Influence of Re-Training in Milling Skill on Entrepreneurial Development of Mechanical Engineering Craft Practice Graduates in Rivers State

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Abstract

This study on influence of re-training in milling skill on entrepreneurial development of mechanical engineering craft practice graduates in Rivers State was necessitated as a result of reduced productive level, job satisfaction, job commitment, innovative ideas and morale of most mechanical engineering craft practice graduates in their various places of engagement and employment. A research question guided the study and one null hypothesis was tested. Descriptive survey research design was employed for the study. The population of study was 156; which comprised 39 supervisors and 117 graduates who are employees of all 39 registered manufacturing industries in Rivers State. The entire population was studied without sampling since the size was not too large and was manageable. The instrument for data collection was a structured questionnaire titled: Influence of Retraining in Milling Skill for Entrepreneurship Development Questionnaire. The instrument was validated by three experts; two from the Departments of Industrial Technical Education and Vocational Education and Educational Foundations of Ignatius Ajuru University of Education, Port Harcourt and one expert from department of Technical Education, Federal College of Education, Omoku. Using Cronbach alpha method to determine the reliability of the instrument, the reliability co-efficient of 0.79was obtained. The data collected for the study were analyzed using mean and standard deviation to answer the research questions and to determine the closeness of the respondents' mean ratings. The z-test was used to test the null hypotheses at 0.05 level of significance. The findings of study revealed that, to a great extent, retraining in milling influenced entrepreneurial development of graduates ofmechanical engineering craft practice in Rivers State. The findings of the study also showed that there was no significant difference in the opinions of supervisors and employed graduates on the extent to which retraining in milling skills influenced entrepreneurial development of graduates of mechanical engineering craft practice in Rivers State. On the basis of the findings of the study, it was concluded that, re-training in milling skills should implemented in all manufacturing industries in Rivers State to enhance entrepreneurial development employed graduates of mechanical engineering craft practice. The study therefore recommended that, managers of manufacturing industries in Rivers State should regularly organize re-training programme in milling skills for employed graduates of mechanical engineering craft practice.

Keywords: Mechanical engineering craft practice, graduates, milling skill, technical college, entrepreneurial development.

Introduction

The industrial development of many nations was dependent on specialized education. One of such education is Vocational and Technical Education. This aspect of education leads to acquisition of practical and applied skill as well as basic scientific knowledge (Federal Republic of Nigeria, 2004). In the view of Abash (2011), technical education involves training process that primarily aims at developing scientific knowledge, practical skills, creative abilities, innovative abilities, decision making skills and problem solving abilities. Technical education is the foundation of nation's wealth and development it is a type of education that is meant to produce semi-skilled and technical manpower necessary to restore, revitalized, energize, operate and sustain the national economy and substantially reduce unemployment. It is the form of education involving in addition to general education the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge related to occupations in various sectors of the economic and social life (FRN, 2014). Vocational and Technical Education is offered in some specialized institutions

One of such specialized educational institutions is technical college. Technical College is saddled with the responsibility of training low and middle level manpower. Technical Colleges in Nigeria are established to produce craftsmen and master craftsmen (Federal Ministry of Education, 2013). The courses offered at the technical colleges lead to the award of National Technical certificate (NTC) Advance National Technical certificate (ANTC). The programs of Technical Colleges according to Federal Republic of Nigeria (2014) are grouped into related trades. One of such trades is embedded in the mechanical engineering craft practice.

Mechanical engineering craft practice is a trade that provides a post primary technical education and practical proficiency in fitting, grinding, forging, milling, drilling turning and machinery to

the levels of good craftsman. The subjects of mechanical craft trade practice is specifically designed to provide the skills and knowledge to fulfill the needs of the modern industry (WAEC, 2012 as cited in Kpolovie et al., 2015). The scheme has been divided into two main parts. Provision was also made for supplementary courses of more specialized character for those who may wish to pursue their studies a stage further after obtaining their part II Certificate. Throughout the courses, emphasis is placed not only on theoretical knowledge but also on practical skills in milling, turning, grinding and forging,

Milling operations according to Gang (2021) basically involves the use of milling cutter in in carrying out special designs in work pieces. There are several operations that are involved in milling activities. These include plain milling operations, face milling operations, side milling operations, end milling operations, gang milling operations, form milling operations, grooves milling operations, T-slot milling operations, gear-cutting operations and straddle milling operations. In carrying out milling operations, the individual should be skillful in spinning cutters at high speed, advance work piece through the cutter slowly, produce hexagonal surface on a work piece among others. The application of those various skills required high level of precision and accuracy (Adams, 2016). Individuals with grinding skill according to Adams (2016) need from time to time reacquaint themselves of their acquired trade skills.

Retraining is defined as a process of updating one's talents and skills in order to keep up with workplace development. In simple words, retraining, as the name implies, involves repetition of previously completed training for improved performance at workplace. It could also be described as the aspect of training which provides the recipient with the basic knowledge and practical skills necessary for entering into or improvement in the world of work as employees or as self-employed. Re-training is a vehicle for skill development which enables one to harness natural

resources for the promotion economic stability of according to Oni (2017) is the type of education that prepares and equips individual for gainful employment in recognized career as a skilled worker. Skill development through re-training not only leads to optimal performance of employees in their areas of occupations but also enhance their entrepreneurship development.

Entrepreneurship development therefore, is the ability to do or to perform an activity that is related to some meaningful exercise, Work or job innovatively. Entrepreneur can be defined as one who brings resources, labour, material among other into combinations that make their value greater than in the past, as well as been able to introduce changes, innovation and new ideas for the growth of a business. Entrepreneur as a special type of labour that requires the assembling of all factors of production namely capital, land and labour and tries to ensure optimum utilization of them to ensure maximum profit. From the management angle, entrepreneurs are pictured as managers of small business. . Therefore, it is imperative for prospective mechanical technologist (entrepreneur) to be technically sound, resourceful and result oriented as well being extremely creative to achieve success in mechanical technology; more especially in milling skill.

However, some experts based on their years of experience allude that re-training in the field of the individual's occupation does not improve entrepreneurship development of the individual, while others disagree (Young, 2018; Ephraim, 2020). This study therefore, seeks to ascertain the influence of re-training in milling skill for entrepreneurship development of graduates of Mechanical Engineering Craft Practice in Technical Colleges in Rivers State.

Statement of the Problem

Retraining programme serves to re-acquaint an employee with previously learnt skills, recall and retain certain potentials and stay updated to the latest skill requirements. This is evident in most organizations as retraining exercise are frequently provided for their staff. While some individual

employee sometimes on their own go for retraining Programmes. The employability of any employee largely depends on being re-acquainted with the required job skills especially in this fast growing technological era.

Undoubtedly, the productive level, job satisfaction, job commitment, innovative ideas, morale of most mechanical engineering craft practice graduates have reduced in their various places of engagement and employment (Akpan, 2021). This could be as a result of advancement in the field of mechanical engineering craft practice in recent times. Many of the graduates according to Danga (2021) have been placed and retained as casual staff for a good number years in their places of employment. This state of affairs could demoralize prospective students from enrolling in mechanical craft trade practice in Technical Colleges. Could re-training in milling skill influence the entrepreneurship development of these graduates in their places of employment or engagement? This study sought to find the answer.

Aim and Objectives of the Study

The aim of this study is to ascertain the extent to which re-training in milling skill influenced entrepreneurship development of graduates of Mechanical Engineering Craft Practice in Rivers State.

Research Question

The following research question guided the study.

1. To what extent does re-training in milling skills influence entrepreneurship development of graduates of Mechanical Engineering Craft Practice in Rivers State.

Hypothesis

The following null hypothesis was formulated and tested at 0.5 level of significance.

H_{O1}: There is no significant difference between the mean responses of supervisors and graduates on the extent to which re-training in milling skill influenced entrepreneurship development of graduates of Mechanical Engineering Craft Practice in Rivers State.

Theoretical Framework

This study is associated with Training and high performance theory. This theory was propounded by Gallie White in 1993. This theory states that the performance of individuals in carrying out a specific task among other things is dependent on the proportion of training of re-training received. This is among the most widely adopted theories in organizations in Britain and the United States of America. The theory is concerned with the 'skills trajectory' and proposes a distinction between those occupations which are becoming increasingly skillful and others which are deskilling over time. (Nwakanma, 2022). This theory is also related to the study since the employability and entrepreneurship development of mechanical craft trade graduates sometimes depends largely on re-training received.

Method

The design for this study was descriptive survey research.The population of this study was 156. It comprised 39 mechanical craft trade practice supervisors and 117 graduates who are employees of all 39 registered and functional manufacturing industries in Rivers State. The data was got from Manufacturers Association of Nigeria MAN, Rivers State Chapter. The entire population was used for the study since it is not too large and is manageable. Hence, no sampling technique will be employed. A structured 18 items questionnaire titled: Influence of Retraining in Mechanical Craft Trade Practice for Entrepreneurship Development Questionnaire (IRMSEDQ) will be used as instrument for data collection. The instrument comprised two parts. Part A sought information on personal data of respondents while part B of the instrument comprised of 18 items. The questionnaire was designed in a 5 point Likert scale of: Very Great

Extent (VGE), Great Extent (GE), Moderate Extent (ME) Small Extent (SE) and Very Small Extent (VSE) with a corresponding numerical values of 5,4,3,2, and 1 respectively.

In other to determine the suitability of the instrument of data collection for of this study, the instrument was subjected to face and content validity by three (3) experts; one of which from the Department of Technical Education, Federal College of Education (Technical) Omuku and two from the Department of Technical Education, Ignatus Ajuru University of Education Port Harcourt. The reliability of the instrument was established using a test retest method. Copies of the questionnaire for the study was administered to 20 respondents (Mechanical Engineering Craft Practice supervisors and graduates of Mechanical Engineering Craft Practice) in Bayelsa, State; which is outside the study area. The area was chosen because it has similar features with the area of study. Data collected for the pilot study were analyzed with Cronbach alpha. The reliability coefficient values of 0.79 was obtained; which indicates a high reliability. The questionnaires was administered to the respondents by the researcher with the aid of one trained research assistant in each industry. All the 156 copies of the questionnaire were administered to the respondents and retrieved for analysis. Mean and standard deviationwere used to answer the research questions and examine the closeness of responses while z-test was the statistical toolused for testing the null hypotheses at 0.05 level of significance. Data will be analyzed using the Statistical Package for Social Sciences (SPSS). Any item that attains the mean score of 3.50 and above was considered as Great Extent while mean score below 3.50 was considered Small Extent. A null hypothesis was rejected where the calculated p-value was less than the 0.05 level of significance. Conversely, where the calculated p-value was greater than or equal to the level of significance (0.05), it meant that there was no significant difference and the hypothesis was accepted.

Results

Research Question 1: To what extent does re-training in milling skills influence entrepreneurship development of graduatesof Mechanical Engineering Craft Practice in Rivers State?

Data collected in respect of research question 1 was analyzed and presented in Table 1

Table 1
Respondents mean ratings on the influence of re-training in milling skills on entrepreneurship **development**

S/N	Items	Respondents					
		Supervisor			Graduates		
	Aspects of Milling Skills	$\overline{X}_1$	SD_1	Remark	$\overline{X}_2$	SD_2	Remark
1.	Ability to make proper use of cutters	3.52	0.54	GE	3.72	0.63	GE
2.	Ability to spin cutters at high speed	3.51	0.43	GE	3.59	0.79	GE
3.	Ability to advance work piece through the cutters slowly	3.52	0.32	GE	3.51	0.82	GE
4	Ability to create horizontal surface parallel to the axis of rotation	3.61	0.54	GE	3.74	0.44	GE
5.	Ability to face mill surface perpendicular to the axis of the cutters	3.58	0.77	GE	3.58	0.71	GE
6.	Ability to operate milling cutter mounted on the stab arbor of a machine	3.61	0.76	GE	3.62	0.53	GE
7.	Ability to make use of side cutter to produce flat vertical surface on the side of work piece	3.54	0.41	GE	3.62	0.54	GE
8.	Ability to carry out end milling operations	3.60	0.76	GE	3.55	0.43	GE
9.	Ability to make use of two or more cutters to perform difficult operations simultaneously	3.55	0.69	GE	3.53	0.42	GE
10.	Ability to make use of convex milling	3.53	0.61	GE	3.51	0.42	GE

	cutter						
11	Ability to make use of concave milling cutter	3.64	0.71	GE	3.57	0.61	GE
12	Ability to make use of corner rounded milling cutter	3.71	0.47	GE	3.61	0.72	GE
13	Ability to create curves in work piece	3.51	0.52	GE	3.51	0.53	GE
14	Ability to produce grooves on surface of work piece	3.53	0.56	GE	3.52	0.53	GE
15	Ability to make use of T-slot milling cutter	3.51	0.58	GE	3.57	0.52	GE
16	Ability to produce gear tooth on the gear blank	3.52	0.72	GE	3.58	0.56	GE
17	Ability to produce hexagonal surface on a work piece	3.51	0.53	GE	3.51	0.58	GE
18	Ability to produce a square surface on a work piece	3.52	0.53	GE	3.50	0.42	GE
	Cluster Mean	**3.56**	**0.58**	GE	**3.57**	**0.57**	GE

Table 1 shows that all the items have a cluster mean of 3.56 and 3.57 for supervisors and graduates respectively. This means that supervisors and employed graduates of technical colleges in Rivers State are of the view that re-training in milling skills influenced entrepreneurial development to a great extent. The cluster standard deviations of 0.58 and 0.57 for supervisors and graduates respectively, show that the respondents are homogenous in their opinions.

Hypothesis 1: There is no significant difference between the mean responses of supervisors and graduates on the extent at which re-training in milling skills influence entrepreneurship development of graduates of Mechanical Engineering Craft Practice in Rivers State.

Data obtained in respect of hypothesis 1 were analyzed and presented in Table 4.5.

Table 2.
Summary of z-test comparison of the mean ratings on the influence of re-training in milling skills on entrepreneurship development.

Category of Respondents	N	$\bar{X}$	SD	α	df	t-cal	p-value	Decision
Supervisors	39	3.56	.58	0.05	154	0.41	.061	Not Significant
Graduates	117	3. 57	.57					

Data in Table 2 show that the supervisors and employed graduates of technical colleges in Rivers State did not differ significantly in their mean ratings on the extent at which re-training in milling skills influenced entrepreneurial development with mean scores of 3.56 and 3. 57 and the corresponding standard deviations of .58 and .57 respectively. The Table indicated a t-value of 0.41, at degree of freedom of 154 and a p-value of .061. Testing at alpha level of 0.05, the p-value is not significant since the p-value is greater than the alpha value (0.05). Therefore, the null hypothesis is not rejected.

Discussion

The findings of this study revealed that retraining in milling skills influenced entrepreneurial development of graduates of Mechanical Engineering Craft Practice in Rivers State to great extent. The study shows that re-training in milling skills such as abilities to make proper use of cutters, to spin cutters at high speed, to advance work piece through the cutters slowly, to create horizontal surface parallel to the axis of rotation, to face mill surface perpendicular to the axis of the cutters, to operate milling cutter mounted on the stab arbor of a machine, to make use of side cutter to produce flat vertical surface on the side of work piece, to make use of side cutter to produce flat vertical surface on the side of work piece, to make use of side cutter to produce flat

vertical surface on the side of work piece, to make use of two or more cutters to perform difficult operations simultaneously, to make use of convex milling cutter, to make use of concave milling cutter, to make use of corner rounded milling cutter, to create curves in work piece, to produce grooves on surface of work piece, to make use of T-slot milling cutter, to produce gear tooth on the gear blank, to produce hexagonal surface on a work piece and to produce a square surface on a work piece influenced entrepreneurial development of graduates of technical colleges in Rivers State

The finding of this study is in agreement with that of Gang (2021) who opined that re-training improves individuals' skills in the use of milling cutter in in carrying out special designs in work pieces, plain milling operations, face milling operations, side milling operations, end milling operations, gang milling operations, form milling operations, grooves milling operations, T-slot milling operations, gear-cutting operations and straddle milling operations.

The findings of the study is also in consonant with that Danga(2021) who noted that re-training enhances job performance and the development of relevant entrepreneurial skills in milling operations such as face milling operations, side milling operations, end milling operations, gang milling operations, form milling operations, grooves milling operations among others. The analysis of the hypothesis reveals that there is no significant difference in the mean ratings of supervisors and employed graduates of technical colleges in Rivers Stateon the extent at which re-training in milling skills influenced entrepreneurial development.

Conclusion

On the basis of the findings of the study, it was concluded that, re-training in milling skills, should implemented in all manufacturing industries in Rivers State to enhance entrepreneurial development employed graduates of technical colleges.

Recommendation

On the basis of the findings of the study and the conclusion reached, it was recommended that, managers of manufacturing industries in Rivers State should regularly organize:

1. Re-training programme in milling skills for employed graduates of mechanical engineering craft practice

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