
EFFECTS OF GREENO PROBLEM-SOLVING INSTRUCTIONAL APPROACH ON STUDENTS RETENTION IN BLOCKLAYING AND CONCRETING IN TECHNICAL COLLEGES IN RIVERS STATE

By

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Abstract

The study was carried out to examine the effects of Greeno Problem Solving Instructional Approach on students' academic retention in Blocklaying and Concreting in technical colleges in Rivers State. The study adopted a quasi-experimental design. The population for the study consisted of all 2017/2018 National Technical Certificate Class Two (NTC II) students (male and female) from the four Technical Colleges in Rivers State, numbering 214. A sample of 124 was drawn from two technical colleges offering Blocklaying and Concreting using purposive sampling techniques. Three experts drawn from the Department of Technical Education, Ignatius Ajuru University of Education, Port Harcourt validated the instruments. Kuder Richardson formula 20 (K – R20) technique was used to estimate the reliability of the instrument which yielded 0.80. The hypothesis was tested at 0.05 level of significance, using analysis of covariance (ANCOVA). The findings of the study revealed that students taught with Greeno problem solving instructional approach had higher mean retention than those students taught using the conventional lecture method. The study recommended amongst others that Blocklaying and Concreting teachers should be encouraged to employ GPSIA in the teaching of the subject in all classes in technical colleges.

Keywords: Technical College, Greeno Problem Solving Instructional Approach, Blocklaying and Concreting and Retention

Introduction

Technical Colleges are regarded as principal vocational institution in Nigeria. Technical Colleges admit junior secondary school leavers. Entry could also be based on evidence of aptitude shown in the technical courses and a reasonably good performance in mathematics and science. Students who have proved exceptional able in the artisan training centres shall also be considered for admission and they are provided with a full vocational course of three years duration (Okoro, 2006). Technical courses or trades offered in Technical Colleges can be classified into engineering and construction trades (Okorie, 2001). According to Okorie, the engineering trades include auto-mechanics work, mechanical engineering craft practice, welding and fabrication, foundry, electrical installation and maintenance work, radio/television repairs and electrical work. The construction trades are the blocklaying, bricklaying and concrete work, plumbing and pipe-fitting, carpentry and joinery, furniture making, painting and decoration, cabinet making among others.

Therefore, Blocklaying and Concreting according to Amobi (2015) is defined as the art or science of erecting or constructing shelters or place or habitations for man or animal. Roy and Rogers (2012), stated that Blocklaying and Concreting is the application of applied technology in the construction industry. Barry (2012) contended that Blocklaying and Concreting depends on natural materials obtainable from the soil which includes stone, sand, clay and other materials like metal, timber, and iron sheets. Despite the good intent of Blocklaying and Concreting trade programme, the number of students who passed below credit level in Blocklaying and Concreting in the various Technical Colleges was far above those who passed at credit level and above (NABTEB, 2010). However if this is traced, the reason might be far from the methodology (conventional lecture method) adopted by the teacher during teaching of Blocklaying and Concreting.

Hence, Nandi, Chan, Chan & Chan (2011), saw conventional method of teaching as teacher-centered method and comprises large group lectures, tutorials, structured laboratory experience and periodic tests of achievement. In conventional lecture method, the teacher does whatever the learners are expected to do at the end of the lesson and showing them how to do it and explaining the step by step process to them (Ameh, Daniel and Akus, 2011). Mundi (2013) described conventional lecture method of teaching as a display or an exhibition usually done by the teacher while the students watch with keen interest. However, this method have not been effective, hence negates the introduction of Greeno problem solving instructional approach.

However, Greeno problem solving instructional approach has been defined by many educationists in various ways with regard to its philosophical and psychological backgrounds. Flowers (2010), defined Greeno problem solving instructional approach as an insightful or initiative process involving the perceptual processes of the solver. In support, Idoko and Oladimeji (2002), described Greeno problem solving instructional approach as the manipulation of the problem statement geared towards achieving the desired solution which is cognitive in nature. Greeno problem solving instructional approach was developed in 1973 by Greeno which has four phases of problem solving (Pekene, 2010). Pekene, commenting on the features of Greeno problem solving instructional approach said that, it is step wise, highly innovative, activity based and student centered.

Retention, according to Hafeezullah and Amir (2010), is the ability of students to repeat an acquired knowledge, skills, and attitudes over time with less error either through their responses to test administered on them or practical application of the acquired

competence. Retention of knowledge is the ability of the learner to recall what has been taught or learnt whenever it is required or the process of maintaining a replica of acquired new meanings (Auwal, 2013). The aim of every teaching and learning exercise is for the learner to retain what has been taught. Hegener, Buning and Papas (2013) stated that every educational programme regardless of its subject matter or audience is committed to making knowledge “stick” or committed to long term memory. This means that retention is the hub of any teaching and learning activity.

Retention has to do with ability to remember and apply previously learnt behaviour. Retention in the view of Abdu-Raheem (2012), is the learning that last beyond the initial unit of lesson and it is assessed with test administration two or more weeks after the information have been taught and tested. This means that a learner who is able to repeat an acquired piece of knowledge and skills with less error over time is said to have retained the knowledge and skills taught to him or her. Retention in the view of Veselinovska (2011) is measured with two tests, the initial or pretest which was used at the time of instruction or immediately after instruction and the delayed or post-test administered two or more weeks after the initial or pre-test to measure the acquired knowledge.

Statement of the Problem

The teaching of Blocklaying and Concreting requires appropriate instructional methods, as their proper application is essential for facilitating the achievement of the set objectives. The experience of the teacher and adoption of appropriate method in teaching greatly help in promoting effectiveness and consequently students’ academic retention. Records showed that students’ poor retention in Blocklaying and Concreting has led to students’ performance in the subject. In light of this, the present study was carried out to determine the effects of Greeno problem-solving instructional approach on students’ retention in Blocklaying and Concreting in technical colleges in Rivers State.

Purpose of the Study

The purpose of the study was to determine the effects of Greeno problem solving instructional approach on students’ academic retention in Blocklaying and Concreting.

Research Question

One research question guided the study
What is the effect of Greeno problem solving instructional approach on students’ retention in Blocklaying and Concreting?

Hypothesis

One null hypothesis was formulation to guide the study at 0.05 level of significance. There is no significant difference in the mean scores of students on the effect of Greeno problem solving instructional approach and the conventional method on students’ retention in Blocklaying and Concreting.

Methodology

- **Research Design:** The study employed quasi-experimental research design.
- **Population of the Study:** The population for the study consisted of all 2017/2018 National Technical Certificate Class Two (NTC II) students from the four Technical Colleges in Rivers State, numbering 214:

- **Sample and Sampling Techniques:** The sample for this study was 124 National Technical Certificate Two (NTC II) students drawn from two Technical Colleges offering Blocklaying and Concreting..
- **Validity of Instrument:** The instrument was validated by three experts. The experts comprised three lecturers of the Department of Technical Education from Ignatius Ajuru University of Education Port Harcourt.
- **Reliability of the Instrument:** Reliability coefficient of the instrument was carried out to estimate the internal consistency using Kuder Richardson formula 20 (K – R 20) technique.
- **Data Analysis:** The hypothesis was tested at 0.05 level of significance, using analysis of covariance (ANCOVA).

Result

Research Question

What is the effect of Greeno problem solving instructional approach on students' retention in Blocklaying and Concreting?

Table 1

Posttest Mean Achievement and Retention Scores of Male and Female Students taught Blocklaying and Concreting with Greeno Problem Solving Instructional Approach and conventional Lecture Method

Greeno Problem Solving Instructional Approach (GPSIA)						Conventional Lecture Method (CLM)					
N	Post test $\bar{X}$	S.D	Retenti on $\bar{X}$	S.D	Mean Gain	N	Post test $\bar{X}$	S.D	Retenti on $\bar{X}$	S.D	Mean Gain
45	74.18	4.74	73.97	4.82	0.21	45	60.78	9.43	75.57	4.85	14.79
17	65.41	3.02	65.25	3.04	0.16	17	56.74	2.51	67.12	2.75	10.38

Source: Authors (2020)

Table 1 shows that male students taught Blocklaying and Concreting with Greeno problem solving instructional approach had a mean achievement score of 74.18 in the posttest and a mean achievement score of 73.97 in the test for retention of learning.

Thus, there was an effect attributable to retention of learning of students - taught Blocklaying and Concreting with Greeno problem solving instructional approach than conventional lecture method.

Ho₁: There is no significant difference in the mean scores of students on the effect of Greeno problem solving instructional approach and the conventional method on students' retention in Blocklaying and Concreting

Table 2

Summary of Analysis of Covariance for Test of Significance of Three Effects:

Treatments, Gender and location (rural and urban) on Students achievement in Blocklaying and Concreting

Source	Sum of Squares	Df	Mean square	F	Sig.
Corrected Model	5465.332	4	1366.333	91.446	.000
Intercept	201.208	1	201.208	74.066	.000
PRE	152.651	1	152.651	56.192	.000
Group	145.101	1	145.101	6.110	.012
Gender	504.154	1	504.154	9.279	.000
Group Location	78.03	1	78.03	3.12	.056
Error	274.378	98	2.717		
Total	595276.000	124			
Corrected Total	5739.710	123			
Corrected Total	5739.710	123			

Source: Authors (2020)

***Significant at sig of F < .05**

Table 2 shows F-calculated for group, gender and interaction of treatment and gender on students' retention in Blocklaying and Concreting. The F-calculated for group is 6.110 with a significance of F at .012 which is less than 0.05. Hence, the null hypothesis was rejected at .05 level of significance. The result means that there was a significant difference between the mean scores of students taught Blocklaying and Concreting with Greeno problem solving instructional approach and those taught with conventional lecture method in the test for retention of learning.

Discussion of Findings

Table 2 reveals the calculated F-value (6.110), significance of F (.012) and confidence level of .05, thus there was a statistically significant difference between the mean scores of the group taught with Greeno problem solving instructional approach and those students taught using the conventional lecture method in the test for retention of learning. The finding indicates that Greeno problem solving instructional approach is more effective in enhancing students' retention of learning in Blocklaying and Concreting than the conventional lecture method.

The finding agreed with the finding of Adebayo (2014) who conducted a study on comparative effects of computer simulation and tutorial techniques on achievement, interest and retention of automechanics students in technical colleges in Lagos State and found out that students taught automechanics with computer simulation retained better in their study than control group. Furthermore, Adegoke (2011) who conducted a study on effect of suggestopedia instructional technique in technical college student's academic achievement, interest and retention in metal work trade in Lagos State and found that students taught metalwork with suggestopedia had a higher mean score than those students taught using the conventional teaching method in the test for retention of learning

Conclusion

From the finding, the researcher made the following conclusions

1. The students' achievement indicated high level of confidence that the treatment in the study was responsible for any gain made by the experimental group.
2. The treatment, that is, the use of Greeno problem solving instructional approach caused the increase in academic achievement, interest and retention.
3. Greeno problem solving instructional approach (GPSIA) from this study is found to be effective in students' retention in Blocklaying and Concreting. It showed more significant effect than the conventional lecture method on the students' retention of concept in Blocklaying and Concreting

Recommendations

1. There should be seminars, conferences and workshops organized by government and professional bodies like the Nigeria Association of Teachers of Technology (NATT) on the use of GPSIA.
2. Since the use of GPSIA has been found to enhance the quality of retention in Blocklaying and Concreting, Blocklaying and Concreting teachers should be encouraged to employ it more in the teaching of the subject in all classes in technical colleges.

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