



EFFECTIVE USE OF INSTRUCTIONAL MATERIALS IN TEACHING AND LEARNING OF TECHNICAL DRAWING IN TECHNICAL COLLEGES IN AWGU L.G.ANJ.

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Abstract: *The purpose of this study was to investigate the effective use of instructional materials in teaching and learning of technical drawing in Awgu Local Government Area. The study was conducted at technical colleges in Awgu Local Government Area of Enugu State Nigeria. The population for the study was 220 people. A simple random sampling technique was used to select a sample of 100 respondents made up of 3 teachers and 97 students. The instrument for data collection was structured questionnaire. The return rate of the instrument was 96%. Three experts from University of Nigeria Nsukka validated the instruments. A pilot study of two teachers and 10 students were conducted at Governmental Technical College Enugu. Cronbach Alpha technique was used to test for the reliability. The reliability coefficient of 0.76 was obtained for the instrument. Three research questions and three null hypotheses guided the study. Mean and standard deviation were used to answer the research questions, while t-test was employed to test the null hypotheses at .05 level of significance. The study revealed that there were lack of instructional materials and hence ineffective use of it in Technical Colleges in Awgu Local Government Area of Enugu State, Nigeria. It was recommended that all players in the educational system should make ceaseless efforts towards encouraging and sustaining the procurement, production, storage and utilization of instructional materials in teaching and learning of technical drawing in our Technical Colleges.*

Key words: Instructional materials, Teaching, Learning, Technical drawing

Introduction

Instructional materials which are the human and non human materials that are used to ease, encourage, improve and promote teaching and learning activities are very important and powerful tool in our Technical Colleges. The place of instructional materials among other teaching resources in the technical colleges cannot be over emphasized. Its importance cannot be overstressed. Instructional material dictates the method and skills to be adopted, in order to facilitate the achievement of instructional objectives. Instructional materials are broad

range of resources which can be used to facilitate effective instruction (Harb, 2016). They indicate a systematic way of designing, carrying out and employing the total process of teaching and learning.

Teaching is an activity aimed at bringing about meaningful learning through a method that is morally and pedagogically acceptable. It involves a teacher, a learner, content in the form of knowledge, facts, information and skills to be impacted with a deliberate intention on the part of the learner to learn. Smith (2018) opined that teaching is impacting knowledge to someone on how to do something.



It is helping someone to understand something by example. Teaching involves creating an environment and engaging with others, so that they learn particular things. At the centre of teaching technical drawing lies the enthusiasm and commitment to engaging people in learning technical drawing.

Technical drawing is the art and discipline of composing drawing that visually communicate how something functions or is constructed. It is skill of creating a plan for a person to visualize and follow how it need to carried out instead of writing and explaining the process (Paul,2010). John (2015) opined that technical drawing is essential for communicating ideas among technical teachers and students in technical colleges. Technical drawing is a graphical language in the technical colleges (Oguejiofor, 2018). It is a very important subject in technical colleges. For the teaching and learning of technical drawing to be effective, there should be an effective use of instructional materials. The concern of this study is that there seems to be lack of instructional materials for the teaching and learning of technical drawing in Technical Colleges in Awgu Local Government Area of Enugu State, Nigeria and this had jeopardized the teaching and learning of this important technical subject in Technical Colleges. The problem of this study therefore is whether instructional materials are available for use in Technical Colleges in Awgu Local Government Area. The purpose of this study was to determine the effective use of instructional materials in teaching and learning of technical drawing in Awgu Local Government Area. Specifically, the study sought to determine:

1. the extent of the availability of instructional materials in Technical Colleges in Awgu Local Government Area.
2. the extent at which teachers use instructional materials in Technical Colleges in Awgu Local Government Area.
3. if the use of instructional materials help to achieve the desired instructional objective in

Technical Colleges in Awgu Local Government Area.

Research Questions

The following research questions were posed to guide the study.

1. To what extent is the availability of technical drawing instructional materials in Technical Colleges in Awgu Local Government Area?
2. To what extent do teachers use technical drawing instructional materials in Technical Colleges in Awgu Local Government Area?
3. Do the use of technical drawing instructional materials in teaching and learning technical drawing effective in achieving the instructional objective?

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 teachers and students on the extent of the availability of instructional materials in Technical Colleges in Awgu Local Government Area.
2. A significant difference does not exist between the mean responses of teachers and students on the extent teachers use instructional materials in Technical colleges in Awgu Local Government Area..
3. There is no significant difference between the mean responses of teachers and students on the effectiveness of instructional materials on achieving instructional goals in technical colleges in Awgu Local Government Area.

Method

The purpose of this study was to investigate the effective use of instructional materials in teaching and learning of technical drawing in Technical Colleges in Awgu Local Government Area of Enugu State, Nigeria. The study adopted survey research design. The study was conducted



at two Technical Colleges in Awgu Local Government Area of Enugu State, Nigeria. The population for the study was 220 people. A simple random sampling technique was used to select a sample of 100 respondents made up of three teachers and 97 students. The instrument for data collection was structured questionnaire. The return rate of the instrument was 96%. Three experts from University of Nigeria Nsukka validated the instruments. A pilot study of two teachers and 10 students were conducted at Governmental Technical College Enugu. Cronbach Alpha technique was used to test for the reliability. The reliability coefficient of 0.76 was obtained for the instrument. Three research questions and three null hypotheses guided the

study. Mean and standard deviation were used to answer the research questions, while t-test was employed to test the null hypotheses at .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

To what extent is the availability of technical drawing instructional materials in technical colleges in Awgu Local Government Area of Enugu State, Nigeria?

Tale 1

Mean and Standard Deviation of Responses of the Respondents on extent of the Availability of Instructional Materials in Technical Colleges in Awgu Local Area of Enugu State, Nigeria.

S/ N	Item statement	Teachers		Students		Overall		Remark
		X1	SD1	X2	SD2	X3	SD3	
1	Drawing template	2.33	0.82	2.38	0.48	2.36	0.65	AVLE
2	Perfective machines	2.00	1.40	1.00	0.10	1.50	0.75	NA
3	Visual resource materials [chart, photographs]	2.66	0.57	2.65	0.46	2.66	0.52	ALE
4	Audio resource materials [tape recorder]	2.33	0.82	2.38	0.48	2.35	0.65	AVLE
5	Audio –Visual resource materials[slides, projector]	1.67	0.81	1.00	0.10	1.34	0.41	NA
6	Functional computers	2.33	0.82	2.38	0.48	2.36	0.65	AVLE
7	Relevant technical drawing textbooks	2.66	0.57	2.56	0.62	2.61	0.60	ALE
8	Functional technical drawing studio	2.00	1.40	2.38	0.48	2.20	0.90	AVLE
9	Chalk board	3.66	0.81	3.28	0.84	3.47	0.83	AGE
10	Dictaphones	1.67	0.61	1.00	0.10	1.34	0.36	NA
11	Functional reprographic machines	1.67	0.61	2.16	0.36	2.00	0.49	NA
12	Good class rooms	3.66	0.81	3.50	0.88	3.58	0.85	AGE
13	Good staff offices	2.33	0.82	2.38	0.48	2.36	0.65	AVLE
14	White board	1.67	0.81	1.00	0.10	1.34	0.46	NA
15	Laptops	1.67	0.61	1.90	0.30	1.79	0.46	NA
16	Tablets	1.67	0.81	1.00	0.10	1.35	0.46	NA
17	Drawing boards	2.66	0.57	2.56	0.62	2.66	0.60	ALE
18	T –square	2.66	0.57	2.65	0.46	2.61	0.60	ALE



19	French curves	2.67	0.81	2.56	0.62	2.62	0.72	ALE
20	Set of compasses	2.67	0.81	2.56	0.62	2.62	0.72	ALE
21	Protractor	2.66	0.57	2.56	0.62	2.66	0.52	ALE
22	Rulers	2.66	0.57	2.65	0.46	2.66	0.52	ALE
23	Standard drawing papers	2.66	0.57	2.65	0.46	2.66	0.52	ALE
24	Straight edge	2.33	0.82	2.56	0.62	2.45	0.72	AVLE
25	Drawing pencils	2.66	0.57	2.65	0.46	2.64	0.52	ALE
26	Set square	2.66	0.57	2.65	0.46	2.66	0.52	ALE
27	Drafting machine	1.67	0.81	1.00	0.10	1.34	0.46	NA
28	Dividers	2.66	0.57	2.65	0.46	2.66	0.52	ALE
	Grand Mean	2.38	0.73	2.15	0.44	2.27	0.59	AVLE

Note: NA = Not Available, AVLE = Available to very low extent, ALE = Available to low extent, AGE = Available to great extent

The result in **Table 1** showed that instructional materials like perfective machines, Audio –visual resource materials, dictaphones, functional reprographic machines, white boards, laptops, tablets and drafting machines are not available in Technical Colleges in Awgu Local government Area of Enugu State, Nigeria. However, some instructional materials like drawing template, audio resource materials, functional computers, functional technical drawing studio, good staff offices and straight edge are available to very low extent. While Visual resource materials, relevant technical drawing textbooks,

drawing boards, T –square, French curves, set of compasses, protractor, rulers, standard drawing papers, set square and dividers are available to low extent. Only chalk board and class rooms are available to great extent.

Null Hypothesis One

There is no significant difference between the mean responses of teachers and students on the extent of the availability of instructional materials in Technical Colleges in Awgu Local Government Area of Enugu State, Nigeria.

Table 2

t-test Analysis of the Mean Responses of students of Technical Colleges and their teachers on the extent of the availability of Technical Drawing Instructional materials

Respondents	N	X	SD	Df	t-cal	t-crit	Decision
Teachers	3	2.38	0.73	98	0.54	±1.96	Do not reject
Students	97	2.15	0.44				

Note: N = number of respondents, X = mean, SD = standard deviation and NS = not significant

The data in **Table 2** showed that t–calculated of 0.54 is less than t-critical (1.96).Therefore, there is no significant different between the mean responses of teachers and students on the extent of the availability of instructional materials in Technical Colleges in Awgu Local Government Area of Enugu State, Nigeria. The null hypothesis was accepted.

Research question Two

To what extent do teachers use instructional materials in Technical Colleges in Awgu Local Government Area of Enugu State, Nigeria?



Tale 3

Mean and Standard Deviation of Responses of the Respondents on extent Teachers use Instructional Materials in Technical Colleges in Awgu Local Area of Enugu State, Nigeria.

S/ N	Item statement	Teachers		Students		Overall		Remark
		X1	SD1	X2	SD2	X3	SD3	
29	Drawing template	2.00	1.40	2.16	0.36	2.08	0.88	NE
30	Perfective machines	2.00	1.40	1.90	0.30	1.95	0.85	NE
31	Visual resource materials [chart, photographs]	2.66	0.57	2.56	0.62	2.61	0.60	LE
32	Audioresource materials [tape recorder]	2.33	0.82	2.16	0.36	2.25	0.59	VLE
33	Audio –Visual resource materials[slides, projector]	2.66	0.57	2.56	0.62	2.61	0.60	LE
34	Functional computers	2.33	0.82	1.90	0.30	2.12	0.56	VLE
35	Relevant technical drawing textbooks	2.66	0.57	2.56	0.62	2.61	0.60	LE
36	Functional technical drawing studio	2.70	0.56	2.65	0.46	2.68	0.51	LE
37	Chalk board	3.66	0.81	3.50	0.88	3.58	0.85	GE
38	Dictaphones	2.00	1.40	1.00	0.10	1.50	0.75	NE
39	Functional reprographic machines	2.00	1.40	1.90	0.30	1.95	0.85	NE
40	Class rooms	3.66	0.81	3.50	0.88	3.58	0.85	GE
41	Staff offices	3.66	0.81	3.50	0.88	3.58	0.85	GE
42	White board	1.67	0.81	1.00	0.10	1.34	0.46	NE
43	Laptops	2.00	1.40	1.90	0.30	1.95	0.85	NE
44	Tablets	1.67	0.81	1.00	0.10	1.34	0.46	NE
45	Drawing boards	3.66	0.81	2.65	0.46	3.12	0.64	GE
46	T –square	3.00	1.70	2.65	0.46	2.78	1.08	LE
47	French curves	2.66	0.57	2.56	0.62	2.61	0.60	LE
48	Compasses	3.66	0.81	3.50	0.88	3.58	0.85	GE
49	Protractors	3.00	1.70	2.65	0.46	2.83	1.08	LE
50	Rulers	2.70	0.56	2.65	0.46	2.68	0.51	LE
51	Standard drawing papers	2.66	0.57	2.56	0.62	2.61	0.60	LE
52	Straight edge	2.65	0.57	2.65	0.46	2.65	0.52	LE
53	Drawing pencils	3.66	0.81	2.65	0.46	3.16	0.64	GE
54	Set square	3.66	0.81	3.50	0.88	3.58	0.85	GE
55	Drafting machine	1.67	0.81	1.00	0.10	1.34	0.46	NE
56	Dividers	3.66	0.81	3.50	0.88	3.58	0.85	GE
	Grand Mean	2.60	0.77	2.39	0.55	2.50	0.66	LE

Note: NE = NoExtent, VLE = Very low extent, LE = Low Extent, GE = Great Extent.



The data in **Table 3** showed that drawing template, perfective machines, dictaphones, functional reprographic machines, white board, laptops, tablets and drafting machine were some of the instructional materials not in use in teaching and learning of technical drawing in Technical Colleges in Awgu Local Government Area because they are not available. However some instructional materials like chalk board, dividers set square, drawing pencils, compasses, drawing boards, class rooms and Staff offices were used to great extent. While protractors, rulers, standard drawing papers, straight edge,

T –square, French curves, relevant technical drawing textbooks and functional technical drawing studio were used to low extent. Audioresource materials and functional computers were used to very low extent.

Null Hypotheses Two

A significant difference does not exist between the mean responses of teachers and students on the extent teachers use instructional materials in Technical colleges in Awgu Local Government of Enugu State, Nigeria.

Table 4

t-test Analysis of the Mean Responses of students of Technical colleges and their teachers on the extent of the use of technical drawing instructional materials in technical college in Awgu Local Government of Enugu State, Nigeria.

Respondents	N	X	SD	Df	t-cal	t-crit	Decision
Teachers	3	2.70	0.77	98	0.47	±1.96	Do not reject
Students	97	2.19	0.55				

Note: N = number of respondents, X = mean, SD = standard deviation and NS = not significant

The data in **Table 4** showed that t–calculated of 0.47 is less than t-critical (1.96). Therefore, a significant difference does not exist between the mean responses of teachers and students on the extent teachers use instructional materials in Technical College in Awgu Local Government of Enugu State, Nigeria. The null hypothesis was not rejected

Research question Three

Do the use of instructional materials in teaching and learning technical drawing effective in achieving the instructional objective in Technical Colleges in Awgu Local Government of Enugu State, Nigeria?

Table 5

Mean and Standard Deviation of Responses of the Respondents on the effectiveness of Instructional Materials in Teaching and Learning technical drawing in Technical Colleges in Awgu Local Area of Enugu State, Nigeria.

S/ N	Item statement	Teachers		Students		Overall		Remark
		X1	SD1	X2	SD2	X3	SD3	
57	Drawing template	2.00	1.40	1.90	0.30	1.95	0.85	EGE
58	Perfective machines	1.90	0.30	1.90	0.30	1.90	0.30	EGE
59	Visual resource materials [chart, photographs]	2.66	0.57	2.56	0.62	2.61	0.60	EGE
60	Audioresource materials [tape recorder]	1.90	0.30	2.00	1.40	1.95	0.85	EGE



61	Audio –Visual resource materials[slides, projector]	2.00	1.40	1.90	0.30	1.95	0.85	EGE
62	Functional computers	2.33	0.82	2.34	0.79	2.34	0.81	EGE
63	Relevant technical drawing textbooks	2.66	0.57	2.56	0.62	2.61	0.60	EGE
64	Functional technical drawing studio	2.65	0.57	2.65	0.46	2.65	0.52	EGE
65	Chalk board	3.66	0.57	3.50	0.88	3.58	0.52	EGE
66	Dictaphones	1.90	0.30	2.00	1.40	1.95	0.85	EGE
67	Functional reprographic machines	2.00	1.40	1.90	0.30	1.95	0.85	EGE
68	Class rooms	3.33	1.40	2.65	0.46	2.99	0.93	EGE
69	Staff offices	3.66	0.81	2.90	0.40	3.28	0.61	EGE
70	White board	2.33	0.82	2.00	1.40	2.17	1.11	EGE
71	Laptops	2.33	0.82	2.33	0.79	2.33	0.81	EGE
72	Tablets	2.33	0.82	2.34	0.79	2.34	0.81	EGE
73	Drawing boards	2.70	0.56	2.65	0.46	2.68	0.51	EGE
74	T –square	3.66	0.81	2.90	0.40	3.28	0.61	EGE
75	French curves	3.67	0.80	3.50	0.88	3.59	0.84	EGE
76	Compasses	2.70	0.56	2.56	0.62	2.63	0.59	EGE
77	Protractors	2.66	0.81	2.65	0.46	2.66	0.64	EGE
78	Rulers	3.33	1.40	2.90	0.40	3.12	0.90	EGE
79	Standard drawing papers	3.00	1.00	2.56	0.62	2.78	0.81	EGE
80	Straight edge	2.70	0.56	2.65	0.46	2.68	0.51	EGE
81	Drawing pencils	3.00	1.00	2.56	0.62	2.78	0.81	EGE
82	Set square	2.70	0.56	2.56	0.62	2.63	0.59	EGE
83	Drafting machine	2.00	1.40	1.90	0.30	1.95	0.85	EGE
84	Dividers	2.70	0.56	2.65	0.46	2.68	0.51	EGE
	Grand Mean	2.66	0.80	2.40	0.63	2.53	0.72	EGE

Note: EGE =Effective to great extent

The result in **Table 5** showed that all available instructional materials indentified were effective instrument to great extent for the teaching and learning of technical drawing in Technical Colleges in Awgu Local Area of Enugu State, Nigeria. The grand mean is greater than the bench mark of 2.55

Null Hypotheses Three

There is no significant difference between the mean responses of teachers and students on the effectiveness of instructional materials on achieving instructional goals in Cechnical colleges in Awgu Local Government Area of Enugu State, Nigeria.



Table 6

t-test Analysis of the Mean Responses of students of Technical Colleges and their teachers on the effectiveness of instructional materials on achieving instructional goals.

Respondents	N	X	SD	Df	t-cal	t-crit	Decision
Teachers	3	2.65	0.80	98	0.56	±1.96	Do not reject
Students	97	2.50	0.63				

Note: N = number of respondents, X = mean, SD = standard deviation and NS = not significant

The data in **Table 6** showed that t-calculated of 0.40 is less than t-critical (1.96). Therefore, a significant difference does not exist between the mean responses of teachers and students on the on the effectiveness of instructional materials in achieving instructional goals in technical colleges in Awgu Local Government Area of Enugu State, Nigeria. The null hypothesis was accepted.

Discussion of the Findings

The result of the study revealed that some instructional materials like perfective machines, Audio –visual resource materials, dictaphones, functional reprographic machines, white boards, laptops, tablets and drafting machines were not available in Technical Colleges in Awgu Local government Area of Enugu State, Nigeria, therefore they are not used in teaching and learning of technical drawing. However, some instructional materials like drawing template, audioresource materials, functional computers, functional technical drawing studio, good staff offices, straight edge were available to very low extent. While Visual resource materials, relevant technical drawing textbooks, drawing boards, T –square, French curves, set of compasses, protractor, rulers, standard drawing papers, set square and dividers were available to low extent. Only chalk board and class rooms were available to great extent. Those available instructional materials are the materials used in teaching and learning of technical drawing in Technical Colleges in Awgu Local Government Area. The study revealed that all the indentified instructional materials are effective to great extent for the teaching and

learning of technical drawing in Technical Colleges. It also showed that there is no significant difference between the mean responses of teachers and students on the extent of the availability and use of instructional materials in technical colleges in Awgu Local Government Area.

Finally it showed that the use of instructional materials makes the teaching and learning of technical drawing effective in our Technical Colleges.

Conclusion

There availability of instructional materials in our Technical Colleges werenot enough. There was no significant difference between the mean responses of teachers and students on the extent of the availability of instructional materials. However, the available instructional materials were effective to great extent for effective teaching and learning of technical drawing in our Technical Colleges. Therewas no significant difference between the mean responses of teachers and students on the effectiveness of instructional materials on achieving instructional goals.Finally, there was no significant difference between the mean responses of teachers and students on the extentof the use instructional materials in technical college.

Recommendations

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

1. All players in the educational system should make ceaseless efforts towards encouraging and sustaining the procurement, production, storage



and utilization of instructional materials in teaching and learning of technical drawing in our Technical Colleges.

2. The Government and Technical Colleges policy makers should map out good percentage of their annual budget for the running of Technical Colleges.
3. The technical drawing teachers should make improvisation of some instructional materials for the teaching and learning of technical drawing in our technical colleges.

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