Enhancing Practical Teaching of Mechanical Craft among Technical College Students for Self-Employment in Enugu State

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Abstract

This study was carried out to determine the strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State. The study adopted survey research design. Three research questions and three null hypotheses tested at 0.05 level of significance guided the study. The population was made up of 41 mechanical craft teachers in the technical colleges across the educational zones covered by the study. The instrument was face-validated by three TVET experts in Enugu State University of Science and Technology. Cronbach Alpha was used to establish the reliability coefficient of .81. Mean and standard deviations were used to answer the research questions while t-test was used for hypotheses testing .Some of the findings include: The teachers disagreed on in-service training of teachers for practical knowledge updates. Secondly, provision of functional workshops and adequate classrooms, supervision of mechanical craft teachers by heads of programme are some of the school strategies for enhancing practical teaching of mechanical craft in technical colleges for self-employment. There was no significant difference between the mean responses of urban and rural teachers on the school related strategies for enhancing practical teaching of mechanical craft in technical colleges. Based on the findings, it was recommended that school administration should provide adequate equipment for practical teaching of mechanical craft, sufficient time for practical teaching of mechanical craft should be allotted in the timetable, the government should constitute uncompromising committee for ensuring judicious use of funds released, regular payment of salaries and allowances to teachers in technical colleges. These will enhance practical teaching of mechanical craft in technical colleges for self-employment in Enugu State.

Introduction

The question of how best to achieve self-employment in Nigeria has been a major issue in the country. It is even imperative now that the nation is witnessing serious economic challenges. A sector of education expected to supply the country with the human resources necessary for self-employment is technical and vocational education (TVE) which goes on in technical colleges. According to Umunadi (2007), TVE stands for the education process in which in addition to general education, there is high emphasis on the study of technologies and related sciences, and the acquisition of practical skills and knowledge relating to occupations in various sectors of economic and social life. Mechanical craft is an aspect of TVE taught in technical colleges but studied as mechanical technology in tertiary institutions.

According to Sudarshan (2013), mechanical technology refers to those scientific, technical and technological knowledge and skills needed for the mechanical industry. It is employed in mechanical craft practices. Mechanical craft is an aspect of TVE which involves

the transmission of skill necessary for mechanical craft practices such as welding, plumbing, foundry and forging. This aspect of TVE, like all aspects of this sector is practical-laden. It means that without adequate practical activities being carried out by mechanical craft students in mechanical craft laboratories and workshops, graduates of the discipline cannot boast of adequate skills that can drive the active labour force category of the economy. In order words, such students cannot achieve the aim of technical and vocational education (TVE) which is ultimately to produce people who could be self-reliant and who could be self-employed and employer of labour. Hence, practical teaching of the course is needed.

Millar (2004), defined practical teaching as an aspect of teaching that involves the teacher transmitting skills into students through the methods of observation and experimentation altogether known as performing practical. It involves the use of empirical research methods whereby the teacher aim at inculcating in students the knowledge of how to put into practice certain principles. In other words, it is an aspect of teaching which aim at practical application of the principles they have learnt theoretically. Practical teaching is done using workshops, laboratories, tools, equipment, or even specimen. In essence, practical teaching involves practical work. Millar (2004) also view

practical work as any teaching and learning activity which involves at some point the students observing or manipulating real objects and materials. Practical teaching takes place through the process of actual practice of making the observations and measurements in the workshop or laboratories and arriving at a conclusion which is a new form of knowledge.

Practical teaching of mechanical craft will lead to the students acquiring the necessary skills very well and be able to be self-reliant/self-employed and be employer of labour. Self-employment refers to a situation where an individual creates, begins and takes control of the business decision rather than working for an employer. Abdulkarim (2012), define self-employment as the act of working for oneself. When one is self-employed, it means one is carrying on one's own business rather than working for an employer (Citizens Information 2014). This implies that self-employment is a situation in which an individual work for him/herself instead of working for an employer that pays salary or wages. Since it is not possible for the government to provide employment for all, there is need to device strategies to enhance practical teaching for self-employment. No wonder Federal Republic of Nigeria (2013) in its National Policy on Education (NPE) enumerated the goals of technical and vocational education and training (TVET) as:

a. To provide trained manpower in the applied science, technology and business particularly at craft, advanced craft at technical levels;

b. To provide the technical knowledge and vocational skills necessary for agricultural, commercial, and economic development;

c. To give training and input the necessary skills to individuals who shall be self- reliant economically (FRN, 2013:3b).

Mechanical craft which is a course taught in the technical colleges, if taught practically very well will lead to the attainment of the above goals. Also, Technical colleges abound both in the rural and urban areas. The rural areas are those areas devoid of good infrastructures and social amenities such as good roads, electricity, pipe born water, hospitals, recreational centres etc. However, some of these rural technical colleges may not have the requirements for practical teaching of mechanical craft. To improve the students and reduce unemployment after graduation depends on a number of factors. These include the availability of equipment, tools and materials, an adequate supply of technical education teachers and the proper

implementation and usage of technical equipments, tools, and materials. (Umunadi, 2004). Though the urban school may have the equipment, are they being put into use?. The urban areas have most of the good infrastructures and social amenities. However, one is not sure how this mechanical craft is being taught in technical colleges both in the urban areas and the rural areas of Enugu State of Nigeria.

Enugu State is one of the 36 states in Nigeria. It is in the south East senatorial zone of Nigeria. Enugu state has many technical colleges both in the rural and urban areas and mechanical craft is taught as a subject in these colleges. In order that mechanical craft be taught practically well in technical colleges in Enugu State and the goals of technical and vocational Education and Training (TVET) being achieved, a lot of factors have to be considered. Firstly, the teachers of the subject are to teach it both theoretically and practically well to the students. The subject needs to be practically learnt very well by the students. However, many graduates of mechanical craft roam about the street unemployed. Central Bank of Nigeria (2002) in Adawo, Essien and Ekpo(2012)observed that unemployment rate in Nigeria has reached unacceptable dimension. Hence, the labour market in Nigeria is dangerously close to saturation. Indeed Ekpo (2011) reiterated that Nigeria's unemployment situation is unacceptable but this may be as a result of non-possession of practical skill. If they have the skills they will be self-employed.

Observation shows that teachers in these colleges may not have adequate practical skills to impact in their students. They may likely lack the necessary training resources and ideas for creative methodologies. Umunadi (2004) reported that the trend in the methods of teaching mechanical craft programmes as aspect of TVE in Nigeria technical and vocational schools is too theoretical with less emphasis on the teaching of practical skill. Most of the technical colleges do not have conducive environment for teaching of mechanical craft. Ukeje (2000), observed that there is a remarkable lack of teachers, infrastructure and social services in different institutions especially in rural areas. Therefore, if a technical college does not have adequate number of qualified teachers and sufficient infrastructure, it will not meet up with the objectives for which such schools are established, such as practical teaching which is carried out in laboratories and workshops. Therefore, this study was designed to determine the strategies needed for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State.

The main purpose of this study is to determine the strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State. Specifically the study sort to determine:

1. Teacher-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State.
2. School management-related strategies for enhancing practical teaching of mechanical craft among technical colleges students for self-employment in Enugu State.
3. Government-related strategies for enhancing practical teaching of mechanical craft among technical colleges students for self-employment in Enugu State.

Research Questions

The following research questions guided the study:

1. What are the teacher-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State?
2. What are the school management-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State?
3. What are the Government-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State?

NULL Hypotheses

The following null hypotheses tested at .05 level of significance guided the study:

Ho_1: There is no significant difference in the mean ratings of rural and urban mechanical craft teachers on teacher-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State.

Ho_2: A significant difference does not exist in the mean ratings of rural and urban mechanical craft teachers on school management-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State.

$H_{O3:}$ There is no significant difference in the mean ratings of rural and urban mechanical craft teachers on the government-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State.

Method

The design adopted for this study was a survey design. A survey research design according to Ezeji (1997) in Alio (2008) is one which involves the assessment of public opinion using questionnaire and sampling method. The design is considered suitable since this study will solicit information from mechanical craft teachers on strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State using a structured questionnaire to sample the opinion of the respondents.

The study was conducted in Enugu State of Nigeria. There are six educational zones spread across the state with twenty six technical colleges. Fifteen technical colleges where mechanical craft teachers were posted among the educational zones were chosen. The population of this study was 41 (28 rural, 13 urban) mechanical craft teachers in the technical colleges in the six educational zones. No sampling was carried out since the population was manageable.

The instrument for data collection was structured questionnaire designed by the researcher from the literature reviewed. The instrument was divided into three sections (A, B and C). Section A with eight items sought information on teachers-related strategies. Section B with eight items dwelt on school administration-related strategies while section C with eight items was on Government-related strategies on enhancing practical teaching of mechanical craft among technical college students for self-employment. The instrument was based on four-point rating scale of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).

The instrument was face- validated by three experts. Two experts from Department of Technology and Vocational Education, one expert from the Department of Science and Computer Education (measurement and evaluation option), both from Enugu State University of Science and Technology. A reliability test was conducted using 20 teachers of mechanical craft from technical colleges in Ebonyi state. Ebonyi state was used because the state has the same ideology and educational policy with Enugu state. The reliability of

the instrument was conducted using Cornbach Alpha and the reliability co-efficient yielded 0.81. Data collection was done by the researcher and six research assistants who were trained on how to administer the questionnaire. All the 41 copies of the questionnaire were filled and retrieved. Hence there was 100% return rate.

Mean and standard deviation were used for answering the research questions which base on the four-point scale, only items with mean 2.50 and above was regarded as agree while any item with mean less than 2.50 was regarded as disagree. The standard deviation was used to determine the closeness or otherwise of the opinions of the respondents from the group data.

The t-test of significant difference between two independent means were used to test the hypotheses at .05 probability level. In testing the hypotheses, when the value of calculated 't' is equal or greater than the given table 't', the null hypothesis was rejected, otherwise do not rejected.

Results

The results are presented in Tables 1 to 6.

Research Question 1: What are the teacher-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State?

Table 1: mean response on teacher-related strategies for enhancing practical teaching of mechanical craft among technical college students for self- employment in Enugu State.

S/N	Items	N_1= 28		N_2 = 13		Aggregate		Remarks
		$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}$	SD	
1	Possession of requisite skills.	3.18	1.09	3.31	0.85	3.26	1.52	Agree
2	In- service training of teachers for knowledge update	1.86	1.15	1.77	0.83	1.82	0.99	Disagree
3	Attending to organized workshops for practical update	3.00	1,08	3.46	0.88	3.23	0.98	Agree
4	Directing students to attend Laboratory practical.	3.25	0.93	3.00	1.00	3.13	0.97	Agree
5	Teaching the students how to manipulate the equipment in the workshops (machines, etc).	3.64	0.49	3.31	0.75	3.48	0.62	Agree
6	Use of attention signals to maintain students' focus during practical's in workshops.	3.36	0.78	3.15	0.69	3.26	0.74	Agree
7	Adoption of different styles of teaching such as to suit different kinds of students.	3.25	0.89	3.77	0.44	3.51	0.67	Agree
8	Enforcing students to carryout practical projects to be graded.	2.68	1.22	3.23	0.83	2.96	1.03	Agree
	Grand mean and pull standard deviation	**3.03**	**0.95**	**3.13**	**0.78**	**3.08**	**0.94**	**Agree**

Data presented in Table (1) shows that the respondents agreed on all the items except on item No 2 with aggregate mean of 1.82. They disagreed on in-service training of teachers for practical knowledge update. The mean ranges from 1.86 – 3.64 and 1.77 – 3.77 for rural and urban teachers respectively. The grand mean of 3.03 and 3.13 of rural and urban respondents indicates that all the items are agreed on as teacher-related strategies for enhancing practical teaching of mechanical craft for self-employment. The pull standard deviation of 0.95 and 0.78 for rural and

urban indicates that the opinions of the respondents are not far from the group.

$H0_1$: There is no significant difference in the mean ratings of rural and urban respondents on teacher-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State.

Table 4: t-test comparison of the mean ratings of rural and urban respondents on teacher-related strategies for enhancing practical teaching of mechanical craft among technical college students for self employment.

S/N	TEACHERS LOCATION	$\bar{X}$	SD	N	Df	t_{cal}	t_{crit}	Remark
1	Rural Teachers	3.03	0.95	28				
					39	0.03	1.68	not significant
2	Urban Teachers	3.13	0.78	13				

The analysis on Table 1 revealed that the t-calculated of 0.03 was far less than the t-table value of 1.68 at 39 degree of freedom and at .05 significance level. Therefore, the null hypothesis, which stated that there is no significant difference in the mean ratings of rural and urban respondents on teacher-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment, was not rejected.

Research Question 2: What are school management-strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State?

Table 2: Mean response on school management related strategies for enhancing practical teaching of mechanical craft for self-employment

S/N	Items	N_1= 28		N_2 = 13		Aggregate		Remarks
		$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}$	SD	
9	Provision of adequate equipment (tools and machines).	3.72	0.79	3.77	0.83	3.76	0.81	Agree
10	Provision of ventilated laboratories.	3.21	0.96	3.31	0.85	3.26	0.91	Agree
11	Provision of functional workshops.	3.25	0.75	2.92	1.12	3.09	0.94	Agree
12	Provision of adequate classrooms.	3.11	1.23	3.23	0.83	3.17	1.03	Agree
13	Allocation of sufficient time for teaching Mechanical craft practical.	3.14	0.77	3.62	0.87	3.38	0.82	Agree
14	Organizing regular seminars for mechanical craft teachers.	3.43	0.74	3.38	0.77	3.41	0.76	Agree
15	Supervision of teachers of mechanical craft by heads of individual programmes	3.46	0.51	3.54	0.52	3.50	0.52	Agree
16	Maintenance of equipment used for work.	3.39	1.31	3.08	1.12	3.24	1.22	Agree
	Grand mean and pull standard deviation	**3.34**	**0.88**	**3.36**	**0.86**	**3.35**	**0.88**	**Agree**

Data presented in Table 2 shows that the respondents agreed on all the items. The items had overall mean value range from 3.11-3.72 and 2.92-3.77 for rural and urban teachers respectively above the cut-off point of 2.50. This shows that item 9 to 16 are school management-related strategies for enhancing practical teaching of mechanical craft for self-employment. The grand mean of 3.34 and 3.36 for urban and rural respondents indicates that all the items are agreed as the school management-related strategies for enhancing practical teaching of mechanical craft for self-employment. The pull standard deviation of 0.88 and 0.86 for rural and urban indicates that the respondents have consensus opinion on their responses.

$H0_2$: A significant difference does not exist in the mean ratings of rural and urban respondents on school management strategies for enhancing practical teaching of mechanical craft among

technical college students for self-employment in Enugu State.

Table 5: t-test analysis of the mean ratings of rural and urban respondents on school management strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment.

S/N	TEACHERS LOCATION	$\bar{X}$	SD	N	Df	t_{cal}	t_{crit}	Remark
1	Rural Teachers	3.34	0.88	28				
					39	0.06	1.68	not significant
2	Urban Teachers	3.36	0.86	13				

The result on Table 2 shows that the calculated t value of 0.06 was less than t critical value of 1.68 at 39 degree of freedom and at .05 level of significance. This implies that the hypothesis which stated that a significant difference does not exist in the mean ratings of rural and urban respondents on school management strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment was not rejected.

Research Question 3: What are the government-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State?

Table 3: Mean responses on Government-related strategies for enhancing practical teaching of mechanical craft for self-employment

S/N	Items	N_1= 28		N_2 = 13		Aggregate		Remarks
		$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}$	SD	
17	Adequate funding of mechanical Craft programmes.	3.46	0.79	3.38	0.77	3.42	0.78	Agree
18	Monitoring the judicious use of funds released for the programmes.	3.82	0.98	3.92	0.76	3.87	0.87	Agree
19	Regular payment of salaries and Allowances of mechanical craft teachers .	3.46	0.74	3.62	0.51	3.54	0.63	Agree
	Sponsoring of in-service training.	3.36	0.91	3.08	1.17	3.22	1.04	Agree
20	Funding research projects.	3.57	0.69	3.54	0.78	3.56	1.47	Agree
21	Adoption of quality assurance mechanisms to maintain standards.	3.00	1.05	3.69	0.48	3.35	0.77	Agree
22	Provision of special motivation.	3.07	1.17	2.85	1.21	2.96	1.19	Agree
23	Provision of adequate infrastructure.	3.32	1.31	3.38	1.28	3.35	1.29	Agree
24	**Grand mean and pull standard deviation**	**3.38**	**0.96**	**3.42**	**0.87**	**3.41**	**1.05**	**Agree**

The data analyzed in Table 3 shows the mean ranges of 3.00-3.82 and 2.85-3.92 from rural and urban respectively were obtained for items 17 to 24 indicates that the items are the government related strategies for enhancing practical teaching in mechanical craft for self-employment. A cluster mean of 3.38 and 3.42 for urban and rural teachers respectively shows that eight items are generally agreed by the respondents. The pull standard deviation of 0.96 and 0.87 for urban and rural indicates that the opinion of the respondents were not far apart.

$H0_3$: There is no significant difference in the mean ratings of rural and urban respondents on government-related strategies for enhancing practical

teaching of mechanical craft among technical college students for self-employment in Enugu State.

Table 6: **t-test analysis of the mean ratings of rural and urban respondents on government-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment.**

S/N	TEACHERS LOCATION	$\bar{X}$	SD	N	Df	t_{cal}	t_{crit}	Remark
1	Rural Teachers	3.38	0.96	28	39	0.02	1.68	not significant
2	Urban Teachers	3.42	0.87	13				

The analysis on Table 3 revealed that the calculated t value of 0.02 was less than the table t value of 1.68 at 39 degree of freedom and at .05 level of significance. The standard deviation of the respondents on their responses are not far. This indicated that there is no significant difference in the mean ratings of rural and urban respondents on government-related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment.

Discussion of Results

The analysis on Table 1 for research question one indicates that these teacher-related strategies: possession of requisite skills, attendance to organized workshops for practical update, directing students to attend laboratory practical, teaching the students how to manipulate the equipment in the workshops (machine, etc), use of attention signals to maintain students' focus during practical's in workshops, adopting different styles of teaching to suit different kinds of students and enforcing students to carryout practical projects to be graded are needed to enhance practical teaching of mechanical craft in technical colleges for self-employment. These attributes agreed with the views of Millar (2004) who identified the three important strategies in practical teaching: using organized workshops, laboratories, how to manipulate equipment and materials, adopting different styles of transmitting skills into students through the methods of observation and experimentation. The teachers disagreed on in-service training of teachers for practical knowledge updates. This is at variance with the findings of Nkomu (2006) in Odo and Nwankwo (2015) who noted that teachers being the core implementers of the school curriculum need to regularly update their knowledge so as to keep pace with the rapid

changing society. The null hypothesis was not rejected.

Research question two sought to find out the school management related strategies for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State. The result of this study showed the school management–related strategies as: provision of adequate equipment (tools and machines), provision of ventilated laboratories, functional workshops, adequate classrooms, organizing regular seminars, allocation of sufficient time for practical teaching, and maintenance of equipment used for work and supervision of teachers are needed to enhance practical teaching of mechanical craft in technical colleges for self-employment. These agreed with the view of Stegall (2013) who pointed out that laboratory must reflect industry. In like manner, it could be said that mechanical craft in technical college workshops must reflect mechanical craft industry. Odo and Nwankwo (2015) also pointed out that quality assurance showcases the quality of an institution in terms of teaching and academic programmes, staffing, students, research, building, facilities, equipment and the general academic environment. The findings also showed that there was no significant difference between the mean responses of urban and rural teachers on the school related strategies for enhancing practical teaching of mechanical craft in technical colleges. Consequently, the hypothesis was not rejected. In effect, all the items making up the school management strategies should be employed for objectives to be achieved.

Research question three revealed that government-related strategies such as ensuring adequate funding programmes, sponsoring of in-service training, adopting of quality assurance mechanisms to maintain standard, and monitoring of judicious use of funds released for programmes, regular payment of salary and allowances of teachers and provision of adequate infrastructure, provision of special motivation are needed for enhancing practical teaching of mechanical craft among technical college students for self-employment in Enugu State. These agreed with the view of Atsumbe, Okoro, and Ogwo (2012) who pointed out that government has done much to improve the quality of training given to mechanical engineering craft practice students by procuring new tools and equipment, refurbishing of existing equipment and increased in-service training for teachers. The t-test further showed that there was no significant difference between the mean responses of urban and rural teachers on the government related strategies for enhancing practical teaching of mechanical craft in technical colleges for self-employment. The hypothesis was not rejected. Therefore, all the items making up the strategies should be employed for the enhancement of practical teaching to be achieved.

Conclusion

Practical teaching is an effective means of developing student potentials for self-employment. Based on the finding of the study, it was discovered that teacher-related, school management-related and government-related strategies are needed for enhancing practical teaching of mechanical craft in technical colleges for

self-employment. Adopting these strategies would be effective means for enhancing and developing practical among students. Teaching in technical colleges needs to be enhanced in order to produce the required manpower for technological and economic development of the society and students. The opinions of the respondents were homogenous to the responses of the items. It shows that the itemized strategies are the effective ways of enhancing practical teaching in technical colleges for self-employment.

Recommendations

Based on findings, the following recommendations were hereby made;

1. The school management should provide enough and adequate equipment for practical teaching of mechanical craft in technical colleges.
2. Enough time should be allotted in the school timetable in mechanical craft practical.
3. The government should constitute uncompromising committee for monitoring judicious use of funds released for practical in schools.
4. Regular payment of salaries and allowances of teachers in technical colleges should be made by the government.

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