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

TECHNICAL REPORT ON

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

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ABSTRACT

As a result of the advancement of digital technologies, intellectual discourse on the role of innovations in designand what value hand drawing/drafting brings into the equation has been on the increase. This research sought to appraise the effects of hand drawing /drafting on the creative behavior of students offering design related courses in tertiary institutions with a focus on the level 200 to 400/500 students.

A surveymethod was employed for thisstudy and data werecollected using well-structured questionnaires to elicitresponsesfrom students inboth the Architecture and Urban and Regional. Planning departments in RSU. The outcome of it reveals the level of appreciation of and engagement of studentsin hand drawing/drafting. It also shows the assessment of students' performance in manual drafting and CAD related courses from the perspective of the students. The studyconcludes that manual drafting can enhancestudent's creative behaviorand more integration of manual drafting and CAD related courses into the curriculaof tertiary institutionsin Nigeria will lead to higher competency and global competitiveness rating of future professional architects and engineers.

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

1.0 INTRODUCTION

1.1 Background to Study

In this era, the quest for innovative solutions and products has grown as time and cost constraints have increased. One of the skills which is increasingly seen as important for dealing with these issues is the ability to be creative in seeking both manual and digital solutions to design problems (Musta'amal, Norman, Rosmin, and Buntat, 2014). The introduction of Computer Aided Design (CAD) has brought a new point of history in how designers deal with their design tasks but it also has its disadvantages. CAD has gone through a progressive evolution for a wide range of users from those undertaking less complex product design to more sophisticated and complicated designtasks but with its efficient and faster methods of generating ideas, it has diminished the creative minds of uprising architecture and Urban and Regional Planning Students. The technology has reduced the imaginative thinking and creation of students how in two-dimensional (2D) and three-dimensional (3D) drawings. It has also made students and professionals lazy and slow in their productions.

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 and appreciation of hand drawing/drafting techniques in design courses in the Faculty of Environmental Sciences.

This report is compiled from the survey carried out on a group of 13 members to get a estimate 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 proficiency of students in hand drawing/drafting techniques have been existing over the years and it can be blamed on the introduction of Computer Aided Designs software and also on the lack of good hand drawing/drafting foundation in schools.

One of the notable problems causing this depreciation is the admission processes into these affected departments where many students do not meet up with the National Universities Commission's benchmark for 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 knowledge of 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.

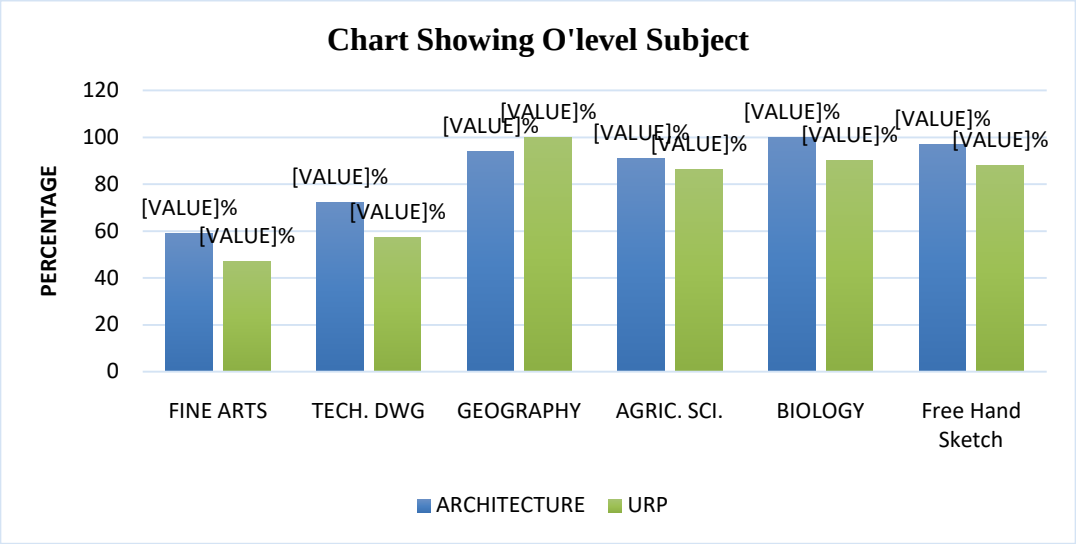
3.1 Section A; Personal Data

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

Department	Architecture		Urban and Regional Planning	
Level	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	Architecture		Urban and Regional Planning	
Subject	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

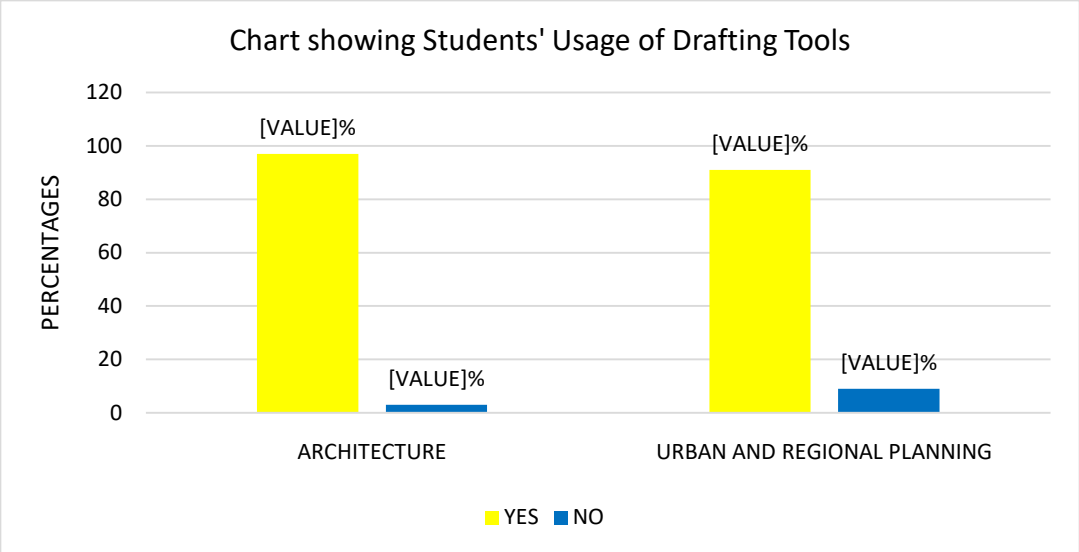


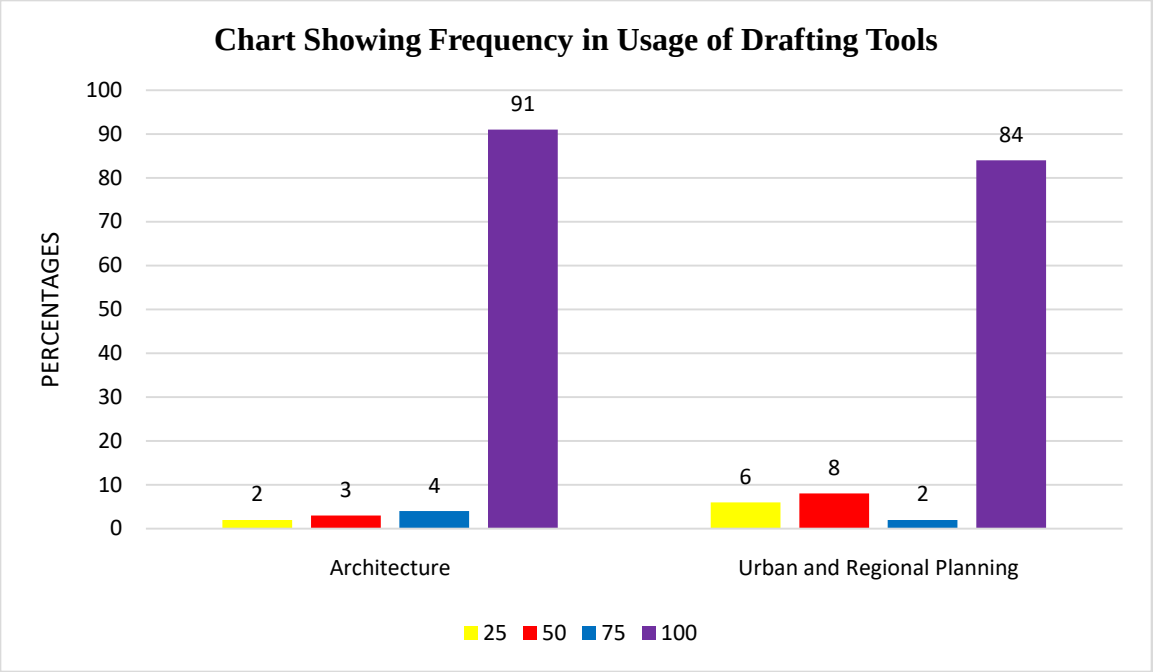
From the chart above, 59% of students in Architecture took Fine Arts in their O'level, while 47% for Urban and Regional Planning. 72% of students in Architecture took Technical Drawing, while 57% for Urban and Regional Planning. 94% of students in Architecture took Geography, while 100%for Urban and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

Department	Architecture						Urban and Regional Planning					
	YES	NO	Frequency of Usage				YES	NO	Frequency of Usage			
Tools			25%	50%	75%	100%			25%	50%	75%	100%
Drawing Table	68	1	0	0	1	67	49	2	4	2	1	42
T-Square	68	1	0	0	2	65	50	1	4	3	0	43
Scale Rule	69	0	0	1	3	65	50	1	2	2	0	46
Adjustable Sets Square	69	0	1	1	2	65	45	6	2	3	3	37
Pencils	69	0	0	1	0	68	50	1	2	4	0	44
Tracing Pens	61	8	3	3	2	53	50	1	1	7	0	42
Tracing Paper	66	3	4	5	5	52	48	3	3	4	2	39
Circle Templates	64	5	3	2	4	55	47	4	4	5	1	36
Furniture Templates	66	3	2	3	4	57	28	23	4	3	2	19
MEAN VALUES	66.7	2.3	1.4	1.8	2.6	60.8	46.3	4.7	2.9	3.7	1	38.7



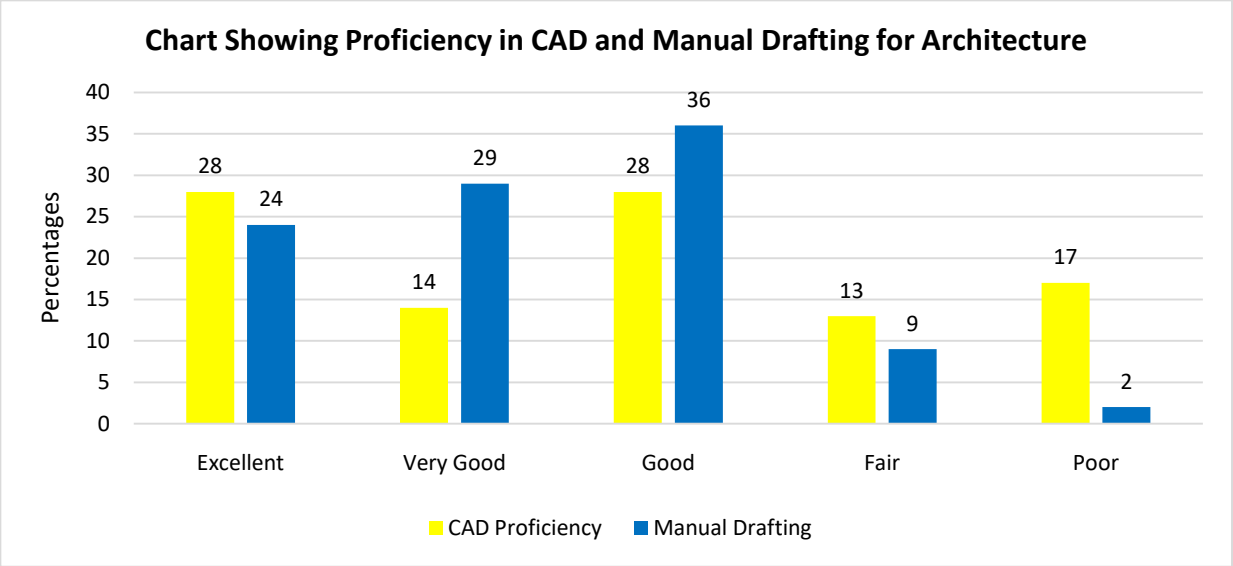


3.3 Section G: Proficiency in CAD and Manual Drafting

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

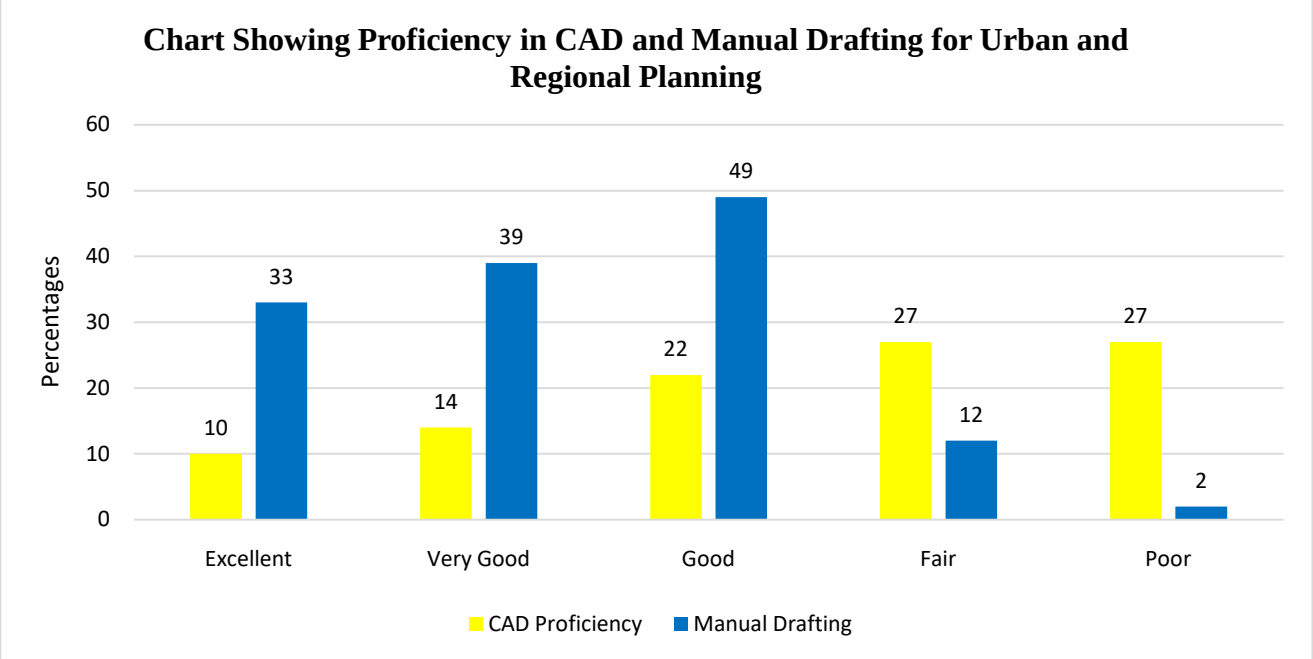
3.3.1 Proficiency in CAD and Manual Drafting for Architecture

Level	CAD Proficiency					Manual Drafting Proficiency				
	Excellent	Very Good	Good	Fair	Poor	Excellent	Very Good	Good	Fair	Poor
200	2	2	2	6	9	3	7	10	1	0
300	7	5	7	2	3	6	7	6	4	1
400	10	3	10	1	0	8	6	9	1	0
Total	19	10	19	9	12	17	20	25	6	1



3.3.2 Proficiency in CAD and Manual Drafting for Urban and Regional Planning

Level	CAD Proficiency					Manual Drafting Proficiency				
	Excellent	Very Good	Good	Fair	Poor	Excellent	Very Good	Good	Fair	Poor
200	1	0	4	4	6	0	3	8	2	2
300	3	5	2	6	7	1	7	7	5	3
400	0	0	0	2	0	1	0	1	0	0
500	1	2	5	2	1	1	1	7	1	1
Total	5	7	11	14	14	17	20	25	6	1



4.0 DEDUCTIONS

This study was set out to investigate the efficient use and appreciation of Hand Drawing and Drafting Techniques in design studio.

Compiling deductions from the questionnaire with respect to Section B: Drawing Tools Usage

It is observed that an average of 94% of all the students have used the drawing tools/ instruments listed except that of the furniture template which is more frequently used in the Architecture department than in the Urban and Regional Planning department.

The chart shows that 96% have used these tools/ instruments while 4% have not.

- 2% use them at most once in a week.
- 3% use them at most twice in a week.
- 4% use them at most thrice in a week.
- While 88% use them at least four times in a week.

Compiling Deductions With Respect To Section G: Proficiency In CAD and Manual Drafting

For both the Architecture and Urban and Regional Planning students, it is observed that the level of appreciation and use of CAD is low compared to that of the manual drafting method.

Comparing their appreciation and use with respect to 200 level, 300 level and 400 level students,

Firstly, the ***Excellent***appreciation and use of CAD in comparison to manual drafting is very low for 200 level students, high for 300 level students and also high for 400 level students.

Secondly, the ***Very Good***appreciation and efficient use of CAD in comparison to manual drafting is low for 200 level students, 300 level students and also the 400 level students.

Thirdly, the ***Good***appreciation and efficient use of CAD in comparison to manual drafting is low for 200 level students and high for both the 300 level and 400 level students.

Fourthly, the ***Fair***appreciation and efficient use of CAD in comparison to manual drafting is high for 200 level students, low for 300 level students and balanced for 400 level students

Lastly, the ***Poor***appreciation and efficient use of CAD in comparison to manual drafting is high for both the 200 level and 300 level students and balanced for 400 level students.

The level of proficiency in CAD compared to manual drafting tends to be decreasing for 200 level students, balanced for 300 level students and increasing for 400 level students.
Thus, the higher the level, the higher their proficiency in CAD in comparison to manual drafting.

5.0 CONCLUSION

From the analysis, interpretation and deductions made from the questionnaires, it can be observed that the general level of appreciation and efficient use of CAD in comparison to Manual drafting process in Design studios is low.
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.

6.0 SUGGESTIONS/ RECOMMENDATION

1. Students are meant to have good knowledge of both drafting techniques because each one influences the efficient use and mastery of the other.
2. Proper manual drafting and CAD classes should be taken in all school offering design studio as a course.
3. Manual drafting are recommended to be used at earlier stages of schooling while CAD can be used in later stages.
4. In as much manual drafting is very necessary, the use of CAD is equally necessary as its use is most prominent in this digital age.

Quoting one of the respondents from Architecture "***hand drafting should be encouraged for preliminaries and design conceptualization and philosophical stage but subsequently, CAD is needed for final and working drawings to encourage accuracy and effectiveness. CAD and BIM are the latest trend globally"***.

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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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