ASSESSMENT METHODS IN FREE-HAND SKETCHING AND DRAWING RELATED COURSES IN VISUAL COMMUNICATION EDUCATION

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ABSTRACT

Young academics in the visual communication or visual culture fields have challenges with assessing class works and assignments that are sketch or drawing related due to the highly subjective nature of these courses, such as free-hand sketching and drawings for early beginners in Universities, especially in environments with high students' population. Assessment criteria may vary from one assessor to another based on experience and ability of the instructor/lecturer to carry out the same project. This appears to be a highly subjective phenomenon, especially where the criteria for assessments are not pre-determined. Within this study, criteria for assessments of drawing related courses are based on the experience of the author as well as other authors in the visual education field, this is so indicated for other instructors/lecturers who do not have pre-determined or well spelt out criteria to have a basis for assessments. Case studies of selected students' projects using photography to capture cases as well as the approach for grading such projects are presented as the methodological approach for the study. The study concluded by recommending that candidates that are seeking admission into architecture and other similar allied professional courses, ought to have a minimum level of artistic abilities that support sketching and drawing, and free-hand sketching and drawing courses should continue throughout the first three years of study and not just end in the first year as it is practised in most Universities where architecture is studied.

Keywords: architectural education, assessment methods, built environment, students' sketches and drawings, visual communication

1.0 INTRODUCTION

Some articles and authors assume that it is not possible to teach or pass knowledge on sketching within architectural education scenarios. What then is sketching? Goldschmitt (1994) posits that sketching is an interactive process of seeing – drawing – seeing. It is not a one-way visualization of designers' inner thoughts, but a brain activity towards creativity than perception. Suwa, Purcel and Gero (1998) define sketching as representations of the results of the thinking process which decreases the cognitive load of designers and provoke creativity during designing. There is a forward-backwards - forward movement when designers sketch, generate ideas and return back to their sketches to develop the ideas. Akin, 1986; and Lawson, 1990, describe sketching as a learned process during design education

where architects learn to think with drawings, develop their ideas and solve complex problems. It appears that developing the ability to read and produce sketches happen to be the only way to develop expertise in architecture. Dizdar (2015) asserts that sketches require both brain and hand coordination. Goel (1995) explains that free-hand sketches are important to designers especially during conceptual design processes; however, (McKim 1972) reiterates that "the process of sketching is quickly performed and has a freshness which is not always evident in a polished, drawn-up version of the design". Ozdemir (2012) describes sketching as an important design process for communication between designers and for introducing new ideas. Cheng (2007) advocate that sketches are capable of assisting designers to come up with other designs without forgetting previous ideas that were worked on. While Novakova, Archten, Treyer and Schmitt (2011) propose that sketching is very helpful both for the designer to develop design ideas and for communication between designers and other professionals so as to explain concepts to other parties, it is unarguably an important means of communication amongst architects and designers. However, Dizdar (2015) advocates that sketches are capable of providing important clues on what the design that appears should look like. Martin-Erro, Dominguez and Espinosa (2016) understand sketching to be one of the most effective visual thinking tool that designers can use to externalize design concepts to provide visual cues for refinement and revision. While sketching using pencils and papers remains one of the most famous visual representation methods, its effectiveness, especially during early conceptual design stages, is well appreciated by most authors (Goldschmidt, 1994; Purcel and Gero, 1998, and Cross, 1999). Akin, 1986,; and Lawson, 1990, advocate that sketching can be learned during the years of design education where architects learn to think using drawings. "The ability to read or produce sketches appears to be the only way to develop architectural expertise, and being unable to sketch may prevent designing completely (Liu, Liu and Chuang, 2009).

Many researchers have concluded that architecture education is incomplete and not possible without a design studio for students to work in (Schon, 1985); Ochsner, (2000); and Vyas, Veer, and Nijholt (2013). While design studios can be described as places with spaces for obtaining basic knowledge that is related to architecture, with drafting tables, stools and lots of images and sketches on walls and exhibition boards, (Dermibas and Demirkan 2003) describes a design studio as the first environment where the initial experiences for future professions can be obtained in architectural education and, that all other courses should be related to design studio.

This study showcases the sketching and drawing environments within and without design studios where learning takes place and exposes the interaction between students and lecturers/instructors in visual design communication and education. The aim of the study is to highlight the importance of sketching and drawing to early architecture students and the different styles of assessing sketches and drawings by instructors/lecturers so as to enhance students learning processes.

1.1 The Importance of Sketching

Architects are notably very fast when it comes to visualizing complex ideas by using sketches. Tovey (2002) describes the advantages of sketching in architectural design as speed and easiness of activity, which is an important aspect of facilitating transformations when

sketching. Suwa and Taversky (1997) assert that architects that are trained in sketching are capable of thinking more deeply on given tasks and projects compared to those who were not trained. Obviously, having access to learning sketching skills gives students more advantage over those who can't sketch or who did not have access to learning sketching. According to Al-Murahhem (2015), when design students are exposed early to artistic methods and skills, this phenomenon has a tremendous impact on students' confidence and presentation skills. Architects and designers have over time simply relied on artistic abilities to express ideas and communicate visual thoughts through sketching and drawings so as to create images. Tsow and Beamer (1987) advocates that emphasis on graphic communication and using graphics and visual images in architecture were the major aim of architectural education in the late seventies. During that time, students spent between fifteen and twenty per cent of their time in studios learning graphic communication. It appears like the advent of CAD is gradually taking the place of sketching and manual drafting as Martin-Erro, Espinosa, and Dominguez (2016) observed that sketching time is being depleted and replaced by CAD drafting lessons in some engineering schools because sketching is not valued as a powerful visual thinking tool but seen as an old drawing method.

Design students are mostly preoccupied with how graphic presentations and visual communication and imagery can influence their presentations during design juries. Obviously, artists are not architects, but architects learn from artists and even draw like artists using visual communication languages borrowed from art. Architects who are also gifted in art see designs differently because they have both skills of architects and artists as well. Giddings and Horne (2002) posit that "artistic talent could help the architect to present ideas visually and clearly, where the architectural drawings become a pleasant painting rather than a mere architectural drawing". Markovitz (2001) asserts that collaborations between artists and architects can bring about new views of how the environment can be further portrayed. Ullman, (1990) posits that it is usual for designers to make visual notes in the form of sketches, drafts, texts, dimensions and calculations. According to Ibrahim and Rahimian (2010), studies were done in the past to compare conventional sketching methods with conventional CAD tools, and findings show that manual sketching remains superior to conventional CAD tools.

Since it has become a known fact that "practice makes perfect", Novakova, Archten, Treyer and Schmitt, (2011) urges that for students to get better in sketching skills, there is the need to practice and develop this skills to be able to use sketching as a visual thinking tool. Do, Gross, Neiman, and Zimring (2000), advises that sketches appear to be very important for refining and revising ideas, generating concepts and facilitating problem-solving. Al-Murahhem (2015) states that "it is clear that the artist's eye sees or interprets differently to an architect's eye. However, a merger of the two sights opens a new horizon for a unique and broader view with regards to the presentation techniques of design projects". Al-Murahhem further deliberates that being an artist is quite different from being an architect, because being an architect does not really mean being an artist, but a combination of both skills and talents can be very beneficial for architects. However, this assertion does not necessarily mean that a designer without artistic abilities cannot be a good designer, but that students should strive to draw efficiently with good presentation skills.

In conclusion, (Dizdar 2015) advises that when students become accustomed to working with sketches, after graduation it provides positive additions to them as designers. This means that sketching skills may be needed in the entire life of a designer. Bilda, Gero and Purcel (2006), opine that it is a difficult task to design without being able to make sketches. Martin-Erro, et al (2016) urges design students, especially from engineering schools to offer formal courses in sketching and drawing to help them generate quicker and more effective external visualizations of ideas and foster creativity amongst designers. Martin-Erro, et al (2016) further states that a lot of design information is conceived, recorded and, communicated through visual language which cannot be reduced into verbal descriptions because of such ambiguities. It is obvious that sketching remains a very vital aspect in the life of designers, and without sketching, such sketching skills may be lost and the architect/designer may be limited.

1.2 Differences between sketching and drawing?

This subsection concerns previous studies on drawings and compares them to earlier write-ups on sketching to avoid repetition and to confirm the differences between sketching and drawing. Hank and Belliston (1992) define drawing as a means to an end – a tool that assists designers in problem-solving, creating new ideas and assisting in communications. In Riley (2004) position, drawing is construed as a philosophical exploration of visual perception itself – the human faculty upon which all visual art practices, both traditional and contemporary depend. Some authors (Dehlinger, 2000; Riley, 2001) have demonstrated that the drawing process is a generative one which transforms visual inputs (as contained in the structure of arrays of light arriving at the eyes) to visual outputs (drawing as a material artefact). According to (Riley, 2004) drawing has the ability to nurture the transformation process involving visual information that arrives the eye thereby creating marked surfaces which leads to drawings. This theory was propounded by Gibson (1979) which professes that information is contained in the structures of arrays of light that arrive the eyes which have the capabilities of converting such into geometric forms that can be used to represent three-dimensional figures on two-dimensional planes, lines that fall unto the retina of the eyes are capable of being converted, thereby producing sketches.

Pedagogy involving drawings are capable of empowering design students so that they can understand the methods of transformation that are attributed to intuition which depends on cultural context within which the work of art is produced. Obviously, an innovative approach towards improving teaching drawing is a combination of perception theories and communication theories which will enhance students' understanding and insight on how drawings should be properly done. Martin-Erro, et al (2016) describes a sketch as an informal drawing with approximated dimensions and little details while a drawing is a detailed description of a design system with exact dimensions. While Herbert (1988) considers sketching to be "a medium for graphic thinking in the exploratory stages of architectural designers' works", Verstijnen, Leeuwen, Goldschmidt, Hamel, and Hennessey (1998) agrees that sketches are the quickest means of externalizing design ideas and graphic representations that allow for easy manipulation and allows designers to find new solutions. This study agrees with Martin-Erro (2016) definition of sketches and drawings, hence concludes that the difference between both is that, while sketches are rough thoughts of a designer's ideas on paper using pencils or pens, drawings are detailed sketches with finishes.

2.0 LITERATURE

2.1 Related Works

Previous studies on sketches advocate that design thinking involves a progression at physical, perceptual, functional and conceptual levels at the same time (Suwa et al., 1998). In summarizing these progression categories, physical aspect refers to the act of looking and drawing, perceptual refers to how visual information is interpreted, functional aspect refers to creating meanings to things, while conceptual refers to actions taken or initiated for design decisions. In Bilda, Gero and Purcel (2006) study, involving three architects as case studies and using blindfolds to test if expert architects can really draw without sketching, the study revealed that sketching may not be a necessary act to conceptualize design when expert architects are involved. The authors, however, accept that learning to sketch remains a very important aspect of conceptual designing and design education requires that students learn how to think using sketches to develop ideas. Findings from related studies also show that there is no significant difference in the sketching abilities between male and female students, which negates previous assumptions that female architecture students perform better because they are more persistent in studies and have more access to educational materials (Avsec, Jagiello-Kowalczy and Markiewicz, 2018). While findings from the study showed that male and female students perform equally in sketching skills, more research is needed in gender-related issues concerning drawing and sketching pedagogies as well as assessments across multi-cultural genders.

Tovey (2002), insists that designers must sketch quite intensively to be able to be good at the skill, which requires practice and more practice. Although sketching and drawing skills are not really seen as a pre-requisite for admission into some architecture schools, first-year architecture students have difficulty and inadequate experience in making sketches by hand so as to communicate visual thinking. Unfortunately, learning and assessment tasks in understanding architectural design usually favour students that are gifted and have abilities to communicate visually through sketching and drawing compared to students without such abilities (Avsec, Jagiello-Kowalczy and Markiewicz, 2018). The essence of assessments is to help faculty in deciding whether students have learned what they have been taught, developed the requisite skill and, are capable of developing confidence in defending what they have drawn.

2.2 Assessment Methods in Sketching/Drawing related Courses

Research in design education towards improving architectural education still remains a broad area and a challenging task especially with methodological approaches (Novakova, Archten, Treyer and Schmitt, 2011). Avsec, Jagiello-Kowalczy and Markiewicz (2018) posit that teaching and assessing creative aspects of architecture is a contentious issue especially at the tertiary level, but that teaching, learning and assessment should focus on processes and products that evolve. Anthony (1991) rightly observed also that design jurors rarely have formal training on how to conduct design juries. To worsen these observations, not many studies have been carried out in the area of assessment of sketching and drawing related courses in Universities.

Sketches and drawing related courses are assessed in University settings at the end of semesters or sessions and mostly do not have written examinations like most other courses do, unlike in free-hand sketching/drawing, where students projects and assignments are assessed weekly. The assessed works are returned to the students so that both students and lecturers can monitor their progress as well. Aderonmu et al (2017) observed that in architecture and engineering courses, the grading system follows the design jury format where students defend their drawings based on known criteria that are set by faculty. Amadeo and Dyck, 2003; and Ilozor, 2006, agree that jury has been a medium of assessment of students' design projects, professional contract award and in design competitions, including exhibitions. Despite the fact that assessments of students' works are intensive, expensive, time and energy-consuming, (Aderonmu et al, 2017) identified that many issues and challenges emanate especially from the design jury system, which sometimes leaves even some gifted students feeling abused, biased, intimidated and filled with uncertainty. These observations have proven that the jury system of assessing students' design projects need to be improved upon by faculty, to create a better grading system for drawing courses.

2.3 The Sketching/drawing Experience in FUTA (The Present Study)

This study relates to how architecture students in the first year in the Federal University of Technology Akure, Nigeria, learn how to sketch and draw so as to improve on image formation and design thinking, which is very vital for improving learning in architectural design. In the first year, students are taught within the studio environment on some basic theoretical concepts in sketching and drawing which involve; observation, seeing, correct pencil holding or grasping positions, pencil and paper types, line representation methods and perspective drawings amongst others. The course free-hand sketching (ARC 103) is taught on a weekly basis for two hours every week for 13 weeks. After a series of three lectures at the beginning of the first semester, students begin to learn how to sketch using pencils and sketch pads only and begin to draw lines and curves before they are introduced to composition sketching and rapid sketching within the studio environment.

Composition sketching involves a process where the instructor or lecturer arranges some common and familiar household items (like buckets, sitting stools, bags, dustbin can) just to mention a few, in whatever manner that is comfortable for the instructor on a table for students to observe and sketch as seen in figure 2 a - d. After composition sketching, students are taken out of the studio environment to learn how to sketch small structures like the solar street lights on campus (fig. 1 a-c) and simple buildings like a toilet block with a tree behind it (fig. 2). Students are also introduced to drawing human figures and shapes (fig. 3a-i) since these figures contain lots of curves and contours than straight lines before they are finally introduced to drawing large and complex buildings like the faculty block (fig. 4a-c). The process of learning the sketching and drawing skills is actually a gradual process that begins from simple structures to complex structures so that the students with less artistic skills can catch up very easily. ARC 104 (Free-hand sketching II or free-hand drawing, depending on the nomenclature used by the school), is a second-semester course and a continuation of ARC 103 of the first semester. Here, the students advance from sketching to drawing proper, with finishes and details in mind such as shading or rendering, introduction to the use of colours and other media for finishes and adding life to drawings.
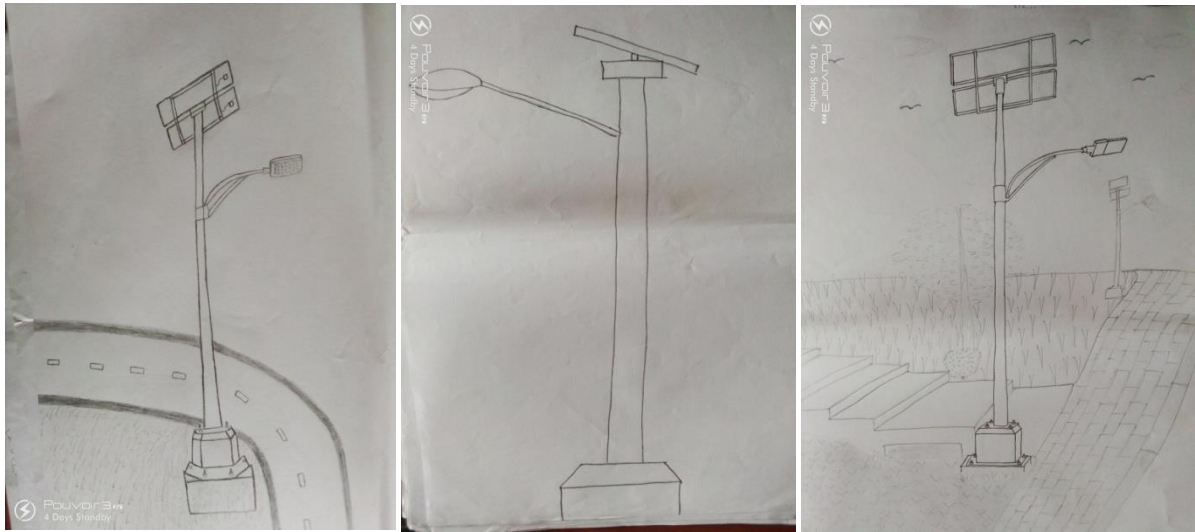
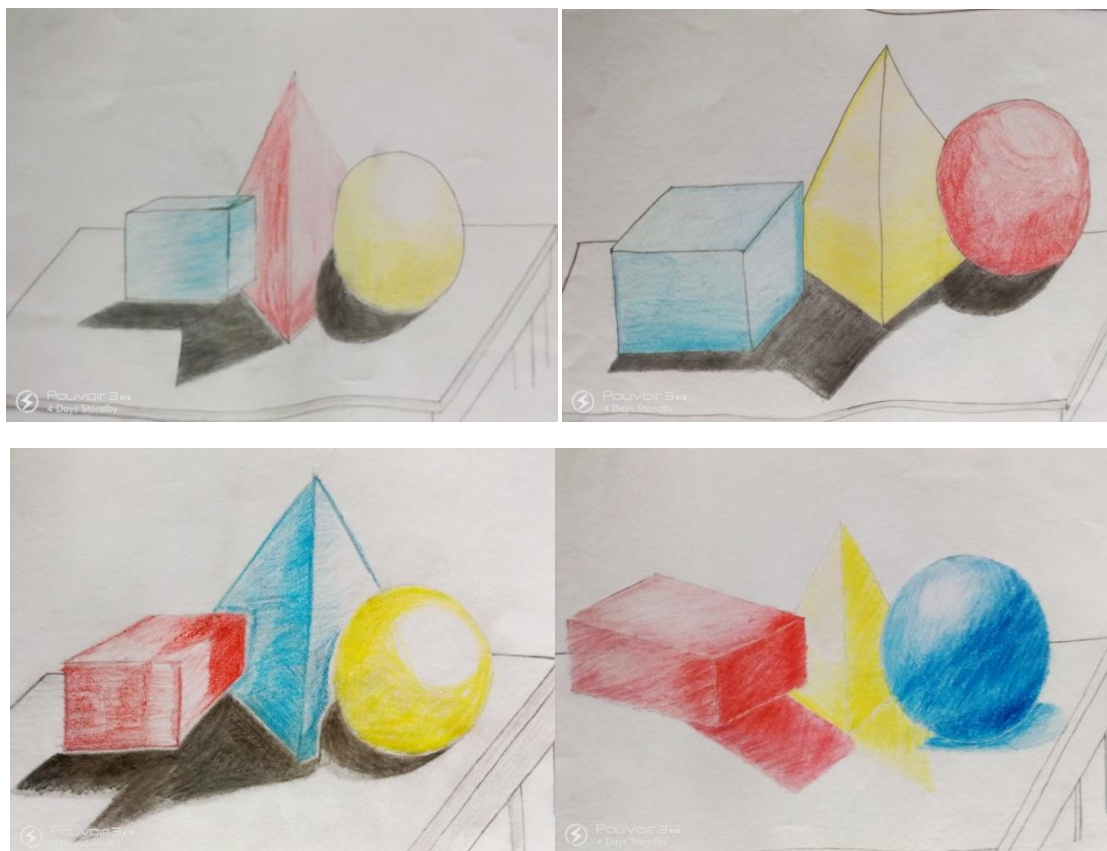**Fig. 1a, b and c: Students' Sketches of Solar street lights on the FUTA Campus**

Fig. 2a, b, c and d: Students' drawings of a composition setting involving the 3 basic forms

The course is more practical in nature and students are expected to submit their sketch pads to their instructors for assessments after the expiry of the two-hour session each week. There are usually two or three lecturers on the course per semester, who take turns one after the other, meeting with the students about three or four times in a semester, teaching and assessing students' projects and grading such after every submission. The idea of using more than one lecturer is for fairness and equity so that the students will not feel biased after being graded by just one lecturer. Ibrahim and Rahimian (2010) advocate that design methodologies in architecture are usually transferred to novice designers by professional practitioners in design studios. It is better for instructors/lecturers to be vast and very experienced in drawings so that knowledge transfer is easy, adequate and robust. Each project is awarded marks between 0 and 10 (0 = very poor, 5=fair and 10=excellent) for at least ten projects in a semester, while the final project for the semester is awarded 20 marks. Out of the ten projects, eight are selected for final grading (which constitutes 80 percent), while the final project makes up for the remaining 20 percent, summing up to 100 per cent. In all of these training, the aim of the course is to learn sketching through observation methods, thereby developing the flexibility of the hand in synchrony with brain actions and activity. This course does not allow for design jury which is usually a norm in most architecture design courses.

Clarity of idea, representation, line quality and, means of expression etc are some of the rubrics that entail the grading system in sketching and drawing courses by instructors/lecturers of such courses. During the sketching exercise, the lecturer-in-charge will be with the students from the beginning of the course period to the end, whether the period holds within the design studio or outside. The lecturer/instructor also goes around the students ensuring monitoring, correcting and supervision of the given tasks. Before the students begin each sketching/drawing session, they are instructed to walk around the object, composition or building to be drawn and choose the best position that showcases their strength before they finally settle down to draw on their sketch pads.

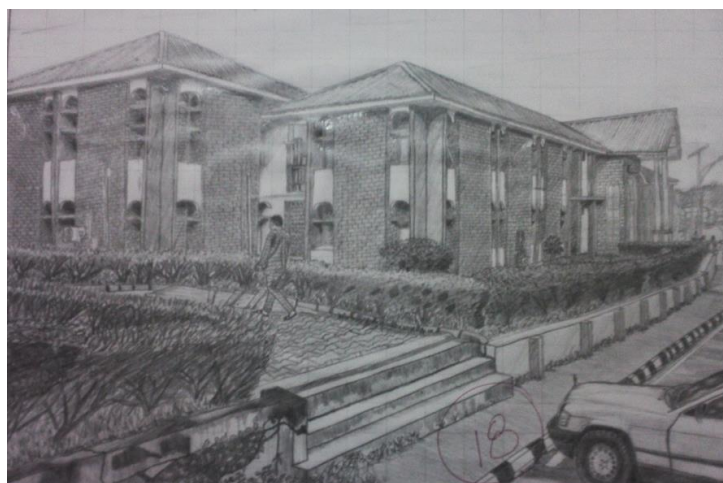**Fig. 3(a - i): Students' sketches of human faces and figures found on Nigerian naira notes**

Fig. 4 (a-c): Students' drawings of a faculty building on campus

3.0 ASSESSMENT METHODOLOGIES

Many sketching and drawing methods exist in design education, and one of such is sketching from observing objects; another is drawing from imagination. Within this study, the sketching or drawing from observing objects is primarily the method adopted within the course ARC 103 and ARC 104. The methods adopted here are as practised within the department of architecture, at the Federal University of Technology Akure, (FUTA) and were purposely adopted due to the high number of students that are admitted into the first year. The case study method is used as the research method within this paper as it deals with individual cases as the case may be. Students' previous works and measures of how they were graded are studied and used as cases for this study. Photography was also employed as a means of capturing the students' projects which have been assessed in the past as case studies. Photographic materials have been proven to be a good medium for assessing, collating, and, accessing visual contents, especially of the environment - whether they be natural or artificial (Omale et al. 2017). Some studies in the past have pointed to very high positive correlations between photographic materials and real images (Li & Chen 2011; Leder et al. 2004). All the methods of assessments commence after the students must have submitted the assigned projects, and submissions are usually done through the class Representative/Governor/Captain. Below are the five methods used for assessing students'

projects in free-hand sketching/drawing courses at the department of architecture, Federal University of Technology Akure, Nigeria. These are; group sorting method, grading as a submitted method, quick scan method, comparing submitted projects to old previous projects method and exhibition method.

3.1. Group Sorting method

Within this method of assessment, the lecturer sorts out the students' submitted sketches or drawings into three or more categories for grading purposes. Since the marks for each submission is 10, I usually sort the student's projects into three groups. The first group is the poor category which is between 0 and 3 marks. The second group is the fair category which attracts between 4 and 7 marks, while the third group is the excellent category which attracts between 8 and 10 marks. Examples of student's works that fall within these categories are shown on plates 1a to c. As soon as the group sorting is complete, marks are then awarded as deemed appropriate based on the discretion of the lecturer which is a subjective venture. It is subjective because on some occasions, I have found certain marks that were allocated to some projects as being exaggerated or under-scored in some instances by some other lecturers or instructors. To reduce the effects of subjectivity in marking, it is expected that only lecturers/instructors who are experienced and if possible have more than average artistic abilities are allowed to handle such drawing courses.

3.2 Grading as a Submitted method

This method is easier for lecturers/instructors that are very experienced and have spent some good number of years assessing or grading students' sketches or drawings repeatedly. The lecturer would have been used to grading by group sorting and has advanced further in the grading methods. Usually, students' don't submit projects according to matriculation numbers or serial numbers, but in haphazard manner, therefore, within this method, the lecturer is already used to grading such tasks and knows by intuition through cognition activities what group each particular student's project belongs to, based on the students' submissions. The advantage within this method is that the process is fast and a good number of sketches can be graded within a short period of time. Time is of utmost priority to lecturers; therefore saving time creates time to perform other duties that require attention.

3.3 Quick Scan method

In this method, the lecturer goes through the students' submissions one after the other very quickly by scanning or running his/her eyes through and observing the performance of the students, while he registers the grades preliminarily in his head. The lecturer does this without writing out the grades on the student's sketch pads, but to have a feel of the students' performance for the particular task given. The lecturer will later settle down and take time out to go through the sketches one after the other and allocate marks by writing and recording such beside the sketches as the case may be. The disadvantage of this style is that it is time-consuming if the class is a large one. However, the advantage is that there is an almost accurate grade allocated for each student by the lecturer since the works had been seen earlier.

3.4 Comparing submitted projects to previous projects

This method requires the lecturer to compare previous immediate assessed sketches to the current sketches that are about being graded, and check for improvements or otherwise, in terms of quality of skill delivery in the submitted sketch. The lecturer has to be very keen in observing very little differences or nuances, so as to arrive at a logical conclusion about the work before allocating grades that are deemed appropriate. This process takes time because of the back and forth movement before a grade is allotted, and more time is lost when large classes are involved. However, it ensures that quality is maintained and the grades that are allocated are merited, deemed fit and with less controversy on the grades.

3.5 Exhibition method

In most schools of architecture and design, this method is very popular. The method requires that students should paste/fasten/attach their sketches or drawings on a vertically inclined board, so that lecturers can move around from student to student, seeing the pasted sketches/drawings and grading each by taking turns. In most cases, a roll call takes place to ascertain the students' presence or absence, just before the exhibition begins. In the exhibition method, one lecturer may go round the exhibition hall observing the pasted students sketches and allocating grades immediately, however, this happens within the studio environment without inviting other students from other levels or other faculty members. The disadvantage of this method is that the exhibition date has to be fixed after the students must have submitted the projects, which may also not be on the submission date.

4.0 DISCUSSIONS

The methods discussed within this study are inexhaustible, as other methods of assessments exist in other schools. However, those discussed here are the methods that apply to lecturers who teach sketching and drawing courses at the department of architecture, at the Federal University of Technology, Akure, Nigeria. These methods are applicable especially to cases where students' population can be termed as many, from 50 students and above in a class. While this study agrees with (Aderonmu et al, 2017) that assessing students projects is not an easy venture, as it is time and energy-consuming, expensive and above all stressful, especially in circumstances where students population can be overwhelming on university teachers, like in public universities in Nigeria, the study calls for more research in this area as issues on architectural pedagogy and visual communication assessments are understudied.

There is the need for students to feel a sense of fairness and equity after their sketches and drawings have been marked and returned by their lecturers, as such assessments will boost their confidence and make them have trust in the grading/assessment methods of their lecturers. Sometimes, lecturers can also use their discretionary humanitarian privileges to encourage students by adding one or two marks here and there, especially to students who have honestly and sincerely attempted the sketching and drawing tasks and have not made a serious mark on the outcome. Rather than discourage such students; they should be encouraged by a few marks or by verbal encouragements to do better.

The issue of subjectivity still remains a vital concern when it comes to marking/grading students' sketches and drawing projects. Subjectivity based on lecturer's discretion cannot be totally eliminated. Sometimes, I have come across grades of sketches which I felt were not merited, and also seen some grades that ought to be higher, but were not, because the

lecturer/instructor felt that was the mark the project merited. The issue of subjectivity needs to be examined and studied by other authors in this area so as to throw more understanding on perception and subjectivity. A closely related issue to subjectivity is the award of marks by some new lecturers/instructors on the sketching course. While some lecturers are overly meticulous with marks, others are extravagant and overzealous with awarding marks. This phenomenon is not good for students as it is capable of discouraging those who are serious and are ready to improve on their sketching skills, while it will also make weak students lazy because they get high marks they don't deserve. This issue arises in some cases and needs to be studied further and findings made known.

While this study agrees with Dizdar's (2015) position on sketches and drawings both requiring brain and hand coordination, it also accepts that sketching is a vital design process for communication and for introducing new ideas as put forward by Ozdemir, 2012. The study also advocates and advances Tsow and Beamer's (1987) suggestion that architecture students should spend more time in learning graphic communication, despite the fact that sketching and drawing periods are being depleted in some universities due to CAD drafting lessons especially in engineering schools as observed by Martin-Erro et al. (2016). Findings from Ibrahim and Rahimian's (2010) study showed that conventional sketching methods still remain superior to conventional CAD tools for sketching, indicating the supremacy of manual sketching. This study finally advises students to keep on sketching and drawing for improvement and enhancement as continuous practice makes better and perfect architects.

5.0 CONCLUSIONS

While the aim of this study is to highlight means of assessing students' sketches and drawings, it can assist new lecturers to have a guide towards assessments, especially where there is none. Lecturers can also develop further the assessment ideas mentioned here, harness and improvise their own ideas to boost those that were dealt with here. A hybrid of two or more ideas can also be merged to form a new broad assessment method of assessing students' assignments.While this study attempted to advance knowledge on architectural pedagogy through assessment methods on sketching and drawings, it is of utmost importance to mention that research into architectural pedagogy is not only a difficult task, but scanty research and sketchy findings exist in this area. Therefore, the study recommends that more research needs to be carried out in this area, especially on students' perceptions of how lecturers grade or assess their sketches and drawings. The study also recommends that during admission processes, prospective students should be subjected to sketching and drawing tests to ascertain their artistic skills, so that those with weak or less artistic tendencies can be worked on for improvements and those who are already good can be guided appropriately on how to be better.

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REFERENCES

Aderonmu, P. A., Awoyera, P. O., Sholanke, A. B., & Erebor, M. E. (2017). Professional Methods of Assessments in Architectural Design Projects: A focus on the Relevant Parametric Measures in Selected Nigerian Universities. *Cogent Social Sciences*, 3: 1328793

Akin, O. (1986). *Psychology of Architectural Design*. London, Pion Ltd

Al-Murahhem, F. M. (2014). Art Courses and Interior Design Students. *Art, Design & Communication in Higher Education*. 14(1), 7-21

Amadeo, D., & Dyck, J. A. (2003). Activity-enhancing Arenas of Designs: A Case Study of the Classroom Layout. *Journal of Architectural and Planning Research*, 20, 323-343.

Anthony, K. H. (1991). *Design Juries on Trial: The Renaissance of the Design Studio*. New-York, NY: Van Nostrand Reinhold.

Avsec, S., Jagiello-Kowalczyk, M., & Markiewicz, P. (2018). Engineering Thinking to Enhance Architectural Design. *World Transactions on Engineering and Technology Education (WIETE), 16, (2), 134-139*

Bilda, Z., Gero, J. S., & Purcell, T. (2006). To Sketch or not to Sketch? That is the Question. *Design Studies*, 27(5), 587-613

Cheng, N. Y. (2007) Mining a collection of animated sketches. Kieferie, J., & Ehlers (eds.), Proceedings of the 25th eCAADe Conference, Frankfurt am Main Germany, 26-29 September 2007.

Cross, N. (1999). Natural Intelligence in Design. *Design Studies*, 20, 25-39

Dehlinger, H. (2000). 'Experimental Search for Order in the Codes of Generated Drawings'. In Soddu, C. (ed.). *Generative Art*. Rome, Alea Design

Demirbas, O. O., Demirkan, H. (2003). "Focus on Architectural Design Process through Learning Styles". *Design Studies*, 24 (5), 437–456

Dizdar, S. I. (2015). "Architectural Education, Project Design Course and Education Process Using Examples" *Procedia - Social and Behavioral Sciences*, 176, 276 – 283

Do, E., Gross, Yi-L., Neiman, M. D., and Zimring, B. (2000) Intentions in and Relations among Design Drawings. *Design Studies,* 21(5) 483-503

Gibson, J. J. (1979). *The Ecological Approach to Visual Perception Systems*. Boston, M. A. Houghton Mifflin

Giddings, B. and Horne, M. (2002), *Artists' Impressions in Architectural Design*. London: Spon Press.

Goel, V (1995) *Sketches of Thought*. MIT Press, Cambridge MA

Goldschmidt, G. (1994). "On Visual Design Thinking: The Vis Kids of Architecture". *Design Studies*, 15(2), 158-174

Hanks, K., & Belliston, L. (1992). *Draw: A Visual approach to Thinking, Learning and Communicating.* USA: Crisp Publications Incorporated

Herbert, D. M. (Winter 1988), Study Drawings in Architectural Design: Their Properties as a Graphic Medium, *Journal of Architectural Education,* 41 (2), 26–38.

Ibrahim, R., & Rahimian, F. P. (2010). Comparing of CAD and Manual Sketching Tools for Teaching Architectural Design. *Animation in Construction*, 19, 978-987

Ilozor, B. D. (2006). Balancing Jury Critique in Design Reviews. *Transactions*, 3, 52-79.

Joshi, D., Datta, R., Fedorovskaya, E., Luong, Q., Wang, J. Z., Li, J., & Luo, J. (2012). Aesthetics and emotions in images: A computational perspective. *IEEE Signal Processing Magazine*. 94-115. Doi: 10.1109/MSP.2011941851. Accessed on 8th September, 2015.

Lawson, B (1990). *How Designers Think?* (2nd ed.), London: Butterworth Architecture

Leder, H., Belke, B., Oeberst, A., & Augustin, D. (2004). A model of aesthetic appreciation and aesthetic judgments. *British Journal of Psychology, 95,* 489–508.

Li, C., & Chen, T. (2011). Aesthetic visual quality assessment of paintings. *IEEE Signal Processing Magazine*. 12,2. 16-25.

Liu, S., Liu, Y., & Chuang, H. (2009). The Relationship between Design Concepts and Sketches of Architectural Design Novices. *Proceedings of the International Association of Societies of Design Research,* October 18-22, Seoul, Korea

Markovitz, G. (2001), Outside: Marrying Art and Architecture. *RSA Journal,* 148: 5499, 34–37.

Martin-Erro, A., Espinosa, M. M., & Dominguez, M. (2016). The Role of Sketching in Engineering Design and its Presence on Engineering Education. *Proceedings of the 10TH International Conference on Technology, Education and Development, Valencia, Spain*. DOI: 10.21125/inted.2016.1822

McKim, R. (1972). "*Experiences in visual thinking*". *Stanford University*, Wadsworth, US, p. 123

Novakova, K., Achten, H., & Matejovska, D. (2011). Towards Improved Architecture Education: A Research Framework, *Proceedings of the 29th eCAADe 2011 Conference*, Ljubljana, Slovenia.

Novakova, K., Archten, H., Treyer, L., & Schmitt, G. (2012). Value Lab: Innovation in Teaching Visual Design. There is nothing to wait for. 16th *International Conference on Information Visualization,* Montpellier, 10-13 July 2012, IEEE Computer Society: pp 426-433

Omale, R. P., Olotuah, A. O., Fadairo, G., & Kayode, O. F. (2017). Assessment of Visual Aesthetic Quality of Public Office Buildings in Akure, Nigeria. An unpublished Ph D Thesis submitted to the School of Post-graduate Studies, Federal University of Technology, Akure. Nigeria.

Ochsner, J. K. (2000). "Behind the Mask: A Psychoanalytic Perspective on Interaction in the Design Studio". *Journal of Architecture Education*, 53 (4), 194–206

Ozdemir, S. (2012). Sketches in Architectural Design Studios: A Perspective from Traditional Environment to Digital Environment. *Proceedings of the International Conference on Technology, Education and Development.* Available at DOI: 10.21125/iceri.2016.0888

Purcell, A. T., & Gero, J. S. (1998). "Drawings and the Design Process: A Review of Protocol Studies in Design and other Disciplines and Related Research in Cognitive Psychology" *Design Studies*, 19 (4), 398-430

Riley, H. (2001). 'Drawing as Transformation'. In Soddu, C. (ed.). *Generative Art*. Milan, Politecnico di Milano

Riley, H. (2004). Enhancing the Teaching of Contemporary Visual Arts Practice. Paper presented at the *2nd CLTAD Conference*, Barcelona, Spain.

Riley, H. (2016). Seeing into Drawing: Perception and Communication. *Art & Perception*, 4, 57-71

Schön, D. A. (1985). "The Design Studio: An Exploration of its Traditions and Potentials" *RIBA, Publications for RIBA Building Industry Trust*, London

Suwa, M., & Taversky, B. (1997). What do Architects and Students Perceive in their Design Sketches? A Protocol Analysis. *Design Studies*, 18(4), 385-403

Suwa, M., Purcell, T., & Gero, J. S. (1998). Macroscopic analysis of design processes based on a scheme for coding designers' cognitive actions. *Design Studies*, 19(4), 455-483.

Tovey, M., & Porter, S. (2002). Sketching, Concept Development and Automotive Design, *Design Studies*, 24(2), 135-153.

Tsow, D. & Beamer, L. (Winter 1987), Verbalization and Visualization: A Need in rchitecture Education. *Journal of Architectural Education*, Verbalization 40(2), 80 – 81.

Ullman, D. G., Wood, S., & Craig, D. (1990). The Importance of Drawing in the Mechanical Design Process, *Computers & Graphics*, 14(2), 263-274

Verstijnen, I. M., Leeuwen, C. V., Goldschmidt, G., Hamel, R., & Hennessey, J. M. (1998). Sketching and Creative Discovery, *Design Studies,* 19(4), 519-546

Vyas, D., Der Veer, G. V., Nijholt, A. (2013). "Creative Practices in the Design Studio Culture: Collaboration and Communication" *Cogn. Technol. Work*., 15(4), 415–443