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# Introduction

Design principles are vital to architectural education. A myriad of principles help designers to generate ideas, increase the design possibilities and make a more informed decision for the occupant or the client before the construction process begins. It could be argued that the design practice of architecture is not always underpinned by a veil of literature, but influenced by precedent, seminal buildings, and treatises of ancient history. Others would claim that designers cannot deny that there is a significant relationship between text and literature, impacting the outcome of the design and build process.

As we navigate towards the twenty-first century, a variety of new literature continues to synthesize with design text and provide a methodology that is not linear but dynamic, experimental, and engaging. The realism of design should consider every aspect as fundamental and pragmatic for creativity to function and respond to architecture holistically. In architecture, the simple fact is every building from a tool shed to a bus stop to a skyscraper is capable of meaning something to someone. Works of architecture that we know as construction, also conveys several levels of meaning to designers.

The essence of this essay is to introduce and highlight the meaning of architecture to the design process. To achieve the understanding of simple and complex meaning in design, the essay will explore an array of elements that are deemed fundamental and definitive to architecture. The principles discussed aims to introduce entry level knowledge to experienced and non-experienced architects in the design industry. The essay is not intended to be an exhaustive lecture of ideas, but a series of general elements considered pivotal for inquiry and dialogue. Each chapter hopes to bring depth and interest that is limitless to the design process.

# Elements

*An Analysis* is an investigative process with which an architect establishes a realm of expectations, assumptions, conditions, and subsequently making design decisions. It is believed, to some extent, that in architectural design, originality does not lie in the discovery of something new but in the appropriation of something that already exists. The initiation is the convergence of two circumstances. One being the givens of a project, which includes the functions it needs to fulfill, material requirements, and location. The other is how the architect interprets these givens. Critical to the analysis process is an awareness of what has come before, to inspire solutions to problem solving fundamentals.

*The Concept* initiates the design process, like a journey rooted in simple to complex abstractions, supplying the designer with tools to develop a proposition and bring it to fruition. A concept may differ from an idea in that it is obligated to lead to a unique design, for instance, the use of light wells to bring additional light into a building is an idea, while the architectural concept would be the use of light wells to provide tubular mechanical and structural support for the building. In architecture, the first concept is usually in the form of a sketch or drawing, providing visual language embedded with conceptual notions and baseline measurements.

*Representation* in architecture uses expression and visual examination to reveal the relationship of surfaces and volumes in space. The plan, section, elevation, axonometric, perspective, animation, and hybrid drawings represent a collection of geometric principles and expressions to examine multiple surfaces, typologies, and the movement between them (Simitch & Warke, 2014).

# Givens

*The Program* begins with expectations and measurements, often in consultation with an architect or specialist. The data collected contributes to the functional, relational, and dimensional aspects of the program. The most fundamental of these imperatives in the program would be the occupation of the human body within the building, taking into account their height, grasp, eye level, sitting position, and movement through space. The architect must also ensure that space fulfills the functionality of design, and the proximity of zones makes agronomical sense. The program is ultimately tailored towards the client; hence an empathetic approach should be effectively considered.

*The Context* gives meaning to architecture, responding to the natural and urban environment. The material context establishes the relationship of typology, for instance a house might be built to a particular species of wood or from rock at a nearby quarry. Within the context lies an aspect of scale and perception, directly impacting the site or location. Building in the middle of the city affects the scale of the neighborhood and the distant views that will be perceived from the building.

*The Environment* frames the relationship in design, engaging a balance between enhancement and exploitation. The architect must evaluate the environment in which the building will interact with and its impact from temperature, solar exposure, precipitation, seasonal change, and wind. The awareness that this brings have an influence on the choice of materials and their subsequent properties against extreme weather conditions. A buildings orientation could take full advantage of the weather, allowing thermal heating, cross ventilation, and daylighting. It is important to note that architecture is dynamic by responding to the continuously changing environment (Bratton, 2008) (DesignBuildingsUK, 2021).

# Physical Substances

*Mass* does not necessarily suggest scale and size buta distinct presence of volumetric density. The pyramids of Egypt are masses that display a volume of stacked blocks of stone, making it impenetrable to protect the inner cores of sanctums for their buried pharaohs. Mass gives a sense of solid form, a sort of exaggerated repetition of stones, bricks, or logs. The heaviness of material is associated with its perpetual weight. However, mass can be articulated to appear weightless when cantilevered or designed as a monolithic beam placed on two supported columns.

*Structure* is considered the main aspect of construction that supports the transferring of loads into the ground and countering gravity. In the production of architectural space, columns, beams, walls, slabs, and their combinations are the basic elements of a structural system. Centuries ago, the exterior forms and interior spaces of ancient and prehistoric architecture were a direct embodiment of their structure. Over time, technology has underpinned capabilities and efficiencies to design structures according to the strength of the material and reveal a cultural and creative context within it.

*The Surface* of a building is literally its clothing, acting as a primary contact with the exterior. The most communicative feature of a structure’s design is its vertical surfaces. From the portals of gothic cathedrals with ornate decoration to the industrial skyscraper embellished in a curtain glass façade, the surfaces of these buildings introduce a civic mask to the public, engaging the function and form of architecture. The effect of daylight and darkness, as well as colors, lend a sense of relative depth, information, texture, or camouflage to evoke an interface between inside and outside. The main role of the exterior surfaces, such as the roofs, walls, and foundation, is to protect the occupants, the interior, and the structure, simultaneously offering insight into the characteristics of the building.

*Materials* selected by an architect have a significant effect on the form and function of a building. The properties and its interaction with the physical context of the building informs the constructive processes of fabrication, transformation, apertures, and acoustics. A material is often identified by its sensorial characteristics, which also impact how a surface performs and how a space is perceived. These characteristics are opaque or transparent, thin or thick, dark or light, matte or reflective. A wall of glass may be utilized to provide a boundary between private and public, but it also creates a reflective hardness and crisp brittleness that suggest an atmospheric serenity (Azizi & Torabi, 2015) (Zilliacus, 2016).

# Ephemeral Substances

*Space* facilitates the stage for human experiences, activity, and the cadence of movement within. The manipulation of space is the principal defining element of architecture and makes it distinct from other arts, such as sculpture. Construction within a given space is also based on prior experiences, knowledge, and techniques of observing. A vital aspect in the formation of architectural space would be the concept of definition and depth. An effective method to understanding these aspects is through the use of rhythmic organization of spaces that include patterns in a floor, beams on a ceiling, or wainscoting a wall. Architects such as Le Corbusier frequently utilized a long dimension method to emphasize depth. Linear perspective is another method of architectural design that promotes the understanding of space and is represented today in many modern design renderings.

*Scale* is the ratio or measurement based on the relative size of architectural elements with each other and the surrounding. The proportions of a chair, the profile of a handrail, and the height of a stair raiser, are all scaled to interact with the dimensions of the human body. The scale of a building is determined by the scale of the context in which it is located, the scale of the operation it serves, and by the scale from which it is experienced. For instance, a building in the city exists at the scale of a city where it interacts with urbanism, it exists at the scale of the street as it interacts with buildings, and it exists at the scale of the human body which interacts with the space physically. Scale is relative as it is a myriad of contexts from which buildings are experienced that inform the variety of scales.

*Light* has the capacity to transform a space as it moves through it, expanding and contracting along its path, as well as altering the appearance of material textures. Light not only reveals and exaggerates textures through the exposure of light but can also amplify the presence of a material even with a shadow cast upon it. Architects believe that built forms are a result of the sculpting of light, and that it is light that constructs the space of architecture. A spatial sequence is a method of using light to intentionally choreograph the relationship between a light source and a surface onto which it falls. Entire buildings can dramatically illuminate a space for spiritual effect, and nowhere is it more evident than the Pantheon in Rome, sculpting light through the oculus as the sun moves across the sky, building an instrument that produces a measure of time passing by. (JefferyJordanArchitect, 2021) (Kothari, 2022).

# Conceptual Devices

*Dialogue* is the capacity for architecture to live beyond its boundaries, giving new perceptions and an enduring artistic value. Such works establish an open-ended dialogue with the architectural world. Monuments are structures that adopt a monological tone of dialogue, often evoking a subject of commemoration and an autobiographical statement. Other buildings such as factories, silos, and water towers operate and communicate monologically as a utilitarian structure. The enrichment of a design by framing, isolating, or highlighting, elaborates on the meaning of an existing building.

*Transformation* occurs on a multiple scale in architecture, being dynamic in nature. Concrete, glass, wood, and steel are predominant materials that experience transformation. Transformations can be implied, literal, or both. Buildings undergo a programmatic transformation for a specific purpose, transforming the perception of the architectural context. For example, the ground floor of the HSBC building in Hong Kong operates as an institution for banks and offices during working hours of the week, yet on weekends it is transformed into a marketplace (Mori, 2015).

# Organizational Devices

*Infrastructure* is a structured approach for supporting and facilitating an organization into innovation. The most basic and grand structure built were the Roman aqueducts to facilitate the transportation of water to its citizens, providing a necessity and architecturally an armature to the context within which they serve. Infrastructure systems are also intermediary devices that provide circulation and establishes the scale and dimension of a structure. The transport department in Curutiba constructed a raised cylindrical steel and glass platform through which passengers can purchase and access the bus seamlessly. This infrastructure added efficiency to the public network system and shelter to its citizens.

*Fabrication* is the act of building through a series of steps. An important aspect of the design process is how a material, structure, or detail is made. Drawings may serve as an instruction manual for the construction method and mediate the process between the designer and the finished work, but the equipment and tools are essential to the assembling the materials and giving character to the finished work. Computer aided software has enabled complex forms to be constructed, bringing efficiency to computational design and the fabrication process (Cutieru, 2020).

# Conclusion

By addressing in breadth the fundamentals discussed in the essay, each aspect embarks on a theme, germinates an idea, or suggests further investigation into the dynamic design process of architecture. The first critical steps of analysis, concept, and representation in a design plan sets the tone for strategizing the project’s budget, schedule, and scope of work. The program, context, and environment initiate the building process with measurements to accommodate human occupation and give meaning and sense to the surrounding environment. This gives the architect an opportunity to design based on a physical context, infrastructure, or environment.

It is evident that when work is conceptually planned as a structure, the resulting mass transcends weightlessness. The distinct presence of a monolithic structure represents a spatial dialogue that can be reminiscent of the past, present, and future. Comprised of natural and artificial materials, structures can take many forms, given the advancement of technology, architects are pushing the boundaries of design while maintaining the mantra of form follows function. It is worth mentioning that selecting materials for the constructive process not only communicates their essential qualities but inform a deeper sense of the building and the unexpected expressions that arise after project completion.

The human experience in a living space is the distinguishing characteristic that is pivotal to the design process. Clearly, it is the presence of light falling on a surface and transforming a space during hours of daylight that gives the architect a basis to compose and choreograph a design plan. The footprint that buildings express in architecture imply that a statement, message, or purpose identifies the typology, school of thought, or degree of formality, such as hospitals, hotels, airports, etc. How these buildings are made, and their construction methodology are also an important aspect to consider in the design process. Additionally, the development of computer aided software has made the process more efficient and cost effective.

Design has adapted to socioeconomic, political, and environmental changes. The fundamental basics discussed conveys to the reader that classical and modern design is dynamic and responsive to changes with the architectural environment. One, if not all principles discussed in this essay, are applicable to the design process, and add value to the objectives of the design plan. As climate change continues to challenge the boundaries of architecture, a sustainable approach is a significant principle that is highly recommended to minimize the negative impact on the environment. Being pragmatic and holistic are underlying skills that one should incorporate when moving forward in the design industry.

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