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SCHOOL OF POST GRADUATE STUDIES
FACULTY OF ENVIRONMENTAL SCIENCES
DEPARTMENT OF ARCHITECTURE

TECHNICAL REPORT ON

STUDENTS' KNOWLEDGE OF HAND DRAWING/DRAFTING TECHNIQUES IN DESIGN STUDIO COURSES IN THE FACULTY OF ENVIRONMENTAL SCIENCES.

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JULY, 2018.

ABSTRACT

In themidst of a globalized world characterized by deployment of Computer Aided Design (CAD), and the establishment of the new rule by the Architects' Registration Council of Nigeria (ARCON) stating that all first to third year students of design studios (Architecture and Urban and Regional Planning) in the Faculty of Environmental Sciences must use hand-drafting in the studio and other design based courses. Thus, this study is to ascertain the students' knowledge of Hand Drawing/Drafting Techniques in design studio courses in the faculty of Environmental Sciences, Rivers State University (RSU) in the departments of Architecture and Urban and Regional Planning. This report carries data and graphical representations of student's knowledge of Hand Drawing/Drafting Techniques in design studio courses, and a general statement of the Hand Drawing/Drafting Techniques in design studios that was obtained through a structured questionnaires administered to students from second year to fourth and fifth year as the case may be in the 2017/2018 academic session. Data obtained was analyzed using descriptive statistics and result showed that students have barely average knowledge of hand drawing/drafting techniques and it is recommended that hand drawing/drafting be taken more serious in the early stages of the education as to strengthen the students' knowledge and build a stable solid foundation as they progress.

Keywords: Hand Drawing/Drafting, Design Studio, Architecture, Urban and Regional Planning.

1.0 INTRODUCTION

1.1 Background to Study

By the establishment of the new rule by the Architects' Registration Council of Nigeria (ARCON) stating that all first to third year students of design studios (Architecture and Urban and Regional Planning) in the Faculty of Environmental Sciences must use hand-drafting in the studio and other design based courses. Based on this, a survey was conducted of students' knowledge of hand drawing/drafting techniques in design courses in the Faculty of Environmental Sciences.

This is a report based on my individual survey conducted and analyzed out of a group of 13members that took part in the survey to acquire an adequate sample size as to obtain an accurate data. The survey religiously covers from second year to final year of the affected departments in the Faculty of Environment Sciences. Each member of the group is a subset to the actual sample size.

1.2 Research Problem

The students over the years have shown by academic performance that they are having a depreciating knowledge of hand drawing/drafting techniques, one could blame this to the emergence or introduction of Computer Aided Designs software or a lack of adequate fundamental training on hand drawing/drafting techniques. One of the notable problems causing this depreciation is the neglecting of the necessary courses that will focus on and enhance the knowing capacity of students'in these areas of concentration. Also, students' initial knowledge and interest should be checked and tested before admission into these departments.

2.0 RESEARCH METHODOLOGY

2.1 Introduction

This chapter outlines the research strategy and method used in collecting data for this study. Generally, research design and procedure aim at answering the research questions posed and test the validity of the hypothesis as well as measure with accuracy of the cause and effects being estimated (Okoye; 2001). The chapter discusses the procedures and methods adopted in the research design, data collection, presentation, processing, analysis and interpretation.

2.2 Research Site

A survey of architecture and Urban and regional planning students in the Faculty of Environmental Sciences, Rivers State Universityfrom the second to the final year was carried. The target populationwas taken as follow; Architecture: Btech4 was 82 students; Btech3 was 76 students; Btech2 was 69 students, while Urban and Regional Planning: Btech5 was 25 students; Btech4 was 30 students; Btech3 was 48students; Btech2 was 50 students, giving a total of 380 students for the both departments. Architecture having 227 students, Urban and Regional Planning having 153 students respectively, this became the target population for the group. 35% of the target population was taken to be the sample size being 132 students shared religiously among the both departments.

2.3 Research Instrument

A total of 132 questionnaires were shared to the various departments, the students were asked to fill a questionnaire, which consisted of six sections. The first section of the questionnaire consists of questions on the profile of the students and their basic entry subjects into the departments, while the other sections elicited information about their knowledge and appreciation of hand drawing/drafting techniques. Among these sections is **Section F** which shows a practical percentageof students' knowledge of some of the graphical symbols used in hand drawing/drafting. The data obtained were analyzed using descriptive statistics, charts and graphs respectively. The 132 questionnaires were shared among the group members to make 11questionnaires as a subset for each member.

3.0 DATA PRESENTATION, ANALYSIS AND INTERPRETATION

This focuses on the presentation, analysis and discussion of findings obtained from the administered questionnaires and a total of 132 questionnaires was administered by the group.

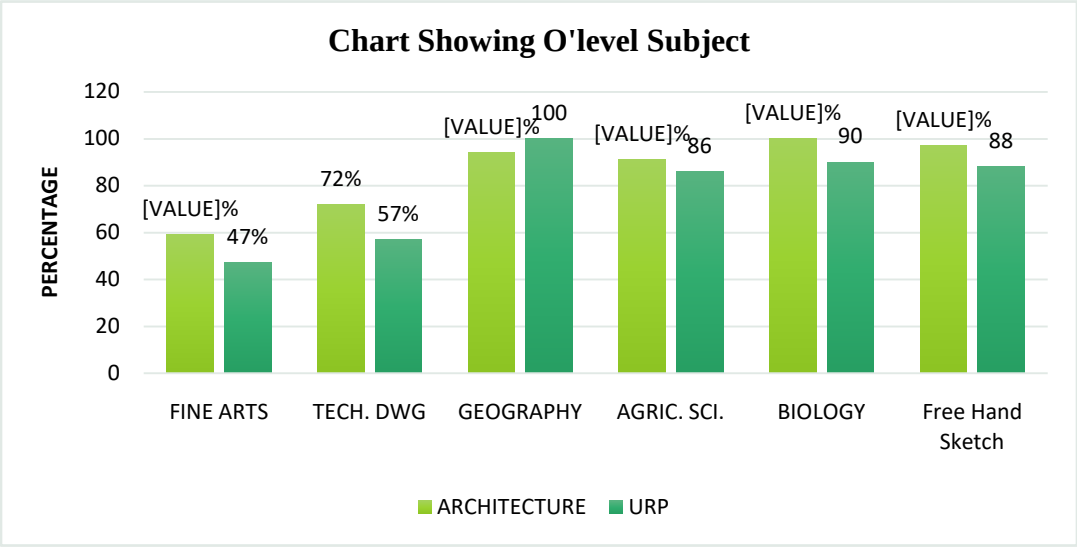
3.1 Section A; Personal Data

Table 3.1 below shows the students' personal data and their corresponding ages for the departments of Architecture and Urban and Regional Planning.

Department Level	Architecture		Urban and Regional Planning	
	Male	Female	Male	Female
200	18	3	14	1
300	17	7	16	7
400	19	5	2	0
500	0	0	7	4
Total	**54**	**15**	**39**	**12**
AGE				
16-20years	21	1	20	5
21-25years	28	9	16	5
26-30years	4	5	3	2
31-40years	1	0	0	0

3.1.1 Section A; O'level Subjects

Department Subject	Architecture		Urban and Regional Planning	
	YES	NO	YES	NO
Fine Arts	41	28	24	27
Technical Drawing	50	19	29	22
Geography	65	4	51	0
Agricultural Science	63	6	44	7
Biology	69	0	46	5
Free Hand sketch	67	2	45	6



From the chart above, 59% of students in Architecture took Fine Arts in their O'level, while 47% for Urban and Regional Planning. 72% of students in Architecture took Technical Drawing, while 57% for Urban and Regional Planning. 94% of students in Architecture took Geography, while 100%for Urban and Regional Planning. 91% of students in Architecture took Agricultural Science, while 86%for Urban and Regional Planning. 100% of students in Architecture took Biology, while 90%for Urban and Regional Planning.

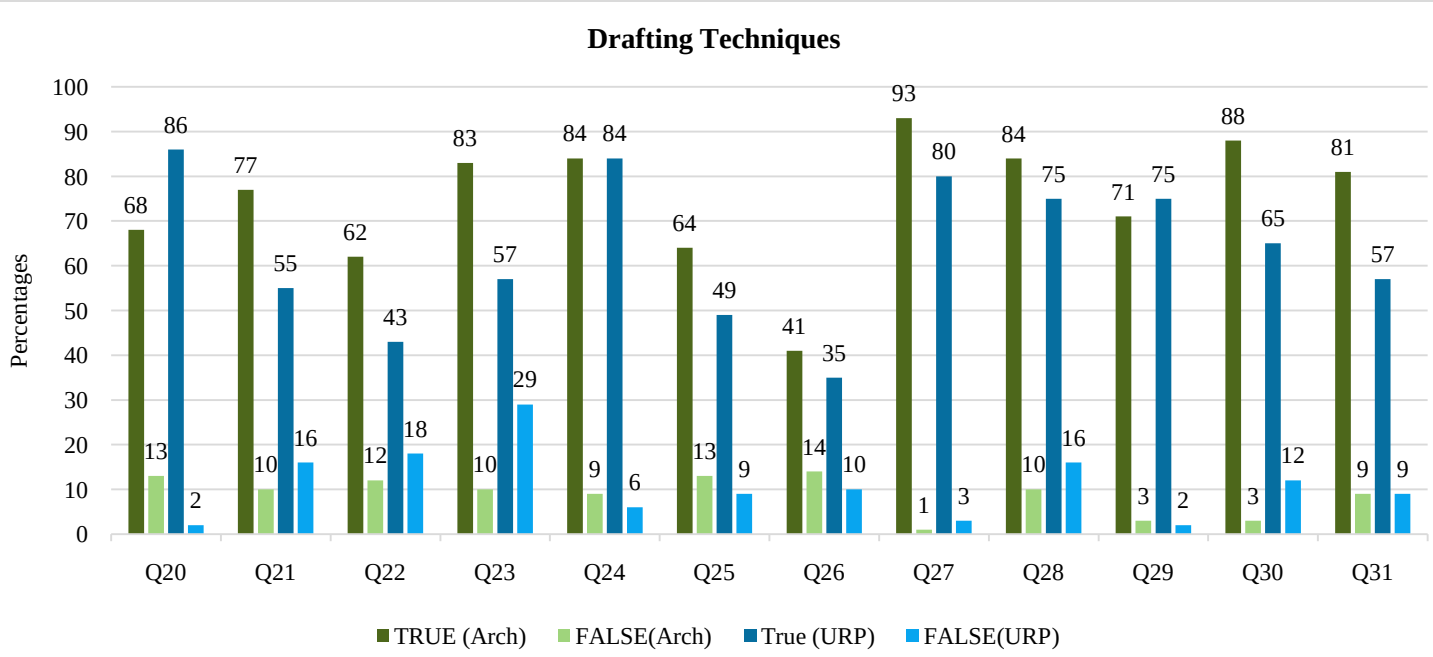
For their first year in the university, 97% of students in Architecture passed through Free hand Sketch training, while 88% for Urban and Regional Planning.

3.2 Section B; Drafting Techniques

S/N	QUESTIONS	True	False	UNDECIDED
20.	The range of line thickness is available with the use of tracing pen			
21.	Hatching takes more time in hand drafting			
22.	Set-square and scales smudges still wet lines			
23.	Constant re-sharpening of pencil slows down drafting			
24.	Sheets are easily stained and difficult to erase when drafting with pen			
25.	The appearance of far too many carefully drawn sheets is marred by the quality of their lettering			
26.	Lettering for the purpose of general annotation should be a minimum of 2mm			
27.	Grid line, Section lines, dimensions lines emphasizes details on drawing.			
28.	The size of drawings determines the scale and drawing paper.			
29.	The use of different scales enables objects and spaces to be depicted at a specific ratio to their actual size			
30.	Do you know/understand graphical symbols?			
31.	Do you have confidence in your hand drafting capabilities?			

3.2.1 Responses

QUESTIONS	Architecture			Urban and Regional Planning		
	True	False	Undecided	True	False	Undecided
20	47	9	13	44	1	6
21	53	7	9	28	8	15
22	43	8	18	22	9	20
23	57	7	5	29	15	7
24	58	6	5	43	4	4
25	44	9	16	25	6	20
26	28	10	31	18	7	26
27	64	1	4	41	2	8
28	58	7	4	38	8	5
29	49	2	18	38	1	12
30	61	2	6	33	6	12
31	56	6	7	29	4	18

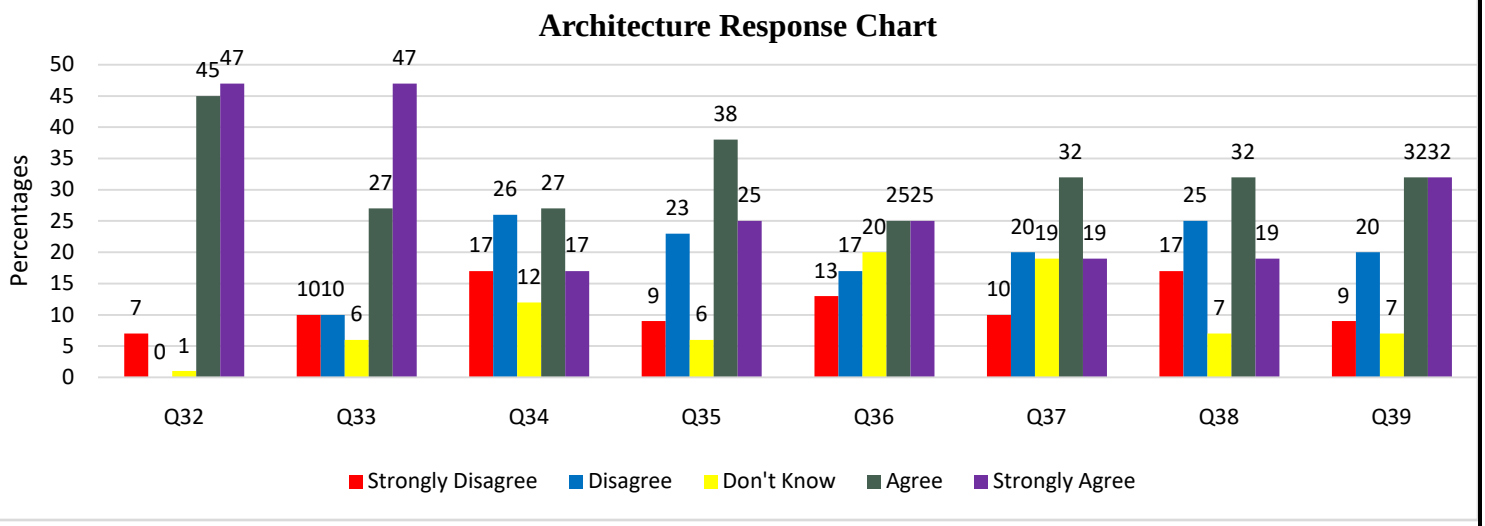


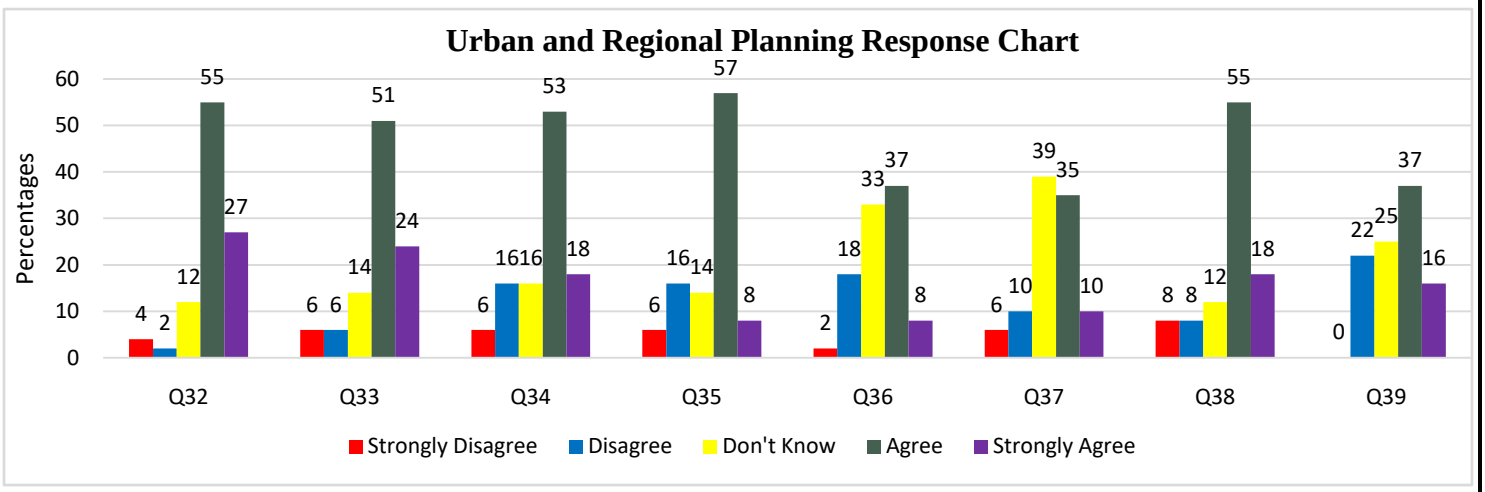
3.3 Section C: Students' Perception to Manual Drafting in Design Studios

S/No	Questions	Strongly Disagree	Disagree	Don't know	Agree	Strongly Agree
32.	Manual drafting is the practice of creating drawings by hand					
33.	Manual drafting enhances creativity					
34.	Manual Drafting makes me a better designer					
35.	Manual Drafting enables me understand my construction details better					
36.	Manual drafting proficiency determines CAD proficiency					
37.	CAD proficiency is a function of Manual Drafting proficiency					
38.	I express my ideas better with Manual Drafting					
39.	With manual drafting, detailing is more difficult					

3.3.1 Response to Students' Perception to Manual Drafting in Design Studios

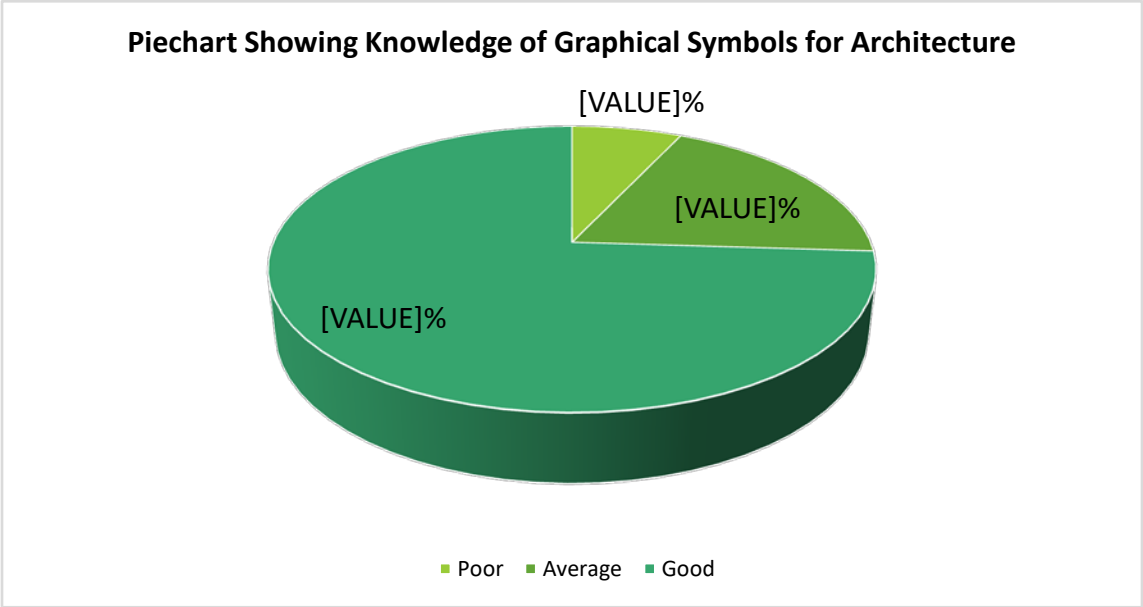
S/NO	Architecture					Urban and Regional Planning				
	Strong Disagree	Disagree	Don't Know	Agree	Strongly Agree	Strong Disagree	Disagree	Don't Know	Agree	Strongly Agree
32.	5	0	1	31	32	2	1	6	28	14
33.	7	7	4	19	32	3	3	7	26	12
34.	12	18	8	19	12	3	8	8	23	9
35.	6	16	4	26	17	3	8	7	29	4
36.	9	12	14	17	17	1	9	17	19	4
37.	7	14	13	22	13	3	5	20	18	5
38.	12	17	5	22	13	4	4	6	28	9
39.	6	14	5	22	22	0	11	13	19	8

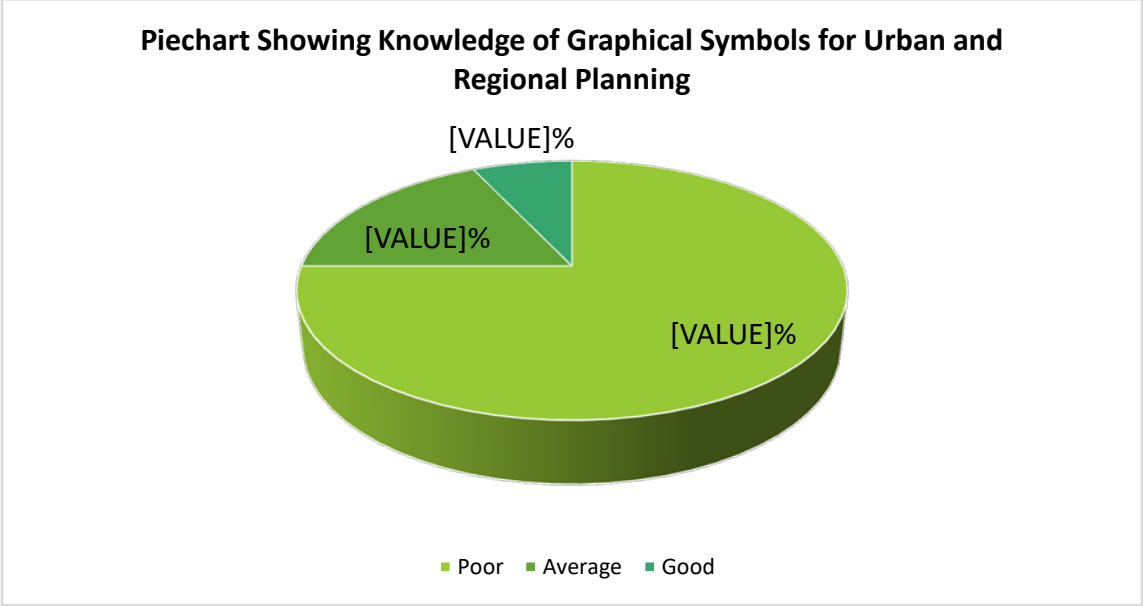




3.5 Section F: Graphical Symbols

Level	Architecture			Urban and Regional Planning		
	Poor 0-9	Average 10-15	Good 16-22	Poor 0-9	Average 10-15	Good 16-22
200	1	7	13	6	5	4
300	1	1	22	21	2	0
400	2	5	17	1	1	0
500				10	1	0
Total	5	13	52	38	9	4


Piechart Showing Knowledge of Graphical Symbols for Architecture
[VALUE]%
[VALUE]%
[VALUE]%
Poor
Average
Good


Piechart Showing Knowledge of Graphical Symbols for Urban and Regional Planning
[VALUE]%
[VALUE]%
[VALUE]%
Poor
Average
Good

4.0 DEDUCTIONS

This study was carried out to investigate on how in-depth or broad the knowledge of students (Departments of Architecture and Urban and Regional Planning) about Hand Drafting and CAD (Computer Aided Design) could be.

Compiling deductions from the questionnaire with respect to the questions in Section D: Drafting Techniques, it is observed that for question no.:

20: Only 68% of the students can identify a tracing pen while 32% cannot.

21, 22, 23 and 24: Very few of these students have realized special knowledge and patterns of carrying out these techniques.

25: 36% of the students have not mastered good lettering techniques or just have architecturally faulty penmanship.

26: All students have varying ideas about beauty, aesthetics and lettering sizes.

27: 70% have varying, little or no knowledge of grid lines, section lines and dimension lines.

28 and 29: 29% to 35% have little or no knowledge on the use of scales and scale rules.

30: 28% have no knowledge of graphical symbols

31: 19% have no confidence in their skills.

5.0 CONCLUSIONS

The findings of this survey indicated that students barely have sufficient knowledge of Hand Drawing/Drafting Techniques in design studio courses in the Faculty of Environmental Sciences have. In the department of Urban and Regional Planning, the knowledge of Hand Drawing/Drafting Techniques is poor. The results suggest that Hand Drawing/Drafting is very relevant in Design Studio Courses as it brings out and enhances creativity in designs.

Quoting one of the respondents from Urban and Regional Planning "***Hand drafting makes me express my ideas better"***.

There is a limit to the generalization of the results of this study. This is because students in only one institution were taken as the sample frame. There may be variance in the result if another institution is considered. Further studies would be required to ascertain if this is so.

6.0 RECOMMENDATION/SUGGESTIONS

Educators should find it necessary to monitor closely, the performance of students on Hand Drawing/Drafting Techniques, introduce techniques such as class quizzes/quick programs where students are demanded to produce hand drawings/drafting in the studio for a short time under the lecturers' supervision. Graphic courses should extend beyond first and second year down to third year studios, while at the final year; advanced graphic course(s) can be introduced.

1. The Hand Drawing/ Drafting tools could be provided in institution offering Design studio as a course.
2. The techniques could also be taught as a 100 level course.
3. Graphical symbols, scaling, etc. should be taught in schools.
4. Knowledge gotten from secondary schools and drafting centers should not be depended on by both students and lecturers.

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QUESTIONNAIRE ON STUDENTS' KNOWLEDGE AND APPRECIATION OF HAND DRAWING/DRAFTING TECHNIQUES IN DESIGN STUDIO COURSES IN THE FACULTY OF ENVIRONMENTAL SCIENCE

Based on the new rule by ARCON the department has stated that all level 100 – 300 students must use hand drafting in studio and other design based courses, please in an objective modus respond to the following questions below.

SECTION A
Personal Data

1. Level ☐200 ☐300 ☐400 ☐500
2. Dept.: ☐Arch. ☐URP
3. Sex: ☐Male ☐Female
4. Age: 16-20 ☐21-25 ☐26-30 ☐31-40 ☐

Please indicate if you learnt any of these subjects while in secondary school.

5. Fine arts ☐Yes ☐No
6. Technical drawing ☐Yes ☐No
7. Geography ☐Yes ☐No
8. Agricultural Science ☐Yes ☐No
9. Biology ☐Yes ☐No
10. Did you study graphics or free hand sketch in your first year? ☐Yes ☐No

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SECTION B - DRAFTING TOOLS

Please in this section answer Yes, No or Undecided by checking the appropriate option if you have used the following drawing instruments.

S/N	TOOLS	YES	NO	If Yes how often			
				Once	Twice	Thrice	Four or more Times
11.	Drawing Table						
12.	T-Square						
13.	Scale Rule						
14.	Adjustable sets Square						
15.	Pencils						
16.	Tracing Pens						
17.	Tracing Paper						
18.	Circle templates						
19.	Furniture Templates						

SECTION D - DRAFTING TECHNIQUES

Please check the appropriate column that matches your opinion on the following statement

S/N	QUESTIONS	True	False	UNDECIDED
20.	The range of line thickness is available with the use of tracing pen			
21.	Hatching takes more time in hand drafting			
22.	Set-square and scales smudges still wet lines			
23.	Constant re-sharpening of pencil slows down drafting			
24.	Sheets are easily stained and difficult to erase when drafting with pen			
25.	The appearance of far too many carefully drawn sheets is marred by the quality of their lettering			
26.	Lettering for the purpose of general annotation should be a minimum of 2mm			
27.	Grid line, Section lines, dimensions lines emphasizes details on drawing.			
28.	The size of drawings determines the scale and drawing paper.			
29.	The use of different scales enables objects and spaces to be depicted at a			

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	specific ratio to their actual size			
30.	Do you know/understand graphical symbols?			
31.	Do you have confidence in your hand drafting capabilities?			

SECTION E - STUDENTS' PERCEPTION OF MANUAL DRAFTING TO DESIGN STUDIO

Please check the appropriate column that matches your opinion on the following statement

		Strongly Disagree	Disagree	Don't know	Agree	Strongly Agree
32.	Manual drafting is the practice of creating drawings by hand					
33.	Manual drafting enhances creativity					
34.	Manual Drafting makes me a better designer					
35.	Manual Drafting enables me understand my construction details better					
36.	Manual drafting proficiency determines CAD proficiency					
37.	CAD proficiency is a function of Manual Drafting proficiency					
38.	I express my ideas better with Manual Drafting					
39.	With manual drafting, detailing is more difficult					

SECTION F – GRAPHICAL SYMBOL

Please identify the following graphical symbols

S/NO	SYMBOL	GRAPHICAL REPRESENTATION
40.	Concrete (In section)	
41.	Earth fill	
42.	Glass	
43.	Wood (Finished)	
44.	Wood (Unfinished)	
45.	Block wall	
46.	Boundary line	

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47.	Hidden line	
48.	Construction line	
49.	Swing door	
50.	Sliding door	
51.	Rotating door	
52.	Bridge	
53.	WC	
54.	Bath tub	
55.	Washing hand basin	
56.	Kitchen sink	
57.	Shower tray	
58.	Wardrobe/cabinet	
59.	Ramp	
60.	Tree	
61.	Road	

SECTION F – PROFICIENCY IN CAD AND MANUAL DRAFTING

Please check the appropriate column that matches your opinion on the following statement

S/N	Description	Excellent	Very Good	Good	Fair	Poor
62.	Level of CAD Proficiency					
63.	Level of manual drafting Proficiency					

Please make a general comment on your appreciation of hand drafting, compared to CAD

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Thank you for your time!

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QuestionnaireSample

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