

EFFECTS OF COOPERATIVE LEARNING ON ACADEMIC ACHIEVEMENT OF RADIO AND TELEVISION SERVICING TRADE STUDENTS IN TECHNICAL COLLEGES OF TARABA STATE, NIGERIA

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Abstract

This study determined the effects of cooperative learning on academic achievement of technical college students. Two research questions and one hypothesis guided the study. The population of the study was 84 technical college students who were grouped into experimental and control groups. The non-equivalent control group, pretest-posttest quasi-experimental design was adopted for the study. Four topics from the 2007 National Board for Technical Education approved curriculum were used for the treatment. The Pretest and posttest instruments were face and content validated and then trial tested. Reliability indices of 0.86 and 0.76 were obtained for pretest and posttest respectively. The two instruments were used for data collection. The research questions were answered using mean and standard deviation while the hypothesis was tested using z-test. The study found that cooperative learning enhances academic achievement of radio television and electronics students, hence recommended implementation of cooperative learning in technical colleges.

Keywords: Cooperative learning, conventional learning, achievement test, technical college students, effect.

1.0 Introduction

Teaching and learning is a transaction between the teacher and the learner. The teacher, acting as a source transmits the knowledge and the learner acting as a sink takes in the knowledge. This practice is supported by rugged individualism where each student learns by him/her self. This practice has a problem of transmitting limited amount of information to the learner, leading to cramming bits of information rather than understanding the whole. Attempts to improve upon the effectiveness of teacher-learner transaction brought in other instructional practices such as

cooperative learning. Cooperative learning is a teaching method which provides opportunity for students to develop skills and knowledge in group interactions and teamwork (Sharan, 2010).

Technical education at technical college level is designed to prepare individuals to acquire practical skills, basic and scientific knowledge and attitudes required as craftsmen and technicians at sub-professional level (Federal Government of Nigeria [FGN], 2004). Radio Television and Electronics (RTVE) Works servicing trade is one of the engineering trades offered at technical college level in Taraba State, Nigeria. The trade is designed to expose students, to the art of installing, maintaining and servicing of electronic devices and systems (National Business and Technical Examination Board [NABTEB], 2007). RTVE curriculum was designed for National Technical Certificate (NTC) programme to meet the following objectives specified by NABTEB (2001):

1. acquisition of knowledge and understanding of the basic concepts and principles of radio, television and other electronic devices,
2. acquisition of skills to build and test simple electronic devices and systems, and
3. acquisition of skills for fault finding, servicing, maintenance and repairs of electronic products.

However, study by Okorie (2001) identified several factors standing against the successful implementation of these objectives. One of such factors identified was a teacher-related problem, which is the instructional strategy adopted by technical teachers in technical colleges. The teachers' inability to use appropriate teaching methods in the classrooms negatively affects students' ability to acquire the necessary attitudes, knowledge and skills required to produce a workforce for industrial development of the Nigerian nation. This also retards the implementation of the Nigerian National Policy on Education.

Students, by design pass through programs of instruction and the effect of such instruction on them is measured by one or more test instruments such as achievement test. Achievement test measures knowledge and skills acquired from school instruction (Sidhu, 2007).

Application of cooperative learning to education is a universal practice as Johnson and Johnson (2009) noted that cooperative learning is now utilized in schools and universities throughout most of the world in every subject area and from preschool through graduate school and adult training programs. This study, therefore, explored the effects of cooperative learning on academic achievement of students who offered RTVE in Taraba State Technical Colleges.

2.0 Theoretical Framework

This study is hinged on social interdependence theory. This theory is rooted in the school of gestalt psychology, and it focuses on the study of perception and memory by employing methods of introspection, observation and experiment (Sperling, 1957).

Johnson and Johnson (2009) stated that "building on the principles of gestalt psychology, Kurt Lewin (1935, 1948) proposed that the essence of a group is the interdependence among members that results in the group being a *dynamic whole* so that a change in the state of any member or subgroup changes the state of any other member or subgroup. Group members are made interdependent through common goals" (p.2).

Cooperative learning emphasizes peer interaction and group learning through social interdependence where inputs of the individuals bring out effective understanding of the structural whole and not just a part.

3.0 Methodology

This study employed the non-equivalent control group quasi-experimental design.

Group	Pretest	Experimental Treatment	Posttest
Experimental	0 ₁	Taught RTVE Using Cooperative Learning Method	0 ₃
Conventional	0 ₂	Taught RTVE Using Conventional Learning Method	0 ₄

The population of the study was 84, which comprised of the intact classes of part II RTVE students of 2010/2011 academic session from four technical colleges in Taraba State. The population was split into two groups. Group one formed the experimental group and was taught RTVE using cooperative learning method while group two formed the control group and was taught RTVE using the conventional method of learning. Two research instruments; pretest and posttest, were used for data collection. The pretest and posttest instruments were face and content validated by experts from the Department of Electrical Technology Education, Federal University of Technology, Yola. The instruments were trial tested for internal consistency on 20 students in Government Technical College, Yola. Reliability coefficients of 0.86 and 0.76 were calculated for pretest and posttest instrument respectively. Pretest instrument was administered on the students to determine their entry level.

Four topics taken from the second term syllabus of the 2007 National Business and Technical Examination Board (NABTEB) approved curriculum for National Technical Certificate (NTC) program were used for treatment of the participants for a period of six weeks. Selected teachers from the four technical colleges were given orientation on how to use the teaching methods after which they assisted in given treatment to the participants. Pretest and Posttest were administered to the participants before and after the treatment respectively.

Two research questions in line with the specific purposes of the study and one hypothesis formulated and tested at 0.05 level of significance guided the research. Responses to the research questions were analyzed using statistical package for social sciences (SPSS), which yielded mean and standard deviation, while the hypothesis was tested using z-test. The research questions that guided the study are: (1) What is the difference between the pretest mean scores of the experimental and control groups and (2) What are the posttest mean scores of the experimental and control groups? The null hypothesis states that there is no significant difference between the posttest mean scores of the experimental and control groups.

Some control measures were taken during the conduct of this research. Maturation factor, which could act on experimental and control groups, and the effect of testing as a threat to internal validity were controlled by the introduction of control group while the effect of instrumentation was controlled by administering same tests to both experimental and control groups.

4.0 Results

4.1 Research Question 1: What is the difference between the pretest mean scores of the experimental and control groups?

Table 1. Difference between pretest mean scores of experimental and control groups.

	Experimental Group	Control Group	Mean Difference ($\bar{\chi}_d$)
Pretest Mean Score ($\bar{\chi}$)	38.9	43.1	4.2
Standard Deviation	9.37	15.76	

The pretest was administered to the participants to ascertain their entry level. Table 1 shows the difference ($\chi = 4.2$) between the pretest mean scores of the two groups, which reveals that the entry levels are close. Despite the closeness of the entry levels, the mean scores are both low, which indicates that both groups are fit for treatment.

4.2 Research Question 2: What are the posttest mean scores in achievement test of the experimental and control groups?

Table 2: Posttest mean scores in achievement test of experimental and control groups.

Learning Group	Achievement Test $\bar{\chi}$	Standard Deviation
Experimental	76.5	0.93
Control	59.2	1.56

Table 2 shows the mean scores of the experimental and the control groups. From the table, the control group has lower posttest mean score than the experimental group in the achievement test. This result vindicates the superiority of cooperative learning method to the conventional learning method. Hence, this finding is purely attributed to the effectiveness of the cooperative learning method used. It has been the purpose of any experimental study that the experimental group did better than the control group.

4.3 Hypothesis: There is no significant difference between the posttest mean scores of the experimental and the control groups in the achievement test.

Table 3: A z-test of difference between posttest mean scores of the experimental and the control groups in the achievement test.

Source of Variation	N	df	$\bar{\chi}$	Sd	SE	z-calc	z-crit	Decision
Cooperative method	42	19	76.54	6.00	0.93	15.11	± 1.96	S
Conventional method	42	40	59.22	10.06	1.56			

From Table 3 above, the z-calculated value (15.11) is greater than z-critical value (± 1.96), the null hypothesis is rejected, indicating that there is significant difference between the mean scores in achievement test of students taught RTVE using cooperative learning method and those students taught RTVE using conventional learning method.

5.0 Findings

On the basis of the research questions and the hypothesis formulated to guide this study, the following findings were made:

1. The entry level of the participants was found to be nearly the same.
2. After both groups had received the same treatment, the experimental (i.e. cooperative learning) group was assessed to have performed better on the posttest achievement test than the control (conventional learning) group.
3. There was a significant difference between the academic achievements of students taught RTVE using cooperative learning method and those students taught RTVE using conventional learning method.
4. Cooperative learning method enhances academic achievement of RTVE students.

6.0 Discussion of findings

The experimental (cooperative) group was assessed to have performed better on the posttest achievement test than the control (conventional) group. This finding vindicates the superiority of cooperative learning method over conventional learning method and it is also in agreement with the findings of Zakaria, Solfitri, Daud and Abidin (2013) who found out from their study on 'Effect of Cooperative learning on secondary school Students' Mathematics achievement' that cooperative learning enhances understanding and self confidence.

Findings from test of hypothesis revealed that the posttest means scores of cooperative (experimental) and the conventional (control) groups were significantly different in the achievement test. This finding is in agreement with that of Dheeraj and Kumari (2013) who found out that, the mean achievement of the students exposed to cooperative learning differs significantly from the mean achievement of the students taught through traditional method. This is also in conformity with the purpose of an experimental research, which according to Sambo (2003), is to show the superiority of experimental group over the control group, provided the finding is not influenced by any other factor, other than the treatment given to the experimental group.

7.0 Conclusion

Among the two learning methods investigated in this study for teaching and learning of RTVE trade by technical college students, the cooperative method of learning was found to be more effective than the conventional method, and that led to the students taught using cooperative learning method having higher mean score on the posttest. Consequently, it then follows that, the use of cooperative learning method enhances better performance by students in RTVE works.

8.0 Recommendations

On the basis of findings of this study, the following recommendations were made:

- 1) Ministry of Education, Taraba State should provide resources needed for the effective implementation of corporative learning method in her technical colleges.
- 2) Ministry of Education, Taraba State should organize seminars and workshops for technical teachers on the application of cooperative learning methods for effective skill acquisition in RTVE trade.

9.0 Suggestion for Further Studies

- 3) Similar study should be carried out with the view to identifying the most effective methods of instruction for teaching other trades in technical colleges of Taraba State.

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