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Effective Constructivism for the Arch-Design Studio

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ABSTRACT: Aim of this paper is to search and find ways and methods of constructivism teaching and learning ideas in teaching the architectural design studio. The objective is to extract all the positive things constructivism has to offer the architectural design studio for efficient teaching and effective learning. Although there are similarities in the curricula of training architects all over the world, but educators go about it in their own convenient and suitable ways and styles. And this is leading to inadequacy in the standards of teaching the arch-design studios in the contemporary world. The topic has become very relevant and timely as arch-educators and other stakeholders are of the opinion that something has to be done to improve the ways and methods of training architects, especially the teaching of the arch-design studio. Through exploration of critical analytical review of literatures and interviews, this paper finds ways and methods of constructivism in teaching the arch-design studio. These ways and methods are critically explored through the research themes of collaboration, integration, adaptability and motivation. By teaching and learning with constructivism ideas in the arch-design studio the students would be grounded in designing with creativity ideas and therefore we can have professionals that design and build creatively, functionally, satisfactorily and safely. It means we can have real buildings and places that satisfy our clients, the society and in harmony with the environment.

Keywords: *Effective constructivism, Arch-Design studio, Collaboration, Integration, Adaptability, Motivation, Teaching and learning.*

INTRODUCTION

History of Arch-Studio Teaching

The Ecole des Beaux Arts in France started the idea of the arch-design studio in the 18th century. It had a particular kind of teaching; theory in the classroom and design in the ateliers (studios). It provided academic architectural training and was open to students of any nationality. It attracted many architects from the US in the 19th and early 20th centuries (Conway & Roenisch, 2005) and became synonymous with architectural education in France, England and America (Moffett, et al., 2003). This system continued into the 20th century, initially within the offices of architects; the atelier of Le Corbusier, and at later stage within schools of art and design, and more recently within schools of architecture. The design studio is said to be the melting pot and therefore the core of the education of architects (Charalambous & Hadjisoteriou, 2009).

Al-Marzoky (1999) maintains the importance of the practising architects' participation in teaching of the design studio along with the academic tutors. Kvan (2012) argues that students draw upon a variety of people to assist in the learning, not only the teacher, and Wang (2005) challenges training of professional architects that will result in creativity and therefore contends for collaborative and interdisciplinary approaches as keys for successful transformation of teaching of the arch-design studio. This study argues further for a selection process and multi-disciplinary approach in these collaborative and integrative issues.

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Definition of Terms

Collaboration, Integration, Adaptability, Motivation, Teaching and Learning, Effectiveness

Collaboration-This is to work in association with, to assist or co-operate and specialists in collaborative design define it as, to work together with a shared goal (Kvan, 2001a, 2001b). Therefore practitioners are frequently invited to participate in the teaching of the design studio as this will enhance and speed up rate of gaining knowledge and work. Kvan (2012) argues for designs and buildings that celebrate themselves, inspire and enrich the users as a result of collaborative and inter-disciplinary approach. Collaborative design is described as process of stimulating each other to contribute to the design task. Therefore participants act towards mutual understanding and maximizing outcomes that satisfy not only their respective goals, but also those of other participants (Achten, 2009; Trocka-Leszczynska, 2009).

Integration-To make up as a whole, to make entire, to combine, to incorporate as Egan (2002) emphasises the great importance of integrated teams is to secure a culture of continuous improvement. 'The best architectural partnerships – like that of Adler and Sullivan – meld people with different talents and this should be true for architectural education' (Mallgrave, 2010, 218). Also in the Windsor forum of 2004, it debates about the need for providing an integrated architectural design education with respect to health, safety and welfare. The document defines the broad role of architecture not only as the design of building and their interiors to fulfil the wishes of clients, but also to helping foster, through design, more wholesome neighbourhoods.

Adaptability – To make fit or suitable and UIA/UNESCO[1] (2003) stresses the ultimate goal of architectural education,

that it must be an adaptable one, with respect to societal and environmental needs and innovation in the design process. Globally, some authors of architectural design education in this past two decades have argue the need for reform to incorporate the needs of society and the natural environment.
Motivation- To provide with intension to excites to action. These are incentives, urges and drives which make students to perform learning satisfactorily and creatively, and teachers' affection for their work (Ughamadu & Okoye, 1998).
Teaching and Learning- This is the act or profession of giving instruction. Teaching is synonymous with learning and both make up an education, of architects. The effectiveness of any system depends on the quality and devotion of the individuals involved in teaching (Ughamadu & Okoye, 1998). Thus, that process or activity the teacher designs to make teaching is to target learning, as teaching is to bring about learning. As the learner is placed under the teacher's guidance and direction and both involved in activities, the learner not only interacts with the teacher but with the entire teaching environment, knowledge, information, facts, altitudes, skills and values which are the ingredients of the content to be learnt as passed on to the learner through teaching.
The types of learning in architectural design studio are problem-solving, learning by doing, reflection-in-action (Schon's) – the student reflects on the action of the instructor and the instructor reflects on the action of the student – these mutual reflection activities form the critique process (Demirbas & Demirkan, 2012). Suffice to say that motivation is an important ingredient to (in form of incentives, urges and drives) effective learning, that is, it makes students to perform any act satisfactorily or well. The general teaching method in architectural design is by the 'project method'. Although in the empirical study by Demirbas and Demirkan, it was concluded that there is a shift from learning by experiencing (CE)[2] and learning by doing (AE)[3] to learning by reflecting (RO)[4] and learning by thinking (AC)[5]. All of these four learning styles occur in the design studio process.
Effective- This means being successful in producing a desired or intended result. Like a soldier fit and available for service or effective teaching method. Effectiveness is; adequate to accomplish a purpose, producing the intended or expected result and synonymous with efficiency. Efficiency means "doing the thing right", whereas effectiveness means "doing the right thing". In education; applied efficiency results to effective accomplishment of a task. In other words, efficient input results to effective output.

Constructivism - The Teaching and Learning Theory

The research finds and adopts constructivism appropriate because it integrates different methods of learning and as Soygenis et al. (2010) emphasises it is the common intersection point of different theories of learning.
Constructivism is found in philosophy (epistemology), psychology, education and in sociology. It is a learning theory that has direct application to education and explains how people acquire knowledge and learning. The theory suggests that humans construct knowledge and meaning from their experiences. It is a procedure where the students actively participate in every stage of the learning process instead of being passive listeners. Soygenis et al. (2010) find and strongly argue that the outcomes are beneficial to improve students' effectiveness in the design process.
Baker et al. (2007) enlightens us that generally there are many faces of constructivism and even within the field of education, there are several varieties over the theme of constructivism. That scholars use qualifiers when they refer to Constructivism hence, we find *individual* and *cognitive* constructivism (often with reference to Jean Piaget), *social* constructivism (often with reference to Lev Vygotsky). Some use the term *simple*, *mild* or even *naïve* constructivism with reference mainly to some interpretations of Piaget, and with a contrast to *radical* constructivism, used by Ernst von Glasersfeld (e.g. 1984). Other widely used versions include contextual constructivism, sociotransformative constructivism and sociocultural constructivism. Baker et al. (2007) goes further to give general characteristics of constructivism as follows:
Knowledge is actively constructed by the learner, not passively received from the outside. Learning is something done by the learner, not something that is imposed on the learner.
Learners come to the learning situation with existing ideas about many phenomena. Some of these ideas are ad hoc and unstable; others are more deeply rooted and well developed. Learners have their own individual ideas about the world, but there are also many similarities and common patterns in their ideas. Some of these ideas are socially and culturally accepted and shared, and they are often part of the language, supported by metaphors etc. They also often function well as tools to understand many phenomena.
These ideas are often at odds with accepted scientific ideas, and some of them may be persistent and hard to change.
Knowledge is represented in the brain as conceptual structures, and it is possible to model and describe these in some detail.
Teaching has to take the learner's existing ideas seriously if they want to change or challenge these.
Although knowledge in one sense is personal and individual, the learners construct their knowledge through their interaction with the physical world, collaboratively in social settings and in a cultural and linguistic environment.

Criticisms of Constructivism

Constructivism has been criticized on various grounds and from a workshop on 'constructivism as a paradigm for teaching and learning' by the Educational Broadcasting Corporation (2004), it relates some of the charges that critics level against it as:
It's elitist. Critics say that constructivism and other 'progressive' educational theories have been most successful with children from privileged backgrounds who are fortunate in having outstanding teachers, committed parents, and rich home environments. They argue that disadvantaged learners, lacking such resources, benefit more from more explicit instruction.
Social constructivism leads to 'group think.' Critics say the collaborative aspects of constructivist classrooms tend to produce a 'tyranny of the majority,' in which a few students' voices or interpretations dominate the group's conclusions, and dissenting students are forced to conform to the emerging consensus.
There is little hard evidence that constructivist methods work. Critics say that constructivists, by rejecting evaluation through testing and other external criteria, have made themselves unaccountable for their students' progress. Critics

also say that studies of various kinds of instruction have found that students in constructivist classrooms lag behind those in more traditional classrooms in basic skills.
Constructivists counter that in studies where learners were compared on higher-order thinking skills, constructivist students outperform their peers.

Benefits of Constructivism

From the workshop on 'constructivism as a paradigm for teaching and learning', the benefits of constructivism are enumerated as follows:
Students learn more, and enjoy learning more when they are actively involved, rather than passive listeners.
Education works best when it concentrates on thinking and understanding, rather than on rote memorization. Constructivism concentrates on learning how to think and understand.
Constructivist learning is transferable. In constructivist classrooms, students create organizing principles that they can take with them to other learning settings.
Constructivism gives students ownership of what they learn, since learning is based on students' questions and explorations, and often the students have a hand in designing the assessments as well. Constructivist assessment engages the students' initiatives and personal investments in their journals, research reports, physical models, and artistic representations. Engaging the creative instincts develops students' abilities to express knowledge through a variety of ways. The students are also more likely to retain and transfer the new knowledge to real life.
By grounding learning activities in an authentic, real-world context, constructivism stimulates and engages students. Students in constructivist classrooms learn to question things and to apply their natural curiosity to the world.
Constructivism promotes social and communication skills by creating a classroom environment that emphasizes collaboration and exchange of ideas. Students must learn how to articulate their ideas clearly as well as to collaborate on tasks effectively by sharing in group projects. Students must therefore exchange ideas and so must learn to 'negotiate' with others and to evaluate their contributions in a socially acceptable manner. This is essential to success in the real world, since they will always be exposed to a variety of experiences in which they will have to cooperate and navigate amongst the ideas of others.
The above points could be broken down into specific area of learning as follows: Develops thinking skills, Develops communication and social skills, Encourages alternative methods of assessment, Helps students transfer skills to the real world and Promotes intrinsic motivation to learn.
From the above criticisms and benefits of constructivism, it is cleared how the benefits out-weight the criticisms and moreso for teaching the arch-design studio. And from the constructivism characteristics, this study therefore derives the themes or core components – collaboration, integration, adaptability and motivation – for architectural design studio teaching.

Core Components of Constructivism

Constructivism (Collaboration)- Architect practitioners are frequently invited to participate in the teaching of the design studio as this will enhance and speed up rate of gaining knowledge and work.
Encourage group work and the use of peers as resources too. Constructivist teachers pose problems (e.g. design problem) then guide students to help them find their own answers (through the design process).
The teacher coaches, moderates, suggest, then allow the students room to experiment (learning by doing), ask questions, try things that don't work as these learning activities require the students' full participation. An important part of the learning process is that students reflect on (learning by reflection), and talk about their activities.
Constructivism (Integration)- The great importance of integrated teams (participation of practitioners from related disciplines) is to secure a culture of continuous improvement. Students are not blank slates upon which knowledge is etched. They come to learning situations with already formulated knowledge, ideas and understanding (e.g. from integrated course work). This previous and current knowledge is the raw material for the new knowledge they will create (design solution).
Constructivism (Adaptability)- The ultimate goal of architectural education is to be an adaptable one, with respect to societal and environmental needs (UIA/UNESCO, 2003). Constructivism advocates mean constructivism is a life view; it is a way of looking at how people construct understanding of our world.
Constructivists argue that education should be grounded in real experience or real world experience.
The knower interprets and constructs a reality based on his experience and interactions with his environment.
Constructivism (Motivation)- These are incentives, urges and drives which make students to perform learning satisfactorily and creatively.

MATERIALS AND METHODS

Teachers should have affection for their teaching and students and rewards for hard working students (competitions). The exploration of literature and various debates on the teaching of the design studio is critically done using the core elements of collaboration, integration, adaptability and motivation as related to constructivism. This session begins with discussions and arguments on collaboration.

RESULTS AND DISCUSSION

Collaboration

The major areas of collaboration that are considered in this session are selection and participation, cross-studio/ disciplinary, peer or team learning, jury as a teaching device, exchange programmes/conferences, and global studio initiative.
Selection and Participation- Those architectural professionals to participate in teaching must be selected and according to Adeyemi (2012b), you know them the way they talk in conferences and seminars; they are architectural experienced, flexible and have the interest to teach and not to ridicule students. Professionals with intrinsic qualities, have entrepreneurial approach to growth and new direction (Hancock, 1981; Interior, 1995). Stringer (2006) argues for stakeholders' participation to obtaining favourable outcomes. Also Christensen & Worzala (2010) emphasizes that working together in interactive decision-making process will help students gain heightened understanding of learning. If only the right calibre of professionals are invited to participate,

then we can contend for and according to Lehmann (2009), this builds strong links to good collaborative practices and one of the varied examples of involving students in real-world projects. They represent examples of applied design research that illustrate what is known as the scholarship of integration (Boyer & Mitgang, 1996).

Lehmann (2009) goes further to add that communities and government bodies could also be involved depending on the type of design project. This, he defends, is a strong interest in the reality of making, as the great practitioner and educator Alvaro Siza calls it, leading to collaborative initiatives and this is to maintain diversity and enhance the students' learning experience. Manufacturers too can also participate.

Cross-disciplinary- Again Lehmann (2009) stresses that cross-disciplinary studio teaching should be developed and intensified. This study emphasises that students should not only be encouraged to undertake their industrial training and study visits in architectural offices, but also in construction management and planning offices. As Olotuah (2012) criticises that our students are design studio trained architects, they cannot even make building drawing for approval, and cannot manage and supervise a simple building project.

Peer learning, Jury as a teaching device, Exchange programmes and Conferences- Chu (2009) says that although students prefer to work alone, teachers should endeavour to encourage team spirit among students. He defends that in the process of teaching practice, teacher needs to have a sense to culture the team spirit among students. This is different from group project which Gross & Yi-luen Do (1999) debate that they are unpopular but they can be used sometimes to leaning teamwork in this manner. But, as it is done now, studio should continue to emphasise both individual and teamwork. Some scholars maintain that juries should be used also as a teaching device; in order to ensure that students will be alert, as well as present. Also of highlights are the importance of exchange programmes and attendance of conferences by students.

Global studio initiative- This involves taking students overseas to participate in an advanced design studio, for example where students from Nigeria or Africa will have the opportunity to collaborate with students from other countries. Iroegbu (2010) reports the Nigerian Institute of Architects, NIA President; Tunji Bolu's statement on the celebration of NIA 50 years that schools of architecture in Nigeria should be trained to compete internationally, and this can be one of the ways to do that. The next session is on integration.

This session is a discussion on integration as an element of teaching the architectural design studio and as related to constructivism.

Integration

These core areas; research, design process, curriculum, beginners'/studio system, style of teaching/ratios, series of seminars and lectures, are critically discussed with respect to constructivism in teaching of architectural design studio.

Research- The emerging challenges to design teaching; what must be taught and learnt is a continuing open research process, therefore Stevens (1998) challenges architectural education to live up to its responsibility by bringing research discovery into design teaching. Amole (2004) and Mgbemena (2007) both debate that students can be equipped with knowledge and skills for solving environmental problems also via research process. This is to foster the students' creativity and strengthen their interest, motivation and commitment to improve the environment (Olotuah & Adesiji, 2005). The objectives of the architectural education as reflected in the aspiration of the 3rd Nigeria's national development plan for educational programme argues the importance of research opportunities appropriate to the development of natural resources and technological skills in meeting national demands (FGN, 2010).Some scholars maintain that the role of the academy is not only to teach received knowledge, but is also to ever question, ever pursue new knowledge.

Design Process and Methods- Many authors including Schon (1982; 1983) associate the design process thus: collection/analysis of information '! development/test of solutions '! presentation of solutions. In particular Brawne (1992; 2003) has it as; P1'!TS'!EE'!P2: (P1=problems recognition, TS=trying solutions, EE=errors elimination and P2=problem solved). Presentation skills should be taught concurrent with each project, and short lectures should be used in studio to teach and clarify the specific subjects being studied. Clarity of subject matter should be highly valued, and faculty should strive to maintain this, as emphasised by Adeyemi (2012b) who equally argues that the tutors do not even know and understand what the project is all about; they need to do their homework.

Curriculum- All samples studied by this research have five (5) areas - design, history, technology, skills, and liberal arts, but with different durations of time. There is an opportunity to have two parallel strands; one that actually strengthens the business of an architect by providing them with useful practice skills where they could serve as good architects by looking very carefully at how actual history, drawing and design courses helped them achieve this.

And the other parallel strand is a general degree in architecture, a degree in architectural studies which will enable the student to go into development, government, real estate, law, and other professions, so that each can have a broad-based understanding of the importance of the built environment. Some scholars argue that this would actually provide students with a more coherent programme. Salama (2006) maintains there are these differences all over the world. Whilst scholars and practitioners like Westfall (2008; 2011; 2012), Rybczynski (2012), Kelbaugh (2004) and Duany (2012) have vehemently argue for and against how we train architects, either in the Beaux Arts style or in the avant garde style like the Le Corbusier and the other Modernists. However, this study advances that whichever strand any school takes it should be acceptable, as some scholars too have praised the idea of diversity in training architects.

The Windsor (2004) debates that the city should be given value than the architecture of object buildings, and students design training should be geared towards the cities as these are the places the architects would do most of their projects. Also, building preservation should also be positioned centrally in the curriculum as a way to reform the place of history and to be more adventuresome and liberal; the programme should be longer. Nigeria's NIA is already pioneering this too. In the Viseu (2004) Conference similar ideas were manifested, the most prominent theme was the emphasis on the inseparability of architecture and urbanism, a theme made explicit in the focus of its proceedings.

Initial design projects courses for freshers/What beginners need to know- Several discussants in the Windsor 2004 forum and IAES 2011 summit contend for giving students abstract exercises like spots and dots and then to composition, because their knowledge of architecture is usually very limited. Viseu (2004) adds collection of drawing exercises in various media (pencil, ink, and watercolour). This study also supports abstract or mini-residential buildings with presentation in any media the individual chooses. This view is also advanced by Chu (2009) and Tornqvist (2008).

Style of teaching/Ratio- The architectural educator David Mohney in Windsor (2004) elaborates that there are two models and two pedagogies that work. You let the students dream and then you give them the rules to organize dreams, or you give them the rules you let them dream. The pedagogies that don't work are the ones where you only dream or you only give them the rules. On ratios in studios and lectures, architecture schools have guided to trade with the 12-person studio and for the 70-person lecture.

Running series of seminars and lectures in the design class- Series of seminars and lectures are usually conducted to run alongside the design project work, this according to Roberts (2007) are intended to help students gain a better understanding of their work, as the students are expected to apply those ideas to reality.

The next session is on adaptability as related to constructivism in teaching the arch-design studio.

Adaptability

Adaptability presents arguments on adaptable professionals/retention, and cultural identity/studio culture, needs of society/natural environment, real world experience, and membership of organizations, as factors in teaching architectural design studio with respect to constructivism.

Adaptable professionals/Retention - According to Adeyemi (2012a; 2000), professionals that are adaptable to the students and not those ones who are stiff-necked; but being open to listen to students' ideas and direct these ideas for design creativity. Unfortunately, he says some professionals are just out to ridicule students and never see anything good in their ideas. On retention for teaching, some scholars support the idea and stress not just the best students, but best students with best in design.

Cultural Identity and being Cultured- The importance of cultural identity in the context of UNESCO/ UIA (2003) is not in conflict with its idea of globalisation of architecture and architectural education. By cultural identity, it means bringing the culture of the people to bear in the architectural designs and its education. Whilst globalization is referring to the standards, training and assessment of architects globally should be up to standard, it strengthens the need for identity on one hand and the need for universality on the other (CAA, 2003).

Needs of society, natural environment and community building- Boyer & Mitgang (1996) maintains that an enriched mission is the key to the renewal of the profession which synonymously applies to its education. The four purposes identified as priorities in the report may each be seen to support the needs of the society and improving the natural environment, as the Windsor 2004 states: building to beautify, for human needs, for urban spaces, and preserving the planet. Peter Brown in Windsor (2004) gives example that the US centre for disease control links the automobile-oriented layout of suburbia to an epidemic in obesity, the rising cost of automobile transportation, and the related increase in commuting and driving time and this is putting a strain on families. And that this can be overcome by the concept of a walkable environment which is safe from crimes and danger.

World Reality Design Studio/Real World- In the robust debate from the international architectural education summit, IAES (2011), the relationship between the design studio and real world proved to be the crux of the debate. Ecole group lamented the conservatism of today's students - reflecting a general concern that environmental issues are used to justify timid designs – and insisted on the importance of maintaining the autonomy of the studio as a place in which to fantasise. During the summit Alejandro Zaera-Polo declared that any studio not actively engaged with reality was headed for irrelevance. It was Ralph Lerner who finally pointed out the elephant in the room: that in this globalised educational marketplace, the students are now so well-informed, mobile and ruthless in their choices that any academic institution or individual not keeping pace with consumer demands is unlikely to survive. World reality experiences can be achieved by the development of the 'live project' as a school subject. This has already been pioneered and in operation in some schools (Martin, 2008).

Membership of Organizations/Artistic Families- Williamson (1991), cited in Stevens (1998) affirms that a number of famous architects did gain access to clients because of their families' social contacts and because they attended Ivy League schools where their classmates included potential future clients. Others, like Frank Lloyd Wright, who did not attend those types of schools, found other ways to reach clients. Wright, for example, not only benefited from his relationship with his uncle's congregation, but actively courted his early clients by joining their organizations and activities. The psychologist D. W. Mackinnon found that many of the great architects came from artistic families (Stevens, 1998). Therefore it is a view of this study that students going out to other departments and faculties to take some liberal courses could serve as a remedial measure to this issue.

Next and last of these core elements is motivation as it relates to constructivism in teaching the arch-design studio.

Motivation

This session discusses government/institutional support, adequate studio provision, originality, evidence of body of knowledge, and scenic site/multiple design typologies.

Government and Institutional Support- The Australian Learning and Teaching Council (2009) as reported by Frankham outlines the rights of curriculum in architecture studio teaching as review and adequate funding, staff motivation in terms of workloads, teaching and research, ensure facilities for learning in terms of workshops, data-room or library, and good access to studio spaces/facilities for students working outside working hours.

Adequate Studio Provision- This is a key to the success in the teaching of architectural design studio as the full potential of peer learning will be exploited within this invaluable learning arena. However, Holgate (2008) asserts that the quantity of space afforded to studios is extensive and expensive, and he says many schools of Architecture in the UK have been forced to close down studio spaces, breaking the spatial link between the production and critique of student

work. This according to him is unfortunate for some schools in the UK. This study supports the consistent use of studio based teaching as part of the varieties of teaching strategies of the arch-design studio, especially in the developing world. Reflecting on Boyer & Mitgang (1996), provision of studio spaces is done for the following reasons: authenticity of students' experience, collaborative and group exercises.

Originality/Creativity- Originality is not synonymous with creativity, but both require imagination and resourcefulness, originality is more about generating wholecloth or from scratch, and less about working with givens or within a system. Creativity on the other hand is less about superseding and more about adding - whether to a language of form or a larger body of knowledge. Originality is inventing out of nothing, while creativity is putting together pre-existing things to make order. Although both are positive, ubiquitous human impulse, there is rarely a pure spark in the dark. Architecture is built on existing ideas and formal precedents seen in other architecture, other domains, or in nature, they are both lifelong experiences (Windsor, 2004). Originality and creativity should be the watch words of architectural design.

Evidence of body of knowledge in an architectural piece - The great practitioner Andres Duany in Windsor (2004) argues that in a school of architecture, it is important to deal with architecture in a rigorous way. And that if you look at the work of architects like Aalto and Corbusier in terms of style, it is all over the place. But the quality is very high because there is a certain rigour; there is a body of knowledge.

Hand or Computer Presentation and Model Making- Giddings & Horne (2008), and Duarte (2005) have debated the disadvantage of hand drawing, being perhaps the greatest impediment has been the effect on the design process; hand drawings and models can involve considerable time investment by students. And Goldman (2005) argues about how architectural students are generally taught to draw the same way their tutors learned – with traditional media first. With CAD, design and presentation methods can be harmonized, and such representations are enabling the development and testing of designs to be faster and more accurate; and students can now quickly and accurately produce designs to a much more sophisticated level. Brawne (1992), Gross & Yi-luen et al. (1999), and Mallgrave (2010); have all also admitted the contributions of CAD in teaching architectural design education.

These authors contend for and that students are now producing with CAD some of the highest quality designs, and some of the most interesting forms ever to come from university schools. This study defends this position and advocates for less number of years for hand drawing. Though agreeing with Giddings & Horne (2008) that Models have the disadvantages of one; viewed from above, they produce less impact than from human viewpoint, and two; they imply neatness in the environment that cannot be replicated in practice. But, sometimes they are understood and appreciated better by clients and professionals than drawings (NIQS, 2011).

Competition- The notion of competition between individuals, schools, firms, is one of enduring values of architecture. At the Ecole in the 18th and 19th century, competition was lauded as a virtue in itself, and progress was made by success in competition. Anthony (1991) and Bourdieu (1986, 1990a, 1990b), defend that it is for approbation and approval, as students can display to their teachers their desire for and acceptance of the game of architecture.

Scenic Sites/Multiple design typologies- Chu (2009) and as in some Nigerian universities architecture handbooks emphasise, in teaching of arch-design studio, teachers can find a scenic site whilst leading student field trips. When looking at the terrain, guide the students to observe the surrounding environment of the land, to see whether it can be used in their design or create something new. Then ask the students to make their own to deepen their understanding after field survey. In addition; multiple design typologies will expose students to wide range of design typologies, different site conditions and structural principles.

CONCLUSION

Therefore, the outcomes of the research study are:

Selection and Inter/Multi-Disciplinary Approach - Selection to participate by the right calibre of professionals and Inter/Multi-Disciplinary approach to teaching of the design studio with constructivism ideas.

Exposition of improved constructivism ways and methods of teaching an architectural design studio.

More awareness on health, safety and welfare, aesthetics and environmental sensitivities issues in teaching designs, and these should be incorporated into the curriculum of training architects.

Awareness to the government and institutions for more support.

This paper started with history of the architecture design studio to enable us have a bearing of where we are coming from and the importance of the arch-design studio and its continued significance in teaching the arch-design studio. Then the research themes as relate to constructivism (collaboration, integration, adaptability and motivation) are picked because of their relevance to teaching of the contemporary arch-design studio and explained with their peculiarity to teaching the arch-design studio. The design requirement factors are discussed appropriately under each of the theme. Criticisms and benefits of constructivism are highlighted to raise support for its effectiveness and the outcomes enumerated.

From explored creative works in literature of authors and scholars cited in this study, the telephone and face-to-face interviews, the experiences and very arguable opinions expressed in the various debates and conferences (IAES, Windsor, Viseu, etc.) to improve ways and methods through constructivism ideas, this study therefore argues for constructivism with the core-themes of collaboration, integration, adaptability and motivation in teaching of architectural design studio.

ENDNOTES

1- United Nations Educational, Scientific and Cultural Organization/ International Union of Architects
2- Concrete Experience
3- Active Exprimentation
4- Reflective Observation
5- Abstract Conceptualisation

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