learning method in order to promote and encourage, active learning, motivation, learning by doing and learning by experience.

It is therefore recommended that:-

(1) The use of individualized method of teaching should be greatly encouraged. This is because the students' achievement when taught using computer-assisted instructional package in individualized learning setting enhanced thinking which will eventually produce outstanding students that can be productive with or without support.

(2) The computer-assisted instruction package in individualized learning settings enhanced the performance of high, medium and low achievers equally.

(3) University lecturers should be encouraged to be computer literate. This will enable them to appreciate and use computer-assisted learning methods to promote effective teaching and learning. To achieve this, the institution should endeavour, as a matter of commitment, to provide the schools with needed computer facilities, manpower as well as routine maintenance.

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