

EFFECT OF INTEGRATING FORMAL AND NON FORMAL INSTRUCTIONAL APPROACHES FOR TEACHING LUBRICATION SYSTEM IN YOBE STATE TECHNICAL COLLEGES FOR JOB CREATION

BY

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Abstract

The study was carried out to determine the effects of integrating two instructional approaches (formal and non-formal) in teaching lubrication system (practical work) on students' skills performance in Yobe State science and Technical Colleges. The study used quasi-experimental research design which employed the pre-test, post-test control group design. The population of the study was made up of 44 NTC II students of Motor Vehicle Mechanics Trade in the 2012/2013 session. Two intact classes from GSTC Potiskum (experimental) and GSTC Damagum (control) groups were used. Two research questions were answered and one hypothesis was tested at 0.05 level of significance. The instrument used for data collection was a performance test with 5-points rating scales tagged motor vehicle lubrication process evaluation skills (MVLPEs), after the instrument validation the results were field tested for its reliability which were administered on the selected population. Analysis of Covariance (ANCOVA) was used for data analysis. The findings of the study revealed that students taught lubrication system (practical work) using the integration of formal and non-formal instructional approaches performed better than those taught only formal instructional approach. The study recommended that integration of formal and non-formal instructional approaches to be employed because it improved the performance of students in lubrication system (practical work); and Master Craftsmen should be employed in addition to the existing technical college teachers to teach practical lessons to motor vehicle mechanics students.

Introduction

As stated in the National Policy on Education, FRN (2008) Technical Education is defined as an aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge. Its goal as stated in the policy is to learn skills, practice it and be proficient in it. This implies that, recipients of the programme acquire marketable skills and are able to have the right habit of doing things. One of the ways to acquire aforementioned practical skill is through apprenticeship (non-formal instruction) in which the practical skills are acquired. Formal instructional approach according to Claudio (1988) Corresponds to a systematic, organized education model structured and administered according to a given set of laws and norms, presenting a rather rigid curriculum as regards

objectives, content and methodology. It corresponds to the education process normally adopted by our schools and universities. Formal education institutions are administratively, physically and curricularly organized and require from students a minimum classroom attendance. Sarah (2010) also viewed formal instruction as the hierarchically structured, chronologically graded running from Primary school to University.

The non-formal education instructional method on the other hand according to Combs et al (1988) is any educational activity outside the established formal system, whether operating separately or as an important feature of some broader activity that is intended to serve identifiable learning objectives. This of course is highly enriching and builds an

individual's skills and capacity. Oyeachu (2010) defined non-formal educational instruction as a type that is purposely designed for people to enable them acquire skills rather than certificate. In view of Roeten (2011) non-formal learning occurs in the virtual world and makes lives busy, centrally concerned of the workplace including training workshops. This therefore calls for the integration of formal and non-formal instructional approaches which is hoped to improve the acquisition of practical skills in addition to the theory and practical learnt in the formal classroom situation for job creation, since most students may not be opportune to have their industrial work experience in the related few industrial training sectors due to accessibility or for accommodate the high population in our schools. Dasmani (2011) stated that, the technical colleges should ensure that practical lessons are both effective and efficient to achieve the desired result of imparting the practical skills necessary for the world of work. According to Dasmani, the practical skill training is closely related to the requirements at the world of work. Technical college graduates lacked the requisite skills for the job market, so they had few chances of gaining employment. This is because the existing technical colleges cannot handle the practical lesson effectively as required due to their low performance in practically taught subjects. Onyeachu(2010) urged training institutions in the country to re-orient their programme towards vocational relevance for the production of graduates that possess

relevant skills for self-employment and self-reliance. People can control their lives well by acquiring practical skills. That is why even the adult members of the society engage themselves in acquisition of skills through adult and non-formal education (apprenticeship). Full knowledge of the skills to be transferred according to Onyeachu is very necessary because no teacher teaches what he does not know and no learner learns best what does not interest him; hence, Nigerian education system requires qualitative education that will be filled up with skill acquisition.

One of the objectives of technical education in the National Policy on Education, FRN (2008) is the acquisition of appropriate skills and competences that can help the individual to live and contribute to the development of the nation or society. This objective of technical education is what is needed to be achieved in Yobe State. According to Okafor (2012), Youth unemployment appears to be shooting up the sky because many of them lack employable skills that they are supposed to acquire from technical colleges. Similarly Bayode, (2004) ascertained that many products of technical colleges cannot stand on their own as being self-employed. Some remain jobless because they lack the skills expected of product of a good technical College. The Yobe State Technical Colleges NABTEB results shown in the summary in table 1 for four years in one of schools under the study performed below expectation.

Table 1: NABTEB RESULT SUMMARY FOR 2011-2013

YEAR	NO. OF STUDENTS	% PASSED	% FAILED
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2010	28	38%	62%
2011	30	43%	57%
2012	37	0%	100%
2013	26	27%	73%

Source: Yobe State NABTEB Office.

Currently practical skills are taught in a formal way in technical colleges by technical teachers, and this is not yielding the desired results as indicated in the 2010, 2011, 2012, and 2013 NABTEB Examination results. This calls for integration of formal and non-formal instruction to be handled by the master craftsmen. One of such agitations came from the Bureau of the Conference of Ministers of Education of the Africa Union (COMEDAFU, 2012) which supported the use of non-formal instructional approach by stressing that every person shall have the opportunity to have his or her experience and skills gained through work, through society and through non-formal training. This research therefore is looking into the need to integrate the formal and non-formal approaches. The problem that this study intends to tackle is integrating the two instructional methods (formal and non-formal) to find out whether it would lead to better acquisition of practical skills in motor vehicle lubrication works.

Purpose of the Study

The purposes of the study were;

1. To determine the performance of students in lubrication system (practical work) when taught using integration of formal and non-formal (apprenticeship) instructional approaches in Yobe State Technical Colleges.
2. To determine performance of students in lubrication system (practical work) when taught using formal instructional approach in Yobe State Technical Colleges.

Research Questions

The following research questions guided the study:

1. What are the performances of students in lubrication system when taught using integration of formal and non-formal (apprenticeship) instructional approaches?
2. What are the performances of students in lubrication system when taught using formal instructional approach?

Hypothesis

The following null hypothesis was tested at 0.05 level of significance;

Ho: There is no significant difference between the performance of students in lubrication system (practical work) when taught using integration of formal and non-formal (apprenticeship) instructional approaches and those taught using formal instructional approach.

Methodology

This study used quasi-experimental design employing pre-test and post-test non-equivalent control group design. The design was used because subjects were not randomly assigned to groups; instead intact classes were used and assigned to experimental and control groups. The researchers used this design because very few school authorities would allow a researcher to disrupt their normal school setting for purpose of creating a true experimental group (Sambo, 2005). In this design two groups were involved, namely GSTC Potiskum (experimental) and Damagum (control). The

population of the study was made up of 44 NTC II of Motor Vehicle Lubrication process evaluation skills (MVLPEs). The area the study was Yobe State located between longitude 12°N and latitude 11°30'E of the Greenwich Meridian. Yobe State lies within the Northeastern region of Nigeria.

The validated instrument used for data collection in this study was developed by the researchers in line with the research questions and hypothesis. A performance test with 5-points rating scales tagged motor vehicle lubrication process evaluation skills (MVLPEs) was modified from mechanics process evaluation skills (MPES) in Yalams (2001). The instrument was made up of one section which is lubrication system (practical work). The questions in the instrument were administered as pre-test to both experimental as well as control groups before treatment and post-test to both experimental and control groups at the end of the treatment.

An automobile technical teacher was assigned to teach theory and used the lesson plan to teach the practical lessons to the control group in GSTC Damagum for two weeks, which was based on the formal instructional approach. While the automobile technical teacher was assigned to teach theory and the master craftsman was assigned using the same lesson plan to teach practical lessons to the experimental groups in GSTC Potiskum for two

weeks, which Sini, L.K. & Jatawa, S. A formal and non-formal instructional approaches. The third week both group were post-tested.

Data collected was analyzed using Analysis of Covariance (ANCOVA) statistical tools. The mean was used for answering the research questions while t-test was used to test the hypothesis at 0.05 level of significance. The ANCOVA statistical tool was used to test the null hypothesis. The null hypothesis was rejected when the F-calculated values is greater than the table value otherwise the null hypotheses was accepted (Akuezilo&Agu, 2002). In the decision rule, the researchers used 50% as the mean cut-off point because in NABTEB grading system, 50% and above scores are regarded as credit level, and scores below 50% are regarded as simple pass and failure. Therefore, any performance score below 50% is considered as poor or weak performance, while any performance from 50% and above is considered as good performance.

Presentation of data

Research Question1: what are the pre-test and post-test scores of students' performance in lubrication system (practical work) when taught using integration of formal and non-formal instructional approaches?

Table 2: Pre-test and post-test scores of students' performance in lubrication system when taught using integration of formal and non-formal (apprenticeship) instructional approaches

S/N	Pre-Test	Post-Test
1	18	65
2	16	56
3	35	70
4	8	41
5	3	60
6	35	90
7	19	82
8	5	48
9	15	85

10	10	
11	5	<i>Sini, L.K. & Jatawa, S. A</i>
12	5	80
13	64	95
14	15	85
15	16	84
16	19	44
17	0	87
18	0	52
19	15	35
20	0	53
21	18	90
22	15	47
Total	336	1473
Mean	15.27	66.95

Table 3: Analysis of Variance on Students' Performance in LubricationSystem when taught using Integration of Formal and Non-Formal(Apprenticeship)Instructional Approaches.

Source of Variation	SS	Df	MS	F	P-value	F crit
Between Groups	29381.11	1	29381.11	98.37961	1.43E-12	4.072654
Within Groups	12543.32	42	298.6504			
Total	41924.43	43				

In table above, the analysis shown that, F-calculated is greater than F-critical which implies that there is significant difference between pre-test and post-test scores of students

performance when taught using integrations of formal and non-formal instructional approaches.

Research Question 2: what are the pre-test and post-test mean scores of students' performance in lubrication system when taught using formal instructional approach?

Table 4: Pre-test and post-test scores of students' performance in lubrication system when taught using formal instructional approach.

S/N	Pre-Test	Post-Test
1	8	35
2	19	60
3	9	46
4	16	59
5	15	45
6	12	50
7	19	43
8	2	35
9	35	61
10	0	40
11	16	35
12	15	55
13	16	48

14	29	52	Sini, L.K. & Jatawa, S. A
15	15	54	
16	0	47	
17	13	29	
18	13	43	
19	14	45	
20	13	44	
21	19	52	
22	22	53	
Total	320	1031	
Mean	14.55	46.86	

Table 4; presents the pre-test, post-test performance scores of the control group when taught using formal instructional approach in lubrication system. In the table, all 22 students scored below the cut-off point (poor

performance). While nine 9 students (41%) scored fifty (50) and above marks which is above the cut-off point (good performance) and thirteen (13) students (59%) scored below the cut-off point (poor performance).

Table 5: Pre-test and Post-test ANCOVA on students' score performance in lubrication system when taught using formal instructional approach

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	4440.091	1	4440.091	19.2817	7.48E-05	4.072654
Within Groups	9671.545	42	230.2749			
Total	14111.64	43				

The table 5 above shows that, the f-calculated is greater than f-critical which implies that students performance are improve when taught using formal instructional approach in lubrication system as post-test performance is higher.

Hypothesis (Ho): There is no Significant difference between the score performance of students when taught using integration of formal and non-formal instructional approaches and those taught using formal instructional approach in lubrication system.

Table 6: Post-test scores of students' performance in lubrication system when taught using integration of formal and non-formal instructional approaches and those taught using formal instructional approach.

S/N	Posttest formal and Non-formal	Posttest formal only.
1	65	35
2	56	60
3	70	46
4	41	59
5	60	45
6	90	50
7	82	43
8	48	35
9	85	61

10	83	40
11	41	35
12	80	55
13	95	48
14	85	52
15	84	54
16	44	47
17	87	29
18	52	43
19	35	45
20	53	44
21	90	52
22	47	53
Total	1473	1031
Mean	66.95	46.86

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The table above shows the post test scores of students which were taught using formal and non-formal instructional approach and the formal instructional approach. The mean of the post test of formal and non-formal is greater than the mean of students that were taught formal approach only.

Table 6: Analysis of Variance on Students' Performance when taught using integration of Formal and Non-formal instructional approaches and those taught using Formal instructional approach in lubrication system

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	4440.091	1	4440.091	19.2817	7.48E-05	4.072654
Within Groups	9671.545	42	230.2749			
Total	14111.64	43				

Table 6 shows the analysis of covariance of the null hypothesis. Since the f-calculated (19.28) is greater than the f-critical (4.07), the null hypothesis (H_0) was rejected which means there is significant difference between the score performance of the experimental and control groups. The score performance mean of the experimental group (66.95) is greater than the mean performance of the control group (46.86). Therefore, the students taught using the integration of formal and non-formal instructional approaches in lubrication system have their mean performance improved over those that were taught through formal instructional approach.

Findings of the Study

The results of the study revealed the followings:

1. The students in the pre-test of the experimental group in lubrication system (practical work) had a poor performance mean of 16% which is below the cut-off point of 50%, while students in the post-test of the experimental group had a good performance mean of 68% above the cut-off point of 50%.
2. The students in the pre-test of the control group in lubrication system had a poor performance mean of 14% which is cut-off point of 50%, while the students in the post-test of the control group had a poor performance of 47% which is below 50% cut-off point.
3. There is significance difference between the mean performance of the experimental and control group in lubrication system. The mean performance of the experimental

(66.95) is greater than the mean performance of the control group (46.86). Therefore, the students that were taught through integration of formal and non-formal instructional approaches in the experimental group lubrication system had their score performance better than those that were taught through formal instructional approach in the control group control.

Discussion of the findings

The findings of the study are discussed in relation to the research questions of the study and the hypothesis. The null hypothesis (H_{01}) was rejected that there was significant difference in the performance of students in the in experimental group and that of the control group. The score performance of the experimental group (67) is greater than the mean performance of the control group (47). The findings revealed research questions 1 and 2 that the students taught in lubrication system using the integration of formal and non-formal instructional approaches in research question 1 performed better than those taught only formal instructional approaches in research question 2.

According to Okwelle (2006), graduates of technology education lacked industrial competencies. These graduates are the technical teachers that teach in the technical colleges that may be the reason that those taught by the technical teachers in the control group performed lower than those taught by the master craftsmen in the experimental group. To obtain such improved performance of students, teachers need to have comprehensive knowledge of equipment and how to use them. In line with the above statement, Tal and Garba (2006) noted that the technical teacher is he who has comprehensive knowledge of equipment and process used in industrial technology and the appropriate methodology of imparting skills. Master craftsmen can handle

practical lesson better as they have comprehensive knowledge of equipment and how to use them. Onyeachu (2010) further stressed that no teacher teaches what he does not know and no learner learns best what does not interest him; hence, Nigerian education system requires qualitative education that will be filled up with skill acquisition.

Conclusion *Sini, L.K. & Jatawa, S. A*

From the findings of this study, therefore it can be conclude that the use of integration of formal and non-formal instructional approaches to teach lubrication system yielded better performance of students than those taught using only formal instructional approach. The use of non-formal instructional approach involved the service of master craftsman, while the formal instructional approach was handled by the technical teachers. The technical teacher handled the theoretical aspect, while the master craftsman handled the practical aspect. Therefore there is greater needs to employ the services of the master craftsmen in handling practical's lessons in our technical colleges for effective performance of students at basic and post basic levels.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. The use of integration of formal and non-formal instructional approaches improved the performance of students in spark ignition engine. Therefore, this approach needs to be adopted.
2. Master craftsmen need to be employed in addition to the existing college technical teachers to teach practical lessons to motor vehicle mechanic students. This will yield positive results in practical skills acquisition level of the students.

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