GOOD ARCHITECTURAL STRUCTURE AS A FUNCTION OF A WELL THOUGHT OUT ACTION PLAN

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ABSTRACT

This paper investigated good architectural structure as a function of a well thought out action plan. Good Architectural Design is planning, designing and devising buildings that are more functional, aesthetical and durable. Good architecture shapes and facilitates our activities with a view to our functions and goals, which are not limited to the aesthetic realm. One of the key elements of good architecture is designing a space that can house all types of clients and employees comfortably and safely. This paper viewed the characteristics and qualities of good architecture as being robust, durable, flexible, innovative, long-lasting, elegant, etc. The paper also measured the importance of good architecture as it not only creates beautiful, inclusive places and spaces that meet pressing client and user needs but addresses the physical, economic, social and environmental concerns of their local communities. The basic skills for good architecture highlighted in this paper include design skills, research skills, communication skills, and technology knowledge. In conclusion, this paper rightly concluded that a good architecture is the result of a well thought out action plan, executed with a matching knowledge and information-based skill to produce a structure. One of the recommendations made in this paper was that architect who really intends to meet the needs of his client should be knowledgeable and also needs to truly grasp information on related topical architectural issues.

KEYWORDS: Good Architectural Structure, Function, and Action Plan

Introduction

Good architecture starts within the designer's understanding; from preconception (the initial idea), grasping of new concepts and thought information to development of competence in an area of inquiry, through the retrieval, display and application of factual and organized knowledge. The society is always in need of good architecture although they may not immediately decipher and most often overlooked the elements that make it "good." Many people view good architecture as a mere work of arts with emphasis on aesthetic even though it abounds with its unusual status. Good architecture shapes and facilitates our activities with a view to our functions and goals, which are not limited to the aesthetic realm (Edem and Okonkwo, 2010). It is important to design for function but worth more to juxtapose it with

aesthetic, and this could only be achieved when both creative thinking and emotional connection come into play, as they both speak to the sense of experiencing good architecture. It involves intellectual understanding and knowledge which the architects need in order to produce good buildings/structures.

One of the key elements of good architecture is designing a space that can house all types of clients and employees comfortably and safely. Architecture does not only affect society on a high level but also on a more personal level, it can have a profound impact on its occupants. Everything from the layout of the space to the material finishes can contribute towards occupant health, mood, and productivity. A successful project comes from understanding that the spaces and buildings we love most stir up feelings in us that are not easy to quantify but are created from the process of collecting and implementing all this knowledge and research.

Good Architecture is a product of studying well and the word 'well' has a number of meanings RIBA (2021b), which include:

• In a good or satisfactory way

• In a thorough manner

• In good health; free or recovered from illness. All of them put together enhance the study of architecture.

In the process of studying well both the students and the teachers has a key role to play. While the students are expected to learn from a wide range of subjects that covers various fields of human endeavours the teachers are also expected to bring out their teaching prowess and strategies in order to bring out the best from the students.

The essence of studying well is to become a good architect. Ghonim & Eweda, (2018) posited that the qualities of architects and their works in a specific context profoundly depend on their education. To that extent good education produces good architects which in turn produce good architecture. However, becoming an architect does not just happen in a day but it happens in stages.

Characteristics and Qualities of Good Architecture

"Architecture is generally conceived – designed – and realized – built – in response to an existing set of conditions which may be purely functional in nature, or they may also reflect in varying degrees the social, political, and economic climate" (Ching, 1996). It should be noted that whenever an existing set of conditions is less satisfactory and a new set of conditions becomes desirable, then architecture emanates to solve the pertinent problems. According to Ching, "the act of creating architecture, then, is a problem-solving or design process". Design is shown to be a special case of general problem-solving processes and Architectural design is modeled as a search process in a space of alternative solutions, seeking one or more solutions that satisfy certain design criteria (Ledbury, 2018). Thus, the practice of architecture is employed to fulfill both practical and expressive requirements, and it serves both utilitarian and aesthetic ends (Ackerman, Scruton, Roger, Collins, Peter and Gowans, 2021). A good architecture should therefore be seen in its entire ramification as problem solving, not problem creation, to the general satisfaction of its users or beneficiaries.

In the light of the above, the Roman architect, Vitruvius, in his treatise *De Architectura* (known today as The Ten Books of Architecture), more than 2,000 years ago, proposed three fundamental laws that Architecture must obey, in order to be considered. These are: *firmitas,*

utilita and venustas, translated in the 17th century by Sir Henry Wotton into English slogan firmness, commodity and delight (meaning structural adequacy, functional adequacy, and beauty) (Ghonim & Eweda, 2018). Leon Battista Alberti, in his book, *De Re Aedificatoria*, placed Vitrivius at the core of the most profound theoretical tradition of modern ages. From Alberti, good architecture is validated through the Vitruvian triad which defines its purpose (Salingaros, 2006). Sparx Systems Pty Ltd, (2020-2021) further elaborate on these three principles thus:

Durability (Firmitas) – It should stand up robustly and remain in good condition

Utility (Utilitas) – It should be useful and function well for the people using it

Beauty (Venustatis) – It should delight people and raise their spirits

These three principles therefore become the yardstick for any good architecture in which other authors built on it. For instance, Ackerman, et.al. (2021) posited the following characteristics as distinguishing characteristics of a work of architecture from other built structures:

i. The suitability of the work to use by human beings in general and the adaptability of it to particular human activities,

ii. The stability and permanence of the work's construction, and

iii. The communication of experience and ideas through its form.

All these conditions must be met in architecture. The second is a constant, while the first and third vary in relative importance according to the social function of buildings. If the function is chiefly utilitarian, as in a factory, communication is of less importance. If the function is chiefly expressive, as in a monumental tomb, utility is a minor concern. In some buildings, such as churches and city halls, utility and communication may be of equal importance. These ancient characteristics can be elaborated on and expanded to apply to Quality Architecture that should be developed by good architects in the twenty first century.

Sparx Systems Pty Ltd, (2020-2021), enumerated the following characteristics as most important qualities of an effective and good Architecture. They include:

Robust: Architecture should be strong and not be vulnerable to minor changes in the business, information, application and technology systems.

Feasible: An Architecture that cannot be implemented will mean that the goals and objectives of the enterprise will not be met. It is best to identify these requirements as quickly as possible so as not to disappoint the party who requisitioned the architecture work.

Utilitarian: Architecture must have utility which, in turn, when implemented will result in practical outcomes. Architecture, though elegant must provide demonstrable and measurable value to the stakeholders or the parties that requisitioned them in order to be successful.

Durable: Architecture is a living entity that describes a target state and - once implemented - will become the new baseline state. The architectures should prove to be durable with the passage of time and be resilient to changes in the business and technical environments that might occur over the lifetime of the architectures. This implies that they must - as much as possible - preempt the future conditions and environments.

Flexible: The architectures must be flexible and be able to adapt to changing conditions and also provide enough guidance for implementation teams that have the knowledge of their discipline to make the important and necessary decisions about technical problems and opportunities. Architectures that are created with too much detail will often result in brittle and inflexible designs and implementations resulting in systems that cannot adapt to changing circumstances and environments.

Verifiable: It should be possible to verify that the architecture will perform as designed and that there would not be side effects that result from the architecture and the parts of the enterprise that it impacts.

Elegant: Architectures must have both form and function and it is a good test of architecture to measure its elegance. An architecture that is well designed will tend to be elegant and have simplicity of form that will be obvious to those that take the time to study it.

A good architectural plan does not just focus on the design of the house or building; it must also consider how the homeowners will use the space as well as the outside environment (Bryant Boyd, 2019). Bryant Boyd added the following 5 points as some of the qualities of a good architectural plan:

i. Sustainability: A good architectural plan must have the technology and design elements that can lead to a building with a lower carbon footprint, low-cost maintenance and energy-efficiency that minimizes utility fees. It should be noted that the buildings we design and the energy they require generate more carbon dioxide than cars yet; the auto makers that we all complain about have less impact than architects and their clients (Leavitt, 2009).

ii. Aesthetics: Designs are highly revolutionary and change over time. A good architectural plan exhibits a design that exudes timeless elegance and beauty.

iii. Functionality: Nothing is better than a building that can actually serve its purpose. What will you do with a beautiful building which cannot function as a home for a family or an industrial building for a company? According to your custom home building services provider, the building's foundation and finishing touches must not just fit its purpose but also helps to enhance its function for the people.

iv. Comfort: With the utilization of quality materials and design principles, a good architectural design must be comfortable and highly durable against general use, weather and the environment.

v. Future-proofing: A good architectural design should not be limited to the current needs of the occupants. It must also be prepared for the years to come. Flexible and dynamic spaces can be key in creating a building that is highly-adaptable to changes.

Dieter Rams in the work of Domingo, (2020) sees good design in the following perspective:

• **Good design is innovative:** The possibilities for innovation are not, by any means, exhausted. Technological development is always offering new opportunities for innovative design. But innovative design always develops in tandem with innovative technology, and can never be an end in itself.

• **Good design makes a product useful:** A product is bought to be used. It has to satisfy certain criteria, not only functional, but also psychological and aesthetic. Good design

emphasizes the usefulness of a product whilst disregarding anything that could possibly detract from it.

- **Good design is unobtrusive:** Products fulfilling a purpose are like tools. They are neither decorative objects nor works of art. Their design should therefore be both neutral and restrained, to leave room for the user's self-expression.

- **Good design is honest:** It does not make a product more innovative, powerful or valuable than it really is. It does not attempt to manipulate the consumer with promises that cannot be kept.

- **Good design is long-lasting**: It avoids being fashionable and therefore never appears antiquated. Unlike fashionable design, it lasts many years – even in today's throwaway society.

Importance of Good Architecture

"Good design not only creates beautiful, inclusive places and spaces that meet pressing client and user needs but addresses the physical, economic, social and environmental concerns of their local communities. It helps to ensure that private and public investment of money and finite natural capital results in valuable, sustainable and equitable outcomes, with the potential to play a central role in, for example, mitigating global climate change" (RIBA,2021a).

i. **Economics:** The best architectural design is one that is cost effective and will still continue to drive economic flow. This goes beyond aesthetic design. For instance, if an architect is designing a building for a business, a few things should be taken into account, e.g. where will the building be located? What is the business goal? What kind of traffic will they be expecting, and what will help drive that traffic and increase profits? (Even unexpected things, such as the type of traffic and their movement patterns, need to be taken into account. Are people walking? Are they driving?). All these questions can be answered with well thought out action plan, executed with a matching knowledge and information based skill to produce a structure".

ii. **Creativity:** According to Kim (2020), architecture takes imagination; the ability to order ideas and communicate them clearly; creatively (not necessarily artistic ability); a keen interest in human behaviour, our habitat and the natural environment; and problem solving skills. Architectural design is primarily driven by the holistically creative manipulation of mass, space, volume, texture, light, shadow, materials, program, and Realistic elements such as cost, construction and technology, in order to achieve an end which is aesthetic, functional and often artistic. This distinguishes Architecture from engineering design, which is usually driven primarily by the creative application of mathematical and scientific principles.

Architects use their creativity to design good buildings and add beauty to our daily lives in ways we cannot imagine. They execute this due to their nature of training and knowledge. With the architect's creativity one can be proud of his space and building but if it is just four walls and a door, imagine how it will be if there is no design intricacies, nothing to add interest to it. The exterior is just four white walls and a door, certainly, that will not be very appealing to the client. Buildings and structures with good architecture and design create stronger and long lasting image in the mind of the clients and observers.

iii. **It creates flow:** To designing a building is not an easy task. Architects need to apply great skills to ensure that a building's flow makes sense and that the building is easy to move around in. Good flow in buildings is very crucial and it makes people's lives more efficient, for example, offices with good architecture experience higher productivity.

iv. **It enhances progress:** Good architecture enhances societal progress in a way that we cannot predict or force. This is one of the most exciting aspects of good architecture and design. Good architecture progresses with the times and encourages us to adopt healthier and more efficient. For instance, without clever new design innovations, one could be stuck with the same huts and clay houses that we lived in centuries ago!

Basic Skills for Good Architecture

Good architecture is acquired through a well thought out action plan, which usually starts from schools of architecture with an adoption of an integrated architectural design and theory course work approach. Having known Architecture as a broad subject that spans the creative and technical, it requires someone to use both sides of his/her brain, and within the studies, different modules are propounded which require different skills. As a student trained to be a good architect in the society, acknowledging this fact will help him/her to be both effective and efficient.

In architecture, a mutually robust relationship exists between education and profession (Ghonim & Eweda, 2018). "Architects draw on a complex body of knowledge to solve problems, balancing risk, opportunity and interdependency. They connect multiple fields of knowledge and cross-disciplinary thinking. Their knowledge is deeper than that of generalists and broader than that of specialists, making them a natural fit to be the 'guardians of the built environment'. Within the academic world where specialism is the norm, the deep generalist nature of architects is beginning to be more appreciated". Architectural programs include a number of theoretical, practical, and studio courses, through which knowledge is transferred and skills developed. Ghonim and Eweda classified them into:

Competence- based courses, which categorizes program courses according to competencies acquired. This classification is based on the perspective of the International Union of Architects (UIA) that categorizes the capabilities of architects into knowledge, design, and skills (UIA, 2014). Figure 1 presents a graphical representation of this taxonomy.
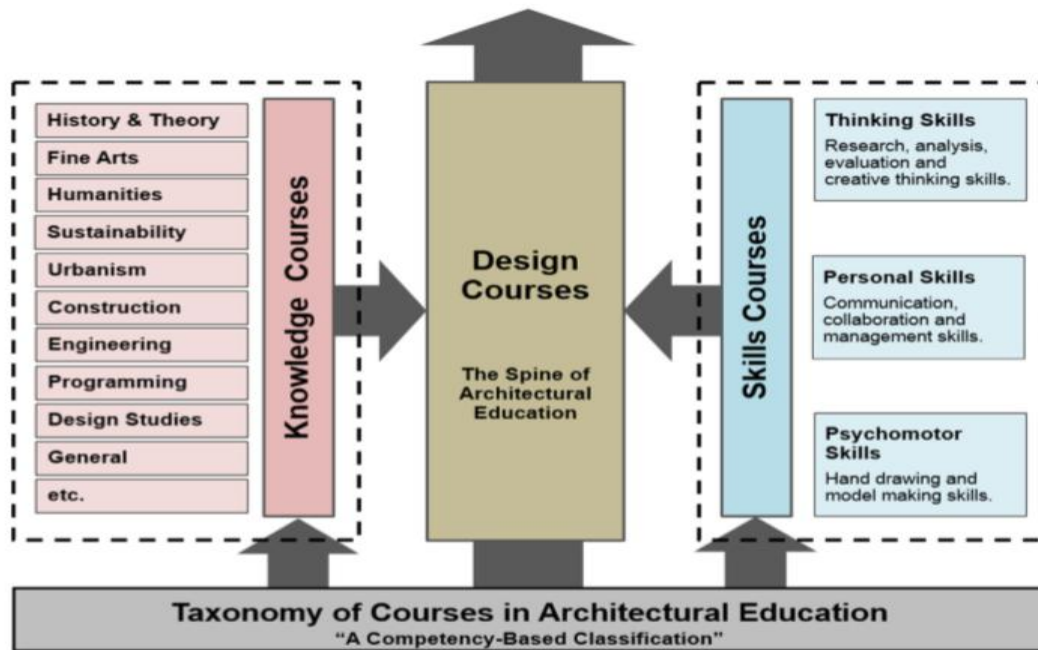
Figure 1: Taxonomy of courses in architectural education according to competencies acquired. **Source:** Ghonim & Eweda, (2018)

Knowledge courses are broadly responsible for familiarizing students with knowledge and increasing their awareness of a set of topics and issues related to architecture. Skill courses refer to supportive courses that develop the skills required to conduct architectural tasks in general and design tasks in particular, such as communicating ideas, working in collaboration, and utilizing manual, as well as digital drawings and models. Design courses represent the spine of architectural curricula where students carry out the design processes and apply the knowledge they have acquired and skills they have developed (Ghonim, 2017) The New Zealand Standard Classification of Education showed that courses can be subject-based classified (Education Counts, 2014). Accordingly, courses in architectural education include history, theory, humanities, environmental, engineering, and general courses.

Courses can also be classified according to their specialization in a range that starts from generalized courses, which teach general knowledge or skills, and extends to specialized courses, which teach advanced architectural topics. In addition, courses can be categorized based on their degree of being mandatory. Therefore, they are classified as compulsory or elective. Figure 2 shows the classification of courses in architectural education according to their specialization and level of mandatory.
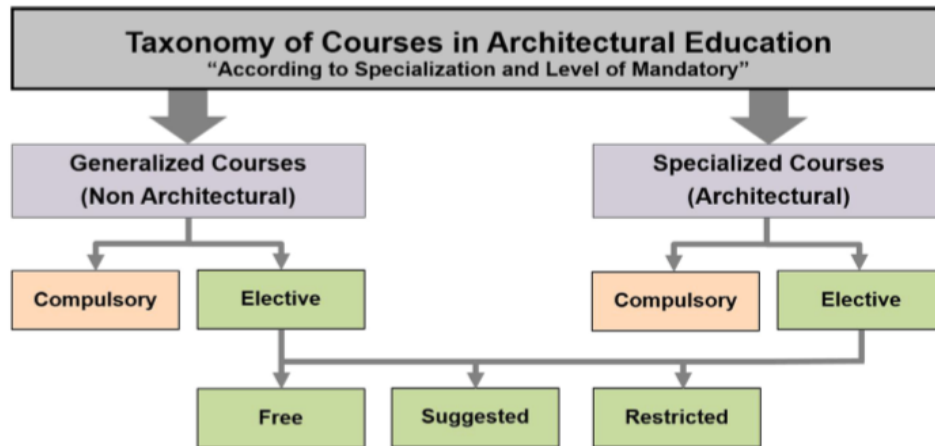
Figure 2: Taxonomy of architectural courses according to specialization and level of mandatory.
Source: Ghonim & Eweda, (2018)

Architecture is considered an interdisciplinary profession. Architects collaborate with engineers and specialists from other disciplines to design and complete their projects. They perform miscellaneous professional activities, such as designing, programming, researching, evaluating, supervising, presenting, and communicating ideas. Thus, architects are expected to possess a comprehensive set of professional competencies, and accordingly, architectural education is expected to provide and grow a wide range of knowledge, skills, and abilities to enable the graduates to achieve an appropriate competency level. Architectural education does not only acquaint students with knowledge and skills but also provides them with the ethics, principles, values, and norms needed to perform their role as architects who are aware of their social responsibilities.

Portico, (2016) further highlights courses studied in Architectural schools in different areas in other to develop the student's skills towards becoming architects who can produce good architecture. They are:

Architectural design

- Completing design projects, either on your own or in a group;
- working in a dedicated studio space;
- focusing on applying your skills to a project - a problem;
- learning and testing design methods;
- use analogue (hand) and digital drawing & modelling techniques;
- Honing skills of presentation and communication.

Construction

- Understanding materials & their properties;
- Learning about construction processes & methods,
- Understanding how to develop detailing;
- Learning principles of durability & weather-tightness and what affects these;
- Learning about finishes - how to achieve them and the pros/cons of different applications.

Theory

- understanding the thinking behind design;
- locating current practice against different theories;
- thinking about design as a form of research;
- developing a personal ethos and identifying aligned thinkers;
- Understanding the relationship between architecture and other practices.

Professional Practice

- studying different types of architecture practice;
- understanding the phases & stages of practice;
- considering the key elements of management;
- overview of the financial aspects of projects and architectural business;
- understanding the legal and ethical obligations of architects;
- Developing knowledge of construction contracts and how they are administered.

Architectural Communication

- sketching, drawing & modeling
- graphic design, layout & presentation;
- computer design methods;
- written communication;
- Oral communication & giving a presentation.

Structures

- Fundamentally, the study of structures is about how buildings stay up!
- knowing the structural components of buildings;
- understanding the forces on a building, and how we design to manage these
- structural calculations;
- understanding the structural capacity of different materials and construction methods;
- Understanding how structural thinking can enhance architectural design.

History

- understanding different styles, movements, and time frames;
- linking technological changes to changes in architectural design;
- thinking about how different cultures have historically responded to their cultural, geographical and climatic needs;
- How architecture is shaped by broader social, economic, and climatic change.

There are many overlaps between these areas, but this outline gives you a general idea.

Following this basic framework, the complexity will increase with each year level, as will the overlap. On graduation, one will be expected to be thinking about the history and theory behind a project, while designing it so that it is structurally sound, having an idea of how it will be constructed, and being able to communicate it in the best way possible.

There is also diversity between schools, with different universities choosing to privilege or excel in certain areas of study. Some universities are known for having a more technical

approach; others are more theoretical and conceptual, while others might have a focus on sustainability or computer-design processes.

A study of architectural education in University of Uyo, Nigeria, reveals the practice of pluralism and design philosophy. Their courses are classified in modules, specifically seven modules, namely:

     i.   Architectural Design
    ii.   Graphics and Communication Skills
   iii.   History and Theoretical Studies
   iv.   Building Systems Technology
    v.   Humanities and Social Issues
   vi.   Environmental Control System
  vii.   Physical Sciences and Information and Communication Technology

All of these modules combined with general and elective courses are expected to make up a good architecture graduates who will eventually become a good architect which invariably will produce a good architecture.

It can therefore be stated that for a good architecture to be produced the architects must possess the following skills:

1. **Design skills:** A good architect must possess adequate design skills. Possessing amazing design skills is a quality that you cannot do without in architecture. Architecture is all about creativity. It requires people to be extraordinarily creative and productive. Since modern architects are required to design state-of-the-art structures that will take the boundaries of aesthetics to a whole new level, it goes without saying that you will have to be both imaginative and creative. Architects must design, plan, and develop concepts to create construction plans and technical documents. These are based on client requirements and ideas.

2. **Research skills:** Architects must learn about the different building codes, safety regulations, construction innovations and city laws that affect their designs. Since these regulations are in constant evolution, they must stay up-to-date with new laws and requirements. Fresh architects need to develop a unique mix of qualities and skills.

3. **Communication skills:** It is important for architects to develop social skills and manners, since they are usually the first construction professional to work with a client. More importantly, architects work closely with clients during all project stages. Hence, architects must have excellent oral and written communication skills. Aside from basic knowledge, design skills, and being creative, communication is perhaps the most important quality in an architect. Architects are required to work with many people from different industries to make things happen. A building's construction is an incredibly complex process, and you'll be required to liaise with structural engineers, tradesmen, local government officials, contractors, surveyors, construction managers, and lawyers. Each of them has their own concerns and interests.

4. **Technology knowledge:** Architects must be trained in modeling software and techniques, such as BIM. This will help them remain competitive in the construction industry, which is becoming more technological.

The Impartation of Knowledge

The strategies of knowledge impartation to would be architect matters. Also, the media through which these precedents and theories are accessed throughout the process of learning becomes influential upon the possible outcomes. The medium itself and making use of information directly affect the end result and the student's learning experience. It is noteworthy that the major goal of schooling is to prepare students for flexible adaptation to new problems and settings. The ability of students to transfer provides an important index of learning that can help teachers evaluate and improve their instruction. The context in which one learns is also important for promoting transfer. Knowledge that is taught in only a single context is less likely to support flexible transfer than knowledge that is taught in multiple contexts. With multiple contexts, students are more likely to abstract the relevant features of concepts and develop a more flexible representation of knowledge. Teachers can help students change their original conceptions by helping students make their thinking visible so that misconceptions can be corrected and so that students can be encouraged to think beyond the specific problem or to think about variations on the problem.

Effective teaching supports positive transfer by actively identifying the relevant knowledge and strengths that students bring to a learning situation and building on them. Transfer from school to everyday environments is the ultimate purpose of school-based learning. An analysis of everyday environments provides opportunities to rethink school practices in order to bring them into alignment with the requirements of everyday environments. But it is important to avoid instruction that is overly dependent on context. Helping learners choose, adapt, and invent tools for solving problems is one way to facilitate transfer while also encouraging flexibility.

Finally, a metacognitive approach to teaching can increase transfer by helping students learn about themselves as learners in the context of acquiring content knowledge. One characteristic of experts is an ability to monitor and regulate their own understanding in ways that allows them to keep learning adaptive expertise: this is an important model for students to emulate (National Research Council, 2000).

Role of Knowledge in Good Architecture

An architect who really intends to meet the needs of his client must be knowledgeable and also needs to truly grasp information on related topical architectural issues. An architect should know that it is not enough to have an office at his/her disposal in order to meet the needs of the clients. Also, techniques for understanding client requirements that are socially oriented lead to the development of a collaborative environment. This allows the architect and the client to communicate as equals and decisions satisfy all parties (Coughlan and Macredie, 2002). Successful relationships between architects and their clients are commonly based on socially oriented models where knowledge can be more easily shared. The better level of communication seen in these situations, which means that understanding between stakeholders, is increased, and ambiguity decreases.

Walz et al. (1993) proposed that the following behaviors should be a component of any communication activity in architecture:

  i. **Knowledge acquisition:** A relationship must be established between the knowledge and experience of the architect and the client. The technical options available for facilitating communication and creating a common goal must also be established.

ii. **Knowledge negotiation:** Knowledge negotiation is also known as sharing. Iterative processes contain requirements that must be understood by stakeholders and negotiated. When these communication activities have been completed, they provide a framework for managing communication challenges. However, this framework must take into account the techniques used to facilitate communication.

The evolution of information to knowledge means that it was transmitted by a neutral media and passed to a human receiver (Moum, 2008).

Smulders et al., (2008) categorized knowledge as: explicit, implicit, or tacit (silent). Explicit knowledge can be easily expressed and transmitted. However, it is implicit and tacit knowledge that are of the most importance in the design process. In this regard, Smulders (2006) suggested that the implicit component of a mental model is where knowledge is located and that this knowledge can be made explicit. Challenges can arise when the participants in a conversation are not aware of what implicit knowledge they should divulge to the other party.

In terms of the building process, architects have a better understanding of architectural problems and can develop solutions based on their knowledge. A well-educated client will have more knowledge and will thus be able better to understand the conceptual solutions proposed by the architect and make valid suggestions. The important point here is that stakeholders must take the time to communicate their implicit knowledge in a factual and clear manner rather than leaving their knowledge locked in the perceptual domain (Smulders et al., 2008).

Conclusion

Knowledge is intellectual and creative capital. What ties these threads is knowledge, both designer's and community knowledge. Architect in the jungle of knowledge - selected items (own arrangement) from the architect's viewpoint (and his design office viewpoint). Knowledge can be formal (explicit knowledge) or hidden (tacit knowledge). Both of them are required in the making of a good Architecture. Formal knowledge is the one obtained, originating from standards, technical conditions of the design, and may even be obtained from technical specifications (Wojciech and Oleg, 2017). While hidden knowledge is individual creative ability, and is used in the design on a regular basis. The architect who is unable to use both kinds of knowledge loses - at least - their professional prestige. Nonetheless, knowledge management is also acquiring knowledge, education (of the architect and society), selection, storage. In the era of digitization, IT technologies acquire special significance. The scope and amount of knowledge expands in accordance with the requirements of development and human resources. Hence, the architect and his/her studio should be a learning organization.

A well thought action plan with respect to construction is based on the education gained by the architect who has been formally trained in the field of architecture. All need the skills, knowledge and experience of architects, from the strategic start to fine detail delivery and occupation, ensuring the performance promised in design is achieved and can be maintained once built. Therefore, without the architect's training, he/she will not be able to mentally and physical achieve this thinking and execution. Thus it can rightly be concluded that "a good architecture is the result of a well thought out action plan, executed with a matching knowledge and information-based skill to produce a structure".

Recommendations

1. Architect who really intends to meet the needs of his client should be knowledgeable and also needs to truly grasp information on related topical architectural issues.

2. It is advisable that architects should diligently draw the architectural plans in order to produce a good and acceptable structure that can stand the test of time.

3. It is pertinent that architects develop social skills and manners, since they are usually the first construction professional to work more closely with clientduring all project stages.

4. Architects should build structures that is resilient enough to wall crack, erosion as well as promoting ventilation in the premises.

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