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## FACTORS AFFECTING THE TEACHING AND LEARNING OF FOUNDRY CRAFT IN TECHNICAL COLLEGES

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**Abstract**

Ascribable to the progressively complicit of the Unmanned aerial vehicle (*The study was a survey research conducted to investigate the factors affecting the Teaching and Learning of foundry craft in technical Colleges in Enugu State of Nigeria. Three research questions and three null hypotheses tested at .05 significant levels guided the study. A 30 items questionnaire was constructed and face validated by three experts, one from the department of science and computer, one from the department technology and vocational education at Enugu State University of science and technology, Enugu and one from faculty of education University of Nigeria Nsukka. The instrument was trial tested using 10 student and 2 teachers at Government technical college Abakaliki in Ebony State and its reliability was 0.78. The instrument was used to generate data for 25 respondents made up of 21 students and 4 teachers of foundry craft. The population for the study was 25 people (21 students and 4 teachers). The population was manageable. There was no sampling. The findings of the study showed that human, environmental and materials factors affect the teaching and learning of foundry craft in technical colleges. The study concluded among other things that the provision of good classroom, laboratory and workshop should be encouraged for effective teaching and learning of foundry craft in technical colleges.*

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## Introduction

Foundry is a factory that produces metal castings. It is a commercial establishment for the production of cast metals by pouring molten metal into a mold and allowing it to solidify. Metals are cast into shapes by melting them into a liquid, pouring the metal into a mold and removing the mold material after the metal has solidified as it cools (Campbell, 2013). Foundry craft works involves many processes especially in the making of patterns, cores and moulds for producing intricate shapes (Jain, 2012). Foundry craft technology is the most efficient and effective means of producing parts of machines and other parts that are difficult to produce on the lathe machine with respect to grinding, milling and shaping. According to Clegg (2014) foundry is an aspect of metal work technology that deals with casting of metals. Nigeria is a country that is rich in iron ore which are not being utilized due some factors affecting the teaching and learning of foundry craft in our technical colleges where competent foundry craft men are trained. Foundry craft has contributed to technological greatness of some country like Germany and Japan because of their focus in foundry craft (Loffler, 2010). The image of the country in the comity of nations can be enhanced by foundry skills if the factors affecting the teaching and learning of foundry craft in our technical colleges are looked into with the intention of improving those factors. Some developing nations have not developed appreciable skills in foundry. This is as a result of some factors that affect the teaching and learning of foundry craft in our technical colleges (Campbell, 2013). The availability of human, environmental and material factors could help to make the teaching and learning of foundry craft effective in our technical colleges. Holistic education enables the teachers and students to teach well and learn well when the necessary factors are in place (Mendonca, 2017)

The concern of this study is that there seems to be some factors affecting the teaching and learning of foundry craft in our technical colleges. The problem of this study therefore is what are the factors affecting the teaching and learning of foundry craft in technical colleges. The main purpose of this study is to determine the factors affecting the teaching and learning of foundry craft in technical colleges. Specifically, the study sought to determined:

1. The extent of human factors affecting the teaching and learning of foundry craft in technical colleges.
2. The extent of environmental factors affecting the teaching and learning of foundry craft in technical colleges.
3. The extent of material factors affecting the teaching and learning of foundry craft in technical colleges.

## Research Questions

The following research questions were posed to guide the study.

1. What are the human factors affecting the teaching and learning of foundry craft in technical colleges?
2. What are the environmental factors affecting the teaching and learning of foundry craft in technical colleges?
3. What are the materials factors affecting the teaching and learning of foundry craft in technical colleges?

## Null Hypotheses

The following null hypotheses were tested at 0.05 level of significance

1. There is no significant difference between the mean responses of students of technical college and their teachers on the human factors affecting the teaching and learning of foundry craft in technical colleges.
2. A significant difference does not exist between the mean responses of students of technical college and their teachers on environmental factors affecting the teaching and learning of foundry craft in technical colleges.
3. There is no significant difference between the mean responses of students of technical college and their teachers on the materials factors affecting the teaching and learning of foundry craft in technical colleges.

## Method

The design adopted in this study was survey. The area of the study was technical colleges in Enugu State of Nigeria. Enugu State is one of the States in Nigeria. Enugu State is made up of 17 local government areas and 26 technical colleges (STVSMB,2015).The population for the study was 25 respondents (comprised of four teachers and 21 students) of foundry craft at G.T.C, Enugu ( the only technical college that offer foundry craft in Enugu State). The population for the study was manageable. There was no sampling. The instrument for data collection was a structured questionnaire developed by the researcher using a four point responses scale of strongly agree (4), agree (3), disagree (2) and strongly disagree (1).The instrument was face validated by three experts one from the department of science and computer, one from the department technology and vocational education, Enugu State University of science and technology, Enugu and one from faculty of education University of Nigeria Nsukka. Their correction and suggestion was used to produce the final instrument.

To determine the reliability of the instrument, it was trial tested using 10 student and 2 teachers at Government technical college Abakaliki in Ebony State. The data collected were

analyzed using Cranach Alpha coefficient. The overall Cranach Alpha coefficient was 0.78 indicating high reliability of the instrument. The instrument was administered by hand with the aid of a research assistant. The return rate was 96%. Out of the 25 copies of the questionnaire distributed, only 24 copies were returned. Mean and standard deviation was used to answer the research questions while t-test statistic was used to test the null hypotheses at 0.05 level of significance.

## Result

Data for the study were presented and analyzed based on the research questions and hypotheses that guided the study. The details are contained in the tables 1-6.

### Research question One

What are the human factors affecting the teaching and learning of foundry craft in technical colleges?

#### Table 1

**Mean and standard deviation of responses on the human factors affecting the teaching and learning of foundry craft in Technical Colleges**

S/N	Item statement	Teachers		Students		Overall		Decision
		X1	SD1	X2	SD2	X3	SD3	
1	Competent teachers	3,50	1.00	3.38	0.84	3.44	0.92	Agree
2	Resourceful teachers	3,50	0.57	3.60	0.49	3.55	0.53	Agree
3	Creative teachers	3,50	0.57	3.38	0.76	3.44	0.67	Agree
4	Innovative teachers	3,25	0.76	2.90	0.48	3,10	0.62	Agree
5	Friendly teachers	3,50	0.57	2.80	0.49	3,15	0.53	Agree
6	Self worth	3,50	0.57	2.90	0.97	3,20	0.77	Agree
7	Good humor	3,50	0.57	2.90	0.97	3,20	0.77	Agree
8	Proper coordination	3,25	0.50	3.22	0.75	3,22	0.60	Agree
9	Focus teachers	3.50	0.57	2.90	0.96	3.20	0.77	Agree
10	Proper supervision	3.50	0.57	3.60	0.57	3.53	0.57	Agree
11	Focus among the students	3.50	0.57	2.65	0.57	3.10	0.77	Agree
12	Motivation	3.50	0.57	3.85	0.36	3.67	0.47	Agree
	<b>Grand mean</b>	<b>3.46</b>	<b>0.62</b>	<b>3.17</b>	<b>0.71</b>	<b>3.32</b>	<b>0.60</b>	<b>Agree</b>

Data in **Table 1** shows that the respondents agreed that all the items identified are the human factors affecting the teaching and learning of foundry Craft in Technical Colleges. The mean values were above the benchmark of 2.50 and the grand mean for the two groups of the respondents were also above 2.50.

### Hypotheses One

There is no significant difference between the mean responses of students of technical colleges and their teachers on the human factors affecting the teaching and learning of foundry Craft in Technical Colleges.

**Table 2**

**t-test analysis of the mean responses of students of Technical Colleges and their teachers on the human factors affecting the teaching and learning of foundry craft in Technical Colleges**

Respondents	N	X	SD	Df	t-cal	t-crit	Decision
Teachers	4	3.49	0.62	23	±1.21	±1.96	Do not
Students	21	3.06	0.78				Reject Ho

The data presented in **Table 2** shows that at 0.05 level of significant, t-calculated of 1.21 is less than t-critical which is 1.96. This implies that there is no significant difference in the mean ratings of students of technical colleges and their teachers on the human factors affecting the teaching and learning of foundry craft in Technical Colleges.

### Research question Two

What are the environmental factor affecting the teaching and learning of foundry craft in technical colleges?

**Table 3**

**Mean and standard deviation of responses on the environmental factors affecting the teaching and learning of foundry craft in Technical Colleges.**

S/N	Item statement	Teachers		Students		Overall		Decision
		X1	SD1	X2	SD1	X3	SD3	
	Good:							
13	classrooms	3.50	0.57	3.14	0.83	3.32	0.70	Agree
14	staff office	3.45	0.56	3.13	0.82	3.30	0.70	Agree
15	Laboratory	3.50	0.57	3.14	0.83	3.18	0.70	Agree
16	foundry workshop	3.50	0.57	3.00	0.84	3.23	0.79	Agree
17	student foundry library	3.50	0.57	3.60	0.54	3.56	0.56	Agree
18	Accommodation	3.75	0.50	3.33	0.48	3.54	0.49	Agree
19	Proper safety awareness	3.50	0.57	3.05	0.79	3.16	0.68	Agree
20	Available medical services	3.50	0.57	3.05	0.79	3.16	0.68	Agree
21	Academic conducive environment	3.75	0.50	3.10	0.77	3.42	0.64	Agree
	<b>Grand mean</b>	<b>3.55</b>	<b>0.55</b>	<b>3.17</b>	<b>0.74</b>	<b>3.32</b>	<b>0.66</b>	<b>Agree</b>

The data in **Table 3** shows that the respondents agreed that all the items identified are the environmental factors affecting the teaching and learning of foundry craft in Technical Colleges. The mean values were above the benchmark of 2.50 and the grand mean for the two groups of the respondents were also above 2.50.

## Hypotheses Two

A significant difference does not exist between the mean responses of students of technical colleges and their teachers on the environmental factors affecting the teaching and learning of foundry craft in Technical Colleges.

**Table 4**

**t-test analysis of the mean responses of students of Technical Colleges and their teachers on the environmental factors effecting the teaching and learning of foundry craft in Technical Colleges**

Respondents	N	X	SD	Df	t-cal	t-crit	Decision
Teachers	4	3.51	0.56	23	±0.99	±1.96	Do not
Students	21	3.12	0.75				Reject Ho2

The data presented in **Table 4** indicates that at 0.05 level of significant, t-calculated of 0.99 is less than t-critical which is 1.96. This implies that there is no significant difference in the mean ratings of students of Technical Colleges and their teachers on the environmental factors affecting the teaching and learning of foundry craft in Technical Colleges.

### Research question 3

What are the materials factors affecting the teaching and learning of foundry craft in technical colleges?

**Table 5**

**Mean and standard deviation of responses on the materials factors affecting the teaching and learning of foundry craft in Technical Colleges.**

S/N	Item statement	Teachers		Students		Overall		Decision
		X1	SD1	X2	SD1	X3	SD3	
	Good:							
22	Chalk board	3.50	0.57	3.14	0.83	3.32	0.70	Agree
23	Digital board	3.50	0.57	3.14	0.83	3.32	0.70	Agree
24	Power point equipment	3.50	0.57	3.14	0.83	3.18	0.70	Agree
25	Workshop equipment	3.50	0.57	3.00	0.84	3.23	0.79	Agree
26	Adequate consumable	3.50	0.57	3.60	0.54	3.56	0.56	Agree
27	Standard laboratory equipment	3.75	0.50	3.33	0.48	3.54	0.49	Agree
29	Required work piece in the workshop	3.50	0.57	3.05	0.79	3.16	0.68	Agree
30	Standard laboratory specimen	3.50	0.57	3.05	0.79	3.16	0.68	Agree
	<b>Grand mean</b>	<b>3.53</b>	<b>0.56</b>	<b>3.18</b>	<b>0.74</b>	<b>3.30</b>	<b>0.66</b>	<b>Agree</b>

Data in **Table 5** shows that the respondents agreed that all the items identified are the material factors affecting the teaching and learning of foundry craft in Technical Colleges. The mean values were above the benchmark of 2.50 and the grand mean for the two groups of the respondents were also above 2.50.

### Hypotheses Three

There is no significant difference between the mean responses of students of Technical Colleges and their teachers on the material factors effecting the teaching and learning of foundry craft in Technical Colleges.

**Table 6**

**t-test analysis of the mean responses of students of Technical Colleges and their teachers on the material factors affecting the teaching and learning of foundry craft in Technical Colleges**

Respondents	N	X	SD	Df	t-cal	t-crit	Decision
Teachers	4	3.48	0.61	23	±1.20	±1.96	Do not
Students	21	3.05	0.77				Reject Ho

The data presented in **Table 6** indicates that at 0.05 level of significant, t-calculated of 1.20 is less than t-critical which is 1.96. This implies that there is no significant difference in the mean ratings of students of technical colleges and their teachers on the material factors affecting the teaching and learning of foundry Craft in Technical Colleges.

### Discussion of Findings

Analysis of respondents to all the three research questions revealed that all the 30 items identified had mean ratings that qualify them as the factors affecting the teaching and learning of foundry craft in technical colleges. This was observed from overall mean(x) values which range between 3.10 to 3.55 for research question one, 3.16 to 3.56 for research question two, and 3.16 to 3.56 for research question three indicating agreed because the mean values were above the benchmark of 2.50.

The grand mean (x) for the two groups of the respondents respectively in the three research questions were above 2.50, showing that they agreed to the items as the factors affecting the teaching and learning of foundry craft in technical colleges. The closeness of the responses as shown by the entire standard deviation (SD) indicates homogeneity in their responses. Testing of the three hypotheses revealed that there is no significance difference on the mean responses of students of Technical Colleges and their teachers on the human, environmental and material factors affecting the teaching and learning of foundry Craft in Technical Colleges.

### Conclusion

The human, environmental and material factors should be put in place for effective teaching and learning of foundry craft in technical colleges. The government and technical education administrators should provide the necessary amenities to the Technical Colleges so that teaching and learning of foundry craft should not be boring. The availability of these amenities would facilitate effective teaching and learning of foundry craft in our Technical Colleges. When the necessary amenities are available, teachers will enjoy teaching and the students will enjoy learning. It will motivate the teachers to put in their best so that they will produce students who will competent foundry craftsmen on graduation.

### Recommendations

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

1. Only qualified technical teachers should be employed to teach foundry craft in our technical colleges.
2. The government and technical education administrators should provide the necessary amenities to the Technical Colleges.
3. The government should make fund available for the training and re-training foundry craft teachers for effective delivery.

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