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EFFECT OF MASTERY LEARNING TEACHING METHOD ON STUDENTS' ACADEMIC ACHIEVEMENT AND ATTITUDE IN RADIO, TELEVISION AND ELECTRONIC WORKS IN TECHNICAL COLLEGES IN IMO STATE, NIGERIA

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Abstract
This study investigated the Effect of Mastery Learning Teaching Method (MLTM) on students' academic achievement and attitude in Radio Television and Electronic Works (RTVEW). A total of 67 RTVEW Year II students from four technical colleges in Imo State were used for the study. Two hypotheses were formulated and tested respectively. The study was a pre-test post-test control group design. Students in the experimental groups were exposed to MLTM while those in the control groups were exposed to the Chalk Talk Teaching Method (CTTM). The instruments used in the study were Radio Television and Electronics Works Achievement Test (RTVEAT) to measure students' achievement and Radio Television and Electronics Works Questionnaire (RTVEQ), a questionnaire on 4- point scale was used to measure students' attitude towards RTVEW. The instrument were pilot tested; r value for RTVEAT = 0.78 using split half method and r = 0.86 for questionnaire using Cronbach Alpha. Pearson Correlation and Analysis of Variance (ANOVA) were used in analyzing the data. The result showed that students exposed to MLTM performed better than those taught using CTTM. Also students with positive attitudes towards RTVEW performed better than those with negative attitudes towards RTVEW. Consequently, it is recommended that MLTM should be encouraged in technical colleges for improved students' achievement and positive attitude towards RTVEW.

Key words: Mastery learning, radio television and electronics works, attitude, achievement.

Introduction

Technological development in electronic industries has necessitated need to equip students of Radio, Television and Electronic Works (RTVEW) with workplace basic and critical thinking skills which will make graduates adaptable to the present and envisaged future changes. This need requires a change from instructional approaches that are teacher-centred to those that are students-centred based on cognitive psychological learning theories (Ogwo & Oranu, 2006). Electronics course has been regarded as the bedrock of modern day technological breakthrough. Electronic devices encompass all aspect of modern day activities, especially in cars, computers, televisions, military, radar and telecommunication are experiencing fast innovative electronics developments. According to Ogbuanya and Onuoha (2015) electronics is a field where power is used to activate passive and active components and micro-chips on telecommunication, radar and of course, computer equipment. Radio Television and Electronic Works is one of the major courses offered at the National Technical Certificate (NTC) and Advance National Technical Certificate (ANTC) levels. After graduation, graduates are expected to maintain electronic equipment. Umunadi (2009) notes that technical college graduates' skill performance in electronics is on the decline which calls for immediate attention to arrest the situation. There is need to imbibe a strategy can help in improving teaching/learning situation thereby improving students' academic performance.

Poor students' academic performance in RTVEW could be attributed to many factors among which teacher/learner strategy an important factor. This unsatisfactory performance has been partly blamed on inadequate teaching methods adopted by technical college teachers (Yalams & Fatiku, 2007). This implies that the mastery of RTVEW concepts in the technical colleges might not be fully achieved without the proper use of instructional method. The teaching of RTVEW in the

technical colleges without the use of appropriate instructional methods may certainly result in poor academic achievement.

Student academic achievement according to Forum on Education and Technology (2001) is the attainment of articulated objectives by students, measured through a variety of identified instruments, which result in excellence and the ability to thrive in the rapidly challenging society. The Forum on Education and technology notes that improved student achievement include improved scores on standardized tests, increased application and production of knowledge for the real world and increased ability of students to manage learning. Academic achievement on the other hand is a measure of success of what a student knows or can do after training. Students' achievements need to be improved in order to prepare them to succeed in the rapidly challenging society. This may be achieved through the use of Mastery Learning Teaching Method (MLTM) to instruction. Tukur (2018) reported that Mastery Learning Teaching Method (MLTM) is an instructional method, where students are allowed unlimited opportunities to demonstrate mastery of content taught.

Mastery Learning Teaching Method (MLTM) involves breaking down the subject matter to be learned into units of learning, each with its own objectives. The strategy allows students to study material unit after unit until students master it (Dembo, 2004). Bloom's (1984) research on group instruction, showed scores of students taught through Mastery Learning were around the ninety-eighth percentile, or approximately two standard deviations above the mean. More time is required by students taught through Mastery Learning to master more advanced material. The MLTM used in the study stressed more of mastery of content, through corrective feedback and remediation rather than cooperative skills but the results showed that MLTM is superior to Chalk talk teaching method in terms of achieving higher scores. MLTM allows students to have enough time to master the prerequisites before making progress.

However, Abu-Hamor and Al-Hamouz (2013) raised an important issue regarding the use of instructional time in Mastery Learning. They argued that low achievers in grouped Mastery Learning do better because of corrective instruction, but faster students may be slowed down waiting for the other students. Results from research studies carried out on Mastery Learning suggest that Mastery Learning yields better retention and transfer of material; yields greater interest and more positive attitudes in various subjects than non- Mastery Learning (Kibler, Cegala, Watson, Barkel & David, 1981). The issue of teaching methods and their effect on technical college students' achievement has been a very important issue in the recent times.

The use of Mastery Learning method is essential in overcoming this challenge. For a long time, RTVEW has been mystified as a difficult technical subject. Students will ordinarily shun RTVEW when given an option as what is experienced in the technical colleges in Imo State since the introduction of RTVEW. That is, given a chance a student would rather drop RTVEW in favour of other technical subjects. This situation may not favour the nation's move towards the educational transformation agenda and the development of a technological nation as RTVEW will be a necessary tool to actualize this feat. The concern is that the performance in RTVEW is poor and the subject is less popular among students in technical colleges as compared to other technical subjects. In the same vein, learning to maintain electronics equipment and skill training required is also becoming difficult. RTVE works students ought to know how to trace and remedy faults in electronic devices with easily interpreted success criteria (Onuoha, 2021). Therefore, it becomes necessary for RTVEW teachers to adopt teaching/learning methods that will help RTVEW students master their learning.

Research on mastery learning has shown positive cognitive and effective learning outcomes in students in general, including learners considered at risk of academic failure (Guskey & Gates, 1996). In addition, the successful use of mastery learning has positive effects on teachers as well, as their expectations for student performance improve. The poor performance of students in RTVEW has assumed a dangerous dimension. In the light of this, RTVEW educators need to seek suitable ways of tackling the current mass failure if they are to halt the drifts of students to other technical subjects. Student-centred instructional methods such as guided discovery and mastery learning have been proved to be better in enhancing students' performance in science (Garuma & Tesfaye, 2012 cited in Duhu & Ibanga, 2020).

In spite of the huge investment by successive Nigerian governments on technical colleges programme aimed at improving the image and performance of technical college students, the performance of the students in Radio, Television and Electronics Works trade has not been encouraging in Imo State specifically. NABTEB results show that average failure rate in RTVE Works trade in the years 2018, 2019, 2020and 2021 were 52%, 65%, 49% and 71% respectively (NABTEB, 2021). The Federal Ministry of Education (FGN, 2000) has observed that some of the factors responsible for the high failure rate of technical college students in the NABTEB examinations particularly in the main trades include poor teaching method in the Technical Colleges. In addition, it has been discovered that the persistent poor academic achievement and low interest of students in RTVEW and other technical subjects is as a result of the inappropriate teaching methods (that do not incorporate proper techniques) adopted by teachers (Aina, 2000).

It has also been observed that the chalk talk method which is teacher-centred is the main teaching method employed by technical teachers for implementing the RTVEW curriculum.

Obviously, the adoption of only teacher-centred methods of teaching by the teacher results into ineffective use of other varieties of instructional method and inability of teachers to effectively implement the curriculum naturally and with commitment to learning. Therefore, there is need to consider a change of methods and techniques in the teaching of RTVEW, so as to prepare students in technical colleges to acquire adequate knowledge and skills for the world of work, better performance in public examination and further studies.

Theoretical Framework

In line with the behaviour theory, mastery learning focuses on overt behaviours that can be observed and measured (Baum, 2005). The concept of mastery learning can be attributed to the behaviorism principles of operant conditioning. According to operant conditioning theory, learning occurs when an association is formed between a stimulus and response. The material that will be taught in mastery is broken down into small discrete lessons that follow a logical progression. In order to demonstrate mastery over each lesson, students must be able to overtly show evidence of understanding of the material before moving to the next lesson (Anderson, 2016).

Purpose of the Study

1. Compare the mean achievement of students' taught RTVEW using Mastery Learning Teaching Method (MLTM) with students taught using the Chalk Talk Teaching Method (CTTM).
2. Determine relationship between students' attitudes towards RTVEW and their achievement.

Hypotheses

The following null hypotheses were tested at .05 level of significance

$H0_1$: There is no significant difference between the mean achievement score of RTVEW students who are exposed to Mastery Learning Teaching Method (MLTM) and those who are exposed to the Chalk Talk Teaching Method (CTM).

$H0_2$: There is no significant relationship between the mean attitude score of students towards RTVEW and their achievement score in RTVEW.

Methodology

The study adopted a pre-test, post-test quasi-experimental design. The population was 67 students, which consists of 28 RTVEW Year II Students of Government Technical College Owerri, Seven RTVEW Year II Students of Osu Technical College, 19 RTVEW Year II Students of Ahiara Technical College and 13 RTVEW Year II Students of Okporo Technical College, Orlu. The technical colleges used are widely separated from one another. The Mastery Learning Teaching Method was used for the experimental group while the Chalk Talk Teaching Method was used for the control group.

Instrument for the collection of data are 40-item RTVEW Achievement Test (RTVEAT) of multiple choice questions was used and 20-item attitude inventory was administered to both the experimental and control groups. In the RTVEAT, the students were expected to select the best suitable option from the four options in the questions. The RTVEAT was used to measure the achievement of students in both pre-test and post-test. The attitude inventory was structured on four-point scale of (Strongly Agreed, Agreed, Disagreed, Strongly Disagreed) and administered on the subjects. The instruments were both face and content validated by three experts. Their reliabilities were ensured through pilot testing in Boys' Technical College Aba, Abia State using split half method for RTVEAT and the r value was calculated to be 0.78. The reliability coefficient of the attitude inventory using Chronbach alpha was 0.86.

The study was carried out in various stages. The first stage in the study involved the identification and familiarization of the subject to technical colleges including a description of the objectives of the research to the RTVEW teachers in the respective technical colleges and their training on the method to be used in teaching the students. In the second stage, a pre-test was administered to both experimental and control groups before the introduction of the treatment to the experimental group. The post-test was then administered to both groups after students have been exposed to the independent variables (mastery learning teaching method and chalk and talk method). In all, a total number of 67 copies of RTVEAT was distributed to the students in the pre-test and post-test groups in the four technical colleges where the research work was conducted. Sixty seven attitude inventory questionnaire were also distributed to the students during the pre-test and post-test in the four technical colleges.

RESULTS

Testing of Hypotheses

$H0_1$: There is no significant difference between the mean achievement score of RTVEW students who are exposed to Mastery Learning Teaching Method (MLTM) and those who are exposed to the Chalk Talk Teaching Method (CTTM).

Table 1: **Analysis of Variance of Difference between Mean Achievement Score of RTVEW Students exposed to Mastery Learning Teaching Method and those exposed to Chalk Talk Teaching Method**

		Sum of Squares	df	Mean Square	F	Sig.
PRETEST	Between Groups	12921.006	1	12921.006	510.208	.000
	Within Groups	4961.416	65	31.423		
	Total	17813.444	66			
POSTTEST	Between Groups	18151.600	1	17153.500	736.735	.000
	Within Groups	3428.265	65	21.473		
	Total	21363.775	66			

Decision: reject Ho1

Table 2: T- TEST (Independent Samples Test)

	Levene's Test for Equality of Variances		t-test for Equality of Means					95% confidence interval of the difference	
	F	Sig.	t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
POST TEST Equal variance assumed	.044	.810	28.93	66	.000	21.24000	.73456	19.79913	22.7006
Equal variances not assumed			28.99	65.19	.000	21.24000	.73456	19.79007	22.7007
PRETEST Equal variance assumed	.018	.879	20.25	66	.000	17.98430	.88770	16.23361	19.7211
Equal variances not assumed			20.25	65.997	.000	17.98430	.88770	16.23361	19.7211

*** Significant at $\alpha \leq 0.05$,** the F factor is significant at $p < 0.05$

The tables 1 and 2 above show the ANOVA results of pre-test and post-test scores of students' Radio Television and Electronic Works Achievement Test. The tables show that there was a significant difference between students exposed to Mastery Learning Teaching method and Conventional teaching methods.

These show that performance of students exposed to Mastery learning teaching method and those exposed to Chalk talk teaching methods are not the same. Students in experimental group performed relatively better than students in control group therefore, hypothesis Ho1 which says that "There is no significant difference between the mean achievement score of RTVEW students who are exposed to Mastery Learning Teaching Method and those who are exposed to the Chalk Talk Teaching Method" is rejected.

$H0_2$: There is no significant relationship between the mean attitude score of students towards

RTVEW and their achievement score in RTVEW.

Pearson correlation was used to test the relationship between students' attitude and their achievement in RTVEW.

Table 3: Test of relationship between attitude of students towards Radio Television and Electronic Works and their achievement

		POSTTEST	RTVEQ
POSTTEST	Pearson Correlation	1	.901
	Sig (2-tailed)		.000
	N	67	67
RTVEQ	Pearson Correlation	.901	1
	Sig (2-tailed)	.000	
	N	67	67

Correlation is Significant at the 0.05 level

In table 3, the Pearson correlation analysis shows that the relationship between the attitude of students towards RTVEW and their performance is significant, positive and very strong. This means that students with positive attitude towards RTVEW will definitely perform better than students with negative attitudes therefore, hypothesis two $H0_2$ which says that "There is no significant relationship between the mean attitude score of students towards RTVEW and their achievement score in RTVEW" is rejected.

Discussion

This study was conducted in order to find out the effect of mastery learning approach on students' achievement in RTVEW. The result showed that there is a significant difference between the mean achievement scores of students exposed to Mastery Learning Teaching Method and students exposed to the Chalk Talk Teaching Method. Students exposed to MLTM performed far better than students exposed to the CTTM. This may be due to the fact that MLTM used in this study stressed more of mastery of content through corrective feedback and remediation. Hence students have enough time to master the contents of the lesson presented thoroughly thereby achieving high mastery level. This is in line with Blooms (1976) assertion that an essential hypothesis in Mastery Learning is that if there is suitable opportunity for

education and there is enough time, all learners can learn all educational targets and have mastery over them. This result is similar to the findings of Wachanga and Changeiywo (2013) that investigated the effects of using Mastery Learning Approach on secondary school students' achievement in Chemistry that Mastery Learning Approach facilitates students learning of Chemistry better than the regular teaching method. Also LeDuc (2001) asserted that the purpose of mastery learning method is that all students achieve high levels of learning.

This result is further in line with the findings and recommendations of Ishitiaq and Qaiser (2016), Lamidi, Oyekelekan and Olarundara (2015), Nnorom and Uchegbu (2017) and Kazu, Kazu and Ozedemi (2008) who found that mastery learning is effective and if effectively employed by classroom teaching would improve students' achievement in a given task. This means that MLTM increases the performance of students exposed to it than students exposed to the regular teaching strategies. The result of hypothesis two indicated a positive and strong significant relationship in the attitude of students towards RTVEW and their achievement. Students who have positive attitude towards RTVEW performed better than students who have negative attitudes towards RTVEW. This means that Mastery Learning Teaching Method is better in increasing the achievement of students.

Conclusion

This study has provided an empirical data on the effectiveness of Mastery Learning Teaching Method in improving students' performance and enhance academic achievement in RTVEW. This means that the use of Mastery Learning in the teaching of RTVEW in the technical colleges can address the poor achievement and the low enrolment in the subject. If appropriate instructional strategies are designed and developed involving Mastery Learning, it will enhance the learning of RTVEW.

Recommendations

1. RTVEW teachers should adopt Mastery Learning Teaching Method as an effective teaching strategy in order to enhance students' achievement in RTVEW in Technical colleges. This will encourage students to study RTVEW and its related disciplines in the tertiary institution

2. Seminars, workshops and conferences should be organized for RTVEW teachers to update their use of Mastery Learning Teaching Method.

3. Teacher trainers should integrate Mastery Learning Teaching Method among instructional strategies used.

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