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Effects of Team Teaching on Students Performance in Introductory Technology in Secondary Schools in Akwa Ibom State, Nigeria (Pp 41-54)

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Abstract

This pre-test post-test non randomized experimental study investigated the effects of team teaching on students' performance in Introductory Technology. A total 316 Junior Secondary School Two students were randomly selected from four schools in Akwa Ibom State for the study. Data for the study was collected using Introductory Technology Achievement Test (ITAT) which was developed and validated by the researchers. The obtained data were analysed with t-test statistics for research results. Students taught Introductory Technology through team teaching approach performed significantly better than students taught by a single instructor. It was

therefore recommended that every reasonable effort should be made to encourage teachers to adopt team teaching approach in the process of teaching Introductory Technology

Introduction

Education for work had its beginning many years ago. In vocational education, individuals are formally prepared for the world of work. Vocational education differs in both concept and status in different nations of the world. In Nigeria, vocational education programmes are offered at the pre-vocational and vocational schools at post-primary level, the technical colleges, the polytechnics, and colleges of technical education at post-secondary level. According to Udo (2004), vocational education is designed to develop skills, abilities, understanding, attitudes, work habits and appreciation that confer knowledge needed to enter and make progress in employment on a useful and productive basis. Pre-vocational subjects offered at the post-primary level include Introductory Technology, Practical Agriculture, Home Economics and Business Studies (Federal Government of Nigeria, 2004).

The Introductory Technology which is taught as part of the pre-vocational subjects to every student is designed as an integrated subject to introduce students to the basic rudiments of vocational subjects. According to Bamiro, Elewa, and Anyabolu (2002), Introductory Technology was introduced to

- (i) provide pre-vocational orientation for further training in technology,
- (ii) provide basic technological literacy for everyday living, and
- (iii) stimulate creativity in students.

The subject, according to Ohikhema (1994), provides knowledge in woodwork, metalwork, technical drawing, auto-mechanics and electricity and electronics at the introductory level and hence exposes students to Technical Education. Topics in Introductory Technology have been sequentially structured for the purpose of effective teaching. Obomanu (2001) had observed that Introductory Technology is an aspect of general education curriculum which attempts to provide learning experiences that would assist students in understanding the industrial and technological aspects of live by offering instructions in selected areas of metalwork, woodwork, electricity, plastics, ceramics, textiles and technical drawing. This implies a systematic

arrangement of all vocational subjects under one subject at the Junior Secondary School level.

After the establishment of Introductory Technology in schools, government envisioned that for its desired goals to be met, adequate facilities should be provided for effective learning. Consequently, sets of Introductory Technology equipment, machines and tools were provided to schools all over the country. Qualified teachers were also posted to schools for the teaching of the subject. There, however, appears to be a consensus of opinion that a positive effect of the subject has not been realised since its introduction (Ezendu, 2003). Reports from different states in Nigeria indicate poor performance of students in their Junior Secondary School Examination in Introductory Technology (Nwoji, 2000; Lenda, 2001). According to Ekefre (2003), many students cannot interpret simple machine drawings. The teaching of Introductory Technology does not provide appropriate job training and experience in any specific trade or industrial area. No student on completion of the course, can carry out simple daily maintenance of motor vehicle in terms of checking oil level and water level in the radiator. He ascribed poor performance of students in Introductory Technology to insufficient tools, equipment, materials and teachers. Usoro (1984) had earlier reported cases of insufficient number of Introductory Technology teachers in Anambra State.

The implementation of Introductory Technology programme is as crucial as its development. After the curriculum had been successfully developed and approved as an acceptable instrument for fostering the education of the youth for the attainment of the society goals, the school then seeks ways and means of implementing the curriculum in order to achieve the curriculum goals. The Introductory Technology teacher whose responsibility is to implement the curriculum must evolve the most effective means of implementing it at the classroom level. The traditional approach adopted in the teaching of Introductory Technology has been designated as individualistic teaching approach. According to Nwoji (2000), individualistic teaching approach is an approach whereby a single teacher teaches a class of students many subjects and singularly evaluates them. This method makes the teacher all in all in the classroom setting. The Introductory Technology teacher using this approach would normally teach very well in the subject areas or topics he knows best and definitely nothing in the areas he knows nothing about to the detriment of the students.

One of the approaches that could be used to facilitate instruction and learning of Introductory Technology is team teaching. Team teaching is traditionally a pedagogic approach or process in which more than one teacher are involved in instruction within a classroom. According to Robinson and Schaible (1995), in team teaching a group of teachers, working together, plan, conduct, and evaluate learning activities for the same group of students. Teams generally comprise staff members who may represent different areas of subject expertise but who share the same group of students and a common planning period to prepare for the teaching.

The authors further listed the benefits which may accrue from team teaching to include:

1. For the instructors, who so often work alone, team teaching provides a supportive environment that overcomes the isolation of working in self-contained or departmentalized classrooms. Being exposed to the subject expertise of colleagues, open critique, different styles of planning and organization, as well as methods of class presentation, teachers can develop their approaches to teaching and acquire a greater depth of understanding of subject matter of concern.
2. Team teaching leads to better student performance in terms of greater independence and assuming responsibility for learning. Exposure to views and skills of more than one teacher can develop a more mature understanding of knowledge often being problematic rather than right or wrong. Learning can become more active and involved. Students could eventually make inputs into team planning.

Statement of the Problem

Implementation of Introductory Technology programme in the classroom is plagued with several problems including the choice of the right teaching strategies. This has resulted in poor performance of the students in their junior secondary school examinations in Introductory Technology. Introductory Technology covers a wide range of discrete subjects that a single teacher in the present dispensation finds it a bit difficult to teach very effectively. It is a general-shop or-industry subject designed to equip learners with pre-vocational and pre-technical skills in many areas. Majority of teachers teaching the subject specialize in one or two component areas of the subject. It is only recently that Introductory Technology has been introduced as a teaching subject in just few of the institutions offering

programmes of studies in vocational teacher education. Until enough of these teachers are provided for the schools, adequate steps need to be taken to make effective use of the existing facilities in the implementation of Introductory Technology curriculum. Team teaching appears to be the most likely option in resolving the instructional problem.

The influence of gender in students' academic achievement has been a major concern to educational researchers for long, yet no consistent result has emerged. Okeke (1999) and Udofia (2009) reported that gender had no significant influence on achievement, while Mbaba (2006) and Ugonabo (2009) reported otherwise. The situation therefore sustains the curiosity of researchers and thus makes it necessary to continue investigating the influence of gender and team teaching on students' mean performance in Introductory Technology. The focal point of the problem for this investigation has been necessitated by the limited or absence of research evidence to indicate the influence of team teaching, among other related variables, on students' performance in Introductory Technology.

The Purpose of Study

The purpose of this study, therefore, was to ascertain the effect of the use of team teaching on students mean performance in Introductory Technology. Specifically, the study sought answers to the following research questions:

1. What is the difference between the mean performance of students in Introductory Technology when taught using team teaching approach and when taught by a single instructor?
2. What is the difference between the mean performance of male and female students in Introductory Technology when taught using team teaching approach?
3. What is the difference between the mean performance of male and female students in Introductory Technology when taught by a single instructor?

The Null Hypotheses

On the bases of the research questions, three null hypotheses were formulated for testing at $p \leq .05$ level of significance in order to provide answers to the questions.

H₀₁: There is no significant difference between students' mean performance in Introductory Technology when team taught and when taught by a single instructor.

Ho₂: There is no significant difference between the mean performance of male and female students in Introductory Technology when team taught.

Ho₃: There is no significant difference between the mean performance of male and female students in Introductory Technology taught by a single instructor.

Research Design and Method

This study involved a pre-test post test non randomized and quasi experimental design. The comparison of students' mean performance in Introductory Technology taught under two pedagogic approaches called for a quasi experimental design.

The investigation was conducted in Akwa Ibom State, Nigeria. Akwa Ibom State, created in 1987 is one of the 36 Nigerian states located in the South-East of Nigeria. It is bounded on the South and East by Cross River and Abia States respectively, and on the West by Rivers State. Akwa Ibom State has a population of 3.4 million (Ukpong, 2007).

The population for the study comprised 8873 Junior Secondary Two students in the 96 public secondary schools offering Introductory Technology subject. Criterion-sampling technique was employed to select 17 schools from the three senatorial districts for the investigation. By the criteria each of the selected public schools had:

- (a) well-equipped and functional Introductory Technology workshop, and
- (b) at least four Introductory Technology teachers.

By simple random sampling technique two senatorial districts were selected for the study. Two schools which met the stipulated criteria were randomly selected from each senatorial district. Thus, four schools out of the 17 were selected to participate in the investigation. The subjects in the two schools selected were randomly assigned to control and experimental groups. Finally, two intact Junior Secondary Two classes in each school constituted the time-place sample totaling 316 which actually participated in the study.

A 50-item multiple-choice test (Introductory Technology Achievement Test) developed and validated by the researchers was used to obtain data from the sample. Each test item had five response options with only one correct answer. To ascertain the reliability of the instrument, ITAT was trial tested

with 39 Junior Secondary Two students from a school which was not selected for the investigation. The data obtained were subjected to split-half reliability test and Spearman-Brown Prophecy formula. The resulting reliability coefficient was .73 which indicated that the instrument was sufficiently reliable for use in this investigation.

Experimental Procedure

Four lesson plans were prepared by the researchers on four topics in Junior Secondary Two third term Introductory Technology Curriculum Guide. The treatment conditions for the study were teaching using the team teaching approach (Experimental group) and teaching by a single teacher (Control group). The teaching lasted for four weeks. The regular Introductory Technology teachers in the selected schools were used for the study after receiving training from the investigators.

The Introductory Technology Achievement Test (ITAT) was administered as a pretest and the scores recorded before treatment commenced. One week after the treatment period was completed, post-test based on the Introductory Technology Achievement Test (ITAT) which contained the same questions as in the pre-test but arranged in different order was administered to the students. The students' scripts were marked and their scores recorded. The recorded scores constituted the data analysed into results.

Data Analysis and Research Results

Data analysis and research results are presented after each research question/hypothesis testing as follows:

Research Question 1: What is the difference between the mean performance of students in Introductory Technology when taught using team teaching approach and when taught by a single instructor?

Data analysis and research results related to Research Question 1 are summarized and presented in Table 1.

Data analysis in Table 1 indicates that the Mean of gain in scores of Introductory Technology students taught using team teaching approach (31.75) was greater than the Mean of gain in score of students taught by a single instructor (15.97). The analysis also indicates that the Mean of post-test scores of Introductory Technology students taught using team teaching (44.09) was greater than the mean of post-test scores of students taught by a single instructor (28.45). This implies that Introductory Technology students

taught using team teaching approach performed better than those taught by a single instructor.

Research Question 2: What is the difference between the mean performance of male and female students in Introductory Technology when taught using team teaching approach?

Data analysis and research results related to Research Question 2 are summarized and presented in Table 2.

Table 2 shows that the mean score gain of male students in Introductory Technology taught using team teaching approach (31.76) was a little higher than that of the female students taught using team teaching approach (30.95).

Research Question 3: What is the difference between the mean performance of male and female students in Introductory Technology when taught by a single instructor?

Data analysis and research results related to Research Question 3 are summarized and presented in Table 3.

Data analysis in Table 3 clearly indicates mean score gain of male (16.02) and female (15.20) students' performance in Introductory Technology taught by a single instructor. However, the post-test performance of male and female students in the single instructor group (28.61) was higher than the post-test performance of female students (27.55) in the same group.

Hypothesis 1: There is no significant difference between students' mean performance in Introductory Technology when team taught and when taught by a single instructor

The summary of testing Hypothesis 1 (H_{01}) is presented in Table 4.

The calculated t-value (3.54) as indicated in Table 4 far exceeds the critical t-value of t (1.96 at $p \leq .05$) under 312 degrees of freedom. The null hypothesis was therefore rejected in favour of the alternative one. The students' mean scores differed significantly under the two teaching methods.

Hypothesis 2: There is no significant difference between the mean performance of male and female students in their Introductory Technology when team taught.

The summary of testing Hypothesis 2 (H_{02}) is presented in Table 5.

Since the calculated t-value of 0.22 is less than the critical t-value of t (1.96) the null hypothesis was accepted on the basis of no significant difference between the mean performance of male and female students when taught Introductory Technology using team teaching approach.

Hypothesis 3: There is no significant difference between the mean performance of male and female students when taught Introductory Technology by a single instructor.

The summary of testing Hypothesis 3 is presented in Table 6.

As indicated in Table 6 the calculated t-value of 0.26 is less than its corresponding critical value of 1.96. The null hypothesis was accepted for the reason of no significant difference between the mean performance of male and female students in Introductory Technology when taught by a single instructor.

Findings of the Study

The results of the study are summarized as follows:

1. Students taught Introductory Technology through team teaching approach performed significantly better than students taught by a single instructor.
2. Male students in the team teaching group performed better in Introductory Technology than male students in the single instructor group.
3. Female students in the team teaching group performed better in Introductory Technology than the female students in the single instructor group.
4. There was no significant difference between the mean performance of male and female students in Introductory Technology when taught using team teaching approach.
5. There was no significant difference between the mean performance of male and female students in Introductory Technology when taught by a single instructor.

Discussion of Findings

The result of the investigation showed that a significant difference exists between the performances of students, both male and female taught using the team teaching approach and those taught by individual instructors. This

finding has supported the efforts of Jackson and Davis (2000) as well as Roffier (2002) that team teaching creates high professional growth and improved school climate which result in school improvement in terms of students' performance. The superiority of team teaching over individualistic approach has confirmed efforts of Whitefield (2000) and Washington (2001) in their reports that there had been significant improvement in the performance of students team-taught by a group of teachers over the performance of students in the traditional single teacher approach. The implication here is that the present crops of Introductory Technology teachers in the schools should see the need of getting together to plan and carry out the teaching of the subject using the team teaching approach. This also call for the need of the Ministry of Education and relevant agencies to make the provision for and encourage available technical teachers to employ team teaching approach in Introductory Technology. Team teaching approach has more growth merits than the single teacher approach.

The result also showed no significant difference between the mean performance of male and female students in Introductory Technology when taught by a team of teachers and when taught by an individual teacher alone. This implies that the male students do not perform better than the female students in Introductory Technology irrespective of whether they are team taught or taught by a single instructor. The non-significant difference in the academic performance of male and female students in Introductory Technology has supported the findings of Nwoji (2000). Team teaching approach is devoid of sex bias and does not discriminate on gender basis. It is, therefore, adequate for both the male and female students.

Conclusions

On the basis of research results and discussion of findings the following conclusions may be drawn:

Team teaching enhances male and female students' performance in Introductory Technology. Team teaching Introductory Technology is superior to single instructor approach because the former has more merits than the latter.

Recommendations

Based on the findings and conclusions of this investigation the following recommendations are proffered.

1. Introductory Technology teachers should get together and jointly plan and carry out the teaching of the subjects in their schools.
2. The Ministry of Education and relevant agencies should as a matter of policy deploy teachers who specialize in different component areas of Introductory Technology to jointly teach the subject in schools offering Introductory Technology.
3. The State Ministry of Education should organize seminars and workshops to educate technical teachers about the benefits of team teaching procedures and approaches.
4. The Ministry of Education should provide the relevant Introductory Technology facilities, equipment and instructional materials for the teaching of the subject.

Table 1: Pre-test and post-test performance of students in team teaching and individualistic teaching approaches

Teaching Approaches	N	Pre-test Mean	Post-test Mean	Mean Gain
Team Teaching	156	12.34	44.09	31.75
Individualistic	158	12.51	28.45	15.97

Table 2

Male and Female students' mean performance in Introductory Technology when team taught

Gender	N	Pre-test Mean	Post-test Mean	Mean Gain
Male	104	12.41	44.17	31.76
Female	52	12.24	43.19	30.95

Table 3

Male and female students mean performance in Introductory Technology when taught by a single instructor

Gender	N	Pre-test Mean	Post-test Mean	Mean Gain
Male	102	12.59	28.61	16.02
Female	56	12.35	27.55	15.20

Table 4: A comparison between the post-test mean performance of Introductory Technology students in team and individualistic teaching groups

Teaching Approaches	N	Mean Score	df	Calculated t-value	Table t P= .05	Decision
Team Teaching	156	44.09	312	3.54	1.96	Reject Ho
Individualistic Teaching	158	28.45				

Table 5: Comparison between the post-test performance of male and female student in Introductory Technology when taught using team teaching approach

Gender	N	Mean Score	df	Calculated t-value	Table t at p ≤ .05	Decision
Male	104	44.17	154	0.22	1.96	Accept Ho
Female	52	43.19				

Table 6: Comparison between the post-test performance of male and female students in Introductory Technology when taught by a single instructor

Gender	N	Mean Score	df	Calculated t-value	Table t p ≤ .05	Decision
Male	102	28.61	.56	0.26	1.96	Accept Ho
Female	56	27.55				

References

- Bamiro, O. A., Elewa, O. & Anyabolu, C. (2002). *Introductory Technology for schools and college*. Ibadan: Evans.
- Ezeudu, S. A. (2003). Instructional material needs of Introductory Technology classes in Enugu State. *Nigerian Journal of Curriculum Studies*, 10 (1), 138 – 147.
- Federal Republic of Nigeria (2004) National Policy on Education. Lagos: NERDC.
- Jackson, W. & Davis, G. A. (2000). *Turning Point 2000: Educating adolescents in the 21st century*. New York: Teachers College Press.
- Lenga, F. K. (2001). Girls' strengths and weaknesses in learning of science, mathematics and technology subjects. *Proceedings of FEMSA/AFCLIST Gender Workshop*. Nairobi, Kenya. December 6 -8.
- Mbaba, U. G. (2006). *Teaching strategies, students' characteristics and academic performance in Introductory Technology in Akwa Ibom State*. Unpublished Ph.D. Thesis, University of Uyo, Uyo.
- Mbakwem, J. N. (2003). School industry collaboration. The missing link. *Nigerian Journal of Curriculum Studies*, 10 (1) 207 – 214.
- Nwoji, R. J. (2000). Improving the teaching and learning of Introductory Technology through the use of media. *Journal of Science Teachers Association of Nigeria*, 16 (16), 45 – 50.
- Obomanu, B. J. (2001). Implementation concerns of the junior secondary school pre-vocational courses in Nigerian Schools: *Nigerian Journal of Curriculum Studies*, 8 (1), 173 – 178.
- Ohikhema, E. (1994). Implementation of Introductory Technology in secondary schools in Cross River and Akwa Ibom States. *Nigerian Vocational Journal*, 7 (1), 13 – 18.
- Okeke, E. A. C. (1999). Sex differences in understanding important biological concepts. *Nigerian Journal of Education*, 12 (1), 125 – 132.

- Roffier, S. (2002). How team teaching influences classroom practices. *American Middle School Journal*, 44: 23 – 27.
- Robinson, B. & Schaible, R. (1995). Collaborative teaching: Reaping the benefits. *College Teaching*, 43 (2), 57 – 60.
- Udo, E. E. (2004). Curriculum issues in vocational education: A proposal for a new order. *Nigerian Journal of Vocational Teacher Education*, 5(2), 184 – 192.
- Udofia, A. E. (2009). *Effects of e-learning and project methods on students psychomotor skill acquisition in Electrical Installation works in technical colleges in Akwa Ibom State*. Unpublished Ph. D. thesis, University of Uyo, Uyo.
- Ugonabo, J. A. (2009). Analysis of students' perceptions of Introductory Technology as a course in the junior secondary school. *Nigerian Vocational Journal* 8, 103 – 107.
- Ugwu, S. S. (2004). *A study of personnel needs of the 3-3 secondary school education system with reference to the teaching of Introductory Technology in Anambra State*. Unpublished M. Sc. Dissertation, University of Nigeria, Nsukka.
- Ukpong, E. A. (2007). *Akwa Ibom Economic Empowerment and Development Strategy* Uyo: Delse Printing And Advertising.
- Washington, K. (2001). In support of interdisciplinary teaming: The climate factor. *Middle School Journal*, 24 (4), 55 – 60.
- Whitefied, D. (2000). The effect of teaming and other collaborative arrangements. *Middle School Journal*, 19 (4), 22 – 25.