Abstract

Research Question

Hidden spaces - beyond dimensions: A research on the correlation between the composition of “space”, sensation, and the “Power of Architecture”.

According to the Oxford Learner’s Dictionaries, the notion of “space” can be read in several ways, of what is the five general understandings of it would be: outside earth’s atmosphere, empty area, period, freedom, and lastly, where things exist/move. With the speed, amount of information, and technology we are currently facing in the 21st century., it is no surprise that the idea of “space” is often correlated with the “space race,” “space tech,” even in the realm of architecture[1]. Given its vast and generic nature, it is essential, especially for this architectural research paper, to make a clear position on “space” or, to be more specific, something “spatial.” Architecture is indeed something of “spatial,” introduced by E. Moursund that a form of “spatial expression” that develops opportunities for humans to navigate, measure, anticipate, project, and construct perceptions; dictated by what architectural practitioner so-called “the language of space,” which consisted numerous spatial manipulative method and tool that help to shape our physical environment (Kasparowitz, 2017). Some great examples of “method” could be Architectural theory, education, or personal experience; as vague as it seems in comparison to “tools,” it could be almost anything creative and inspiring (or the other way); “tool” is more of a tangible object in our daily life that prevents or encourages a type of human behaviour, and as simple as it seems, some of the notable examples would be your bathroom door, living room windows, or partition walls that separate different functions; to demonstrate our knowledge and skill in both the “method” and “tool,” we draw, and to realize. Therefore, we build. The charm, speed, and impact of our panoptical creations encourage our egotistical profession to think that “space” stops where the site boundary of the plot of land ends. Fortunately (also, unfortunately), the domain of “space” does not end here; it also exists in what our optic and haptic sensibility cannot perceive; it is something else and, indeed, something more.

A truly cross-dimensional [Physical] research that explores and recognizes “space” that exists in another realm outside architecture. This realm of “space” and “spatial” would be the starting point of this research, asking the generic yet essential question of how people perceive the notion of “space”? Meanwhile, with the ambitious attempt to answer it by investigating the elements that compose “space” and something “spatial.” Next, the topic of “sensation” would also be discussed as a reaction and first tier of consequences generated by the composition of “space.” The third chapter of this research is the “Power of Architecture”; it could be seen as an attempt to show the inevitable influential power of our physical space and environment while simultaneously demonstrating the limitation of its “space.” The departure point of this research could be seen as another attempt to seek a common understanding from the audience that to create what we so-called the ideal “space,” we must first understand, study, and consider “space” from other realms cause only then “space” can be as meaningful, as functional, and pragmatic like they are all first intended to be.

Keywords: spatial intelligence, space, composition, haptic, optic, sensation, architectural order, language, light, solid and void, color, experience, observation, perception, perceptionism, aesthetics, logic, dimensions, behavioral, movements, decision making, influences, influential power, intangible, tangible, manipulation, fabrication of space

[1] “Space Architecture,” coined by the Space Architect Organization, is the theory, design, building, and practice that explore human settlements and infrastructure in outer space.

The Architect, the conductor of defined space, composition, and experience. To be an architect means that you are odd to have the power to shape the form of our physical built environment. So, to master the craft of space manifestation and create a positive outcome, we as architectural practitioners **MUST** understand the manifestation of "space."

The realms of tangibility

Currently, numerous architectural theories concern the creation of our physical environment. Some tend to "stay on paper" and thrill in the academic realm[2] (figure. 01). At the same time, some are introduced and being realized by the newer generation of architects[3] (figure. 02). Yet, the fundamentals of spatial construction or the elements of space are rarely discussed and are often ignored by not only the majority of people but also different architectural/spatial practitioner. Consequentially, this results in the creation of failed public space and a system that generates adverse outcomes for our society (figure. 03).

As introduced in the beginning, space's domain goes beyond our 3-dimensional space. In science and mathematics, the definition of "dimensions" can be read several times depending on the situations being described or measured[4]. As for a physicist, "dimensions" mean an element's precise direction, coordinates, or position. In spatial terms, the word "dimensions" take a more geometrical definition and is often known as "3-Dimensional". It was first introduced in the book "The Elements" written by ancient Greek mathematician Euclid[5],where he developed the first logical system and mathematical proof of plane geometry and solid geometry in three dimensions. Thus, the theory of Euclid eventually became the foundation of our architectural system of 3-Dimensional space. This physical quantitative system measures our surrounding[6],and helps guide the construction of our physical world.

The realms of intangibility

In the book "Experiencing architecture," the Danish Architect Steen Eiler Rasmussen described "architecture" as a type of "art" that is impossible to explain its limits[7], and as for "art" it is by no means to well-defined, it must be "experienced"; claimed that it is something beyond plans, sections, and elevations. This cross-dimensional description of architecture, space, and art can also be seen in Hegel's perception of aesthetics, where he first stated his position that "art" is the sole representation of the ideal. From there, he generated a theoretical framework that attempted to describe "art" as an idealization system that can be classified depending on the object's dimensionality. Hence, for Hegel, "architecture" is placed at the first ranked (the first form) of "art" as unlike *Sculpture, Painting, Music, and Poetry*, **Architecture** tends to be represented in a vague and

[2] For example: Superstudio's notion of space should be created using human body and mind orientated approach; a reductive processes that minimise the interference of materials, and substances. As a result, a city without 3 Dimensional support, a homogeneous grid / supersurface.
[3] For example: Steven Holl's "Seven Principles for the interpretation of Urban and Rural Vernacular", suggesting that the creation of "space" is the resulted of different architectural elements, for example "Plan and Section", "Geometry", and "Proportion" etc.
[4] In string theory, there are specifically 10 dimensions.
[5] Also famously known as the "Father of geometry".
[6] Such as length, width, height, distance, area, volume, mass and time.
[7] Tangibly, and intangibly

indeterminate manner, which follows the order of laws, physics, and geometrical proportion; an "art form" that has the least abstraction amongst the rest, yet seeks validation from the audience, based on their satisfaction level in sensation, character, and spirit.

Thus, to seek validation from audience, the audience **MUST** first "experience" the "space[8]" using their sensory receptor (human body), depicting information that constructed perception of the defined surrounding, reaching knowledge that exists beyond our 3-dimensional space, to the realms of intangibility, imagination, and impression (figure. 04).

The human body, and "space"

In the work of Edmund Husserl and Maurice Merleau-Ponty, the two phenomenologists believed that the human body is in its manifestation of space. What they presented is the inevitable correlation between the human body (receptor) and the sequence that dictates the surrounding (transmitter), of which (the experience) and process of the audience when entering the space; all started when the human body perceives a specific spatial fabric. Furthermore, in the work of the two pragmatists, George Lakoff and Mark Johnson, the correlation between our built environment and the human body has also been recognized in their investigation[9], where the two pragmatists claimed that "built space" is a fundamental instrument for articulating people consciousness, understanding, and identity.

This awareness and knowledge of "space" and "surrounding" to the human body has long been employed in Native culture. In the work of Emile Durkheim, the French Sociologist analysis "built space" in a more instrumental manner. Thus, he depicted the importance of physical spaces to Aboriginal culture in Australia, and Native American culture, where they both demonstrated a close association of "physical space" to their social relations, consciousness, and cosmology, using the "environment" not only as a navigation system of the body, but also religious beliefs, and practices (figure. 05).

"…reaching knowledge that exists beyond our 3-deimnesional space, to the realms of intangibility, imagination, and impression…"

Sensing Architecture

The word "sense" In biology and medicine means the ability to convey specific types of external or internal information (stimuli) to the brain and perceive them. Five basic systems are responsible for collecting such information for our brain, generally known as the "sensory receptor." This process may involve the unique senses of hearing, sight, smell, taste, and touch, with the appropriate sensory receptors concentrated in the ear, eye, olfactory (smell) apparatus, taste buds, and skin.

In Irish Architect Robin Walker's writing "A sense of place," the notion of sensory in architecture has been delicately explained and categorized under the Architect's theoretical framework of "the characteristics of the environment." There are four tiers of perceiving the environment: *Practical, Theoretical, Sensual, and Spiritual.* While in the chapter "Sensual," the Architect

[8] Not limited to architecturally defined space.
[9] Built space, and its association to human body

In a paper[10] by Mark M. Smith, the American historian explained that sensory is an experience that originated from the past, a historical event that shows how they read and understand their worlds and asks why. Thus, the author further defined “sensory” or “to sense” as a technique used for the participants (sensory consumption) to investigate and understand their surrounding (sensory production), which can be easily uttered by the smallest factor that is impossible to anticipate. In short, something that can be easily manipulated through uttering the surrounding, whether it is the people, the color, the object, or the space.

Indeed, if the purpose of “sensory” is used subconsciously as a technique to read and investigate, this could result in Robin Walker’s notion of “Sensual,” where architecture embedded the meaning as a “space art” that evokes imagination. As a matter of fact, towards the end of the “Sensual,” the Irish Architect gave another insight into his perception of “sensory,” which can be seen as an interaction with the site, where it involves the behavior and imagination of the audience; an Anthropomorphic symbolism that provokes the curiosity of a person through stimulating the person’s sensory receptor, something of “conceptual,” and “movement” which has no physical impact but happens inside the mind of the participants - a “movement” beyond 3-Dimensional, a “movement” beyond our physical world.

The threshold of space beyond 3-Dimensional – The theory of “Sensorium”

Even though there is numerous scientific research that concerns the "sensory" of humans variously, whether it is looking into solely the visual system or auditory system, how our perception works as a matter of face do not work according to the generic classification of “senses” from the field of science.

In the article "Seeing is Perceiving," the two authors, Catherin Frieman and Mark Gillings, introduced the notion of "sensorium" when describing how human being consumes information in a particular order, which would be presented in the later paragraph. Thus, "Sensorium" is a psychological term[11] that suggests that "sensory environment" is a real character that includes not only sensation but also perception and the interaction of information received from our surroundings, which helps guide our body, and mind. As a result, changing the surroundings also means changing the "self."

Yet, Paul Duncum, a Professor Emeritus of Art Education, in his paper "An Eye Does Not Make an I," claimed that even though the scientific field has long defined the notion of "Sensorium" into three generic assumptions (Appendix. 01), they are deemed problematic for many including psychologist, philosophers, and architecture theorists, as the number of senses is considered uncertain, and perhaps infinite. Consequently, in the search for "sensorium," there has been very little standardized research to use when viewing "sensory" more holistically; instead, the majority of scholars, for example, Democritus's notion of "senses," has taken a more reductionist approach, whom he believed that of all senses, they all boiled down to the sense of "touch". As for Socrates, his view on "sensory" has given an exciting position on how we should define it in a more philosophical manner, quoted "there are others besides, a great number which has names, an infinite number which has not.".

[10] “Producing Sense, Consuming Sense, Making Sense: Perils and Prospects for Sensory History”

[11] A referral system that explains how the senses operate make up the total perceptual systems in relation to the participant environment.

As vague as it seems, there are indeed some philosophers who tried to put forward another approach when studying "Sensorium," where they used the basic scientific terms of traditional five senses as a foundation and gave it a hierarchical system, while the majority of them suggested that "vision system" should be ranked as the top tier amongst the five "receptors," followed by hearing, touch, taste, and smell, respectively. For example, in Serres's notion of senses, "sight" is seen as the most important, "hearing" comes as the secondary receptor, and the rest is viewed as a minority. For instance, in Plato's notion of "sensation," he claimed that even though "vision" has its limitation and distorting nature, it is indeed "the cause of the greatest benefit to us" when in comparison to other defined "senses." Thus, the act of acquiring knowledge and information often comes from sight; therefore, we are enlightened, seen, and known; this is because vision operates under a significant distance, qualitatively, like no other "sensory receptor"; so for that reasons, "sight" is considered the most valid and objective.

To sum up, there are currently two major approaches when tackling the theory of "sensorium" in various fields, including philosophy, psychology, and architecture. Firstly, there is the "reductionist" approach, where the notion of "senses" should be viewed from a first-person point of view, following the analysis of solely the person's perception and how he/she interacts with the information from his/her surrounding. Secondly, a more systematic approach has also been introduced. Different scholars suggested using the generic scientific term of the five senses to view "sensation" and give it a hierarchical order to analyze the person's experience and perception.

A parallelly reading in space, architecture, and “Sensorium.”

In the work of Peter Zumthor, the Swiss architect has put forward the definition of “sensory” and developed it further in its implication to “space” and architecture; Zumthor defined“space” = “experience,” so to measure (dimension) something of “spatial,” “emotions” would be the unit to do so, and the goal is to create “atmosphere”; stressing that architecture is not merely a visual journey, but a sequential experience embraced by the human body, through each understanding of perception, sensation, and movement; a totality of body experience that speaks the language of “sensorium,” as physical, sensory, and mental.

This “sensorium” of space has also been explained by Catherin Frieman and Mark Gillings, who, In their paper[12] introduced their notion of “sensory envelope,” a holistic approach of viewing sensory as an “envelope,” a bubble that contains sensory stimuli in our environment; which has to view the perceiver perception, experience, cultural identity, and imagination. In short, instead of focusing on how space is perceived, we should take one step backward in search of the mix of “sensorium” not separately but as a phenomenal event, an embodiment, and a sensory experience.

For example, the materiality of a wall can be read by the person in various ways, whether it is the smoothness, sound, temperature, color or smell, etc. it is a total experience that cannot be analyzed by viewing solely on one particular “sensory receptors”. Thus, to experience space means to read space phenomenologically, engaging the body, environmental stimuli, and culture to provide an emotional connection.

[12] “Seeing is perceiving”

The creation of “Sensorium” in architecture – Methodology

Here are some interesting view and frameworks created by Keunhye Lee from the department of Interior Architecture at Gachon University, which would need further investigation to understand the relevance of author’s methodology. Yet, it provides a potential guideline on “measuring” “sensory”.

Table 1.

Table 2.

Table 3.

Hidden spaces - beyond dimensions

From visual experience to spatial experience, then a sensory experience, and emotional experience.

This theory paper has discussed first how space is formulated under the realm of both intangibility and tangibility. And from there, the perception of space and its correlation with our body has been discussed to clarify the fundamental understating of the relationship between “space” and “body” using Edmund Husserl and Maurice Merleau-Ponty’s notion of sensory, where they suggested that the body itself is its own manifestation of space. The next short chapter, “sensing architecture,” can be seen as an attempt to explain some approaches to how the architectural community tackle senses in spatial design. Thus, followed by the chapter - The theory of “Sensorium,” the notion of “sensorium” has been introduced to argue that “senses” should not be viewed as separated elements but as a whole, where it has to do with people's perception, experience, cultural identity, and imagination.

“Our three-dimensional space, fortunately (also, unfortunately), the domain of “space” does not end here; it also exists in what our optic and haptic sensibility cannot perceive; it is something else and, indeed, something more….”

Because of this limitation on words and time, this topic of “sensory” has to be further investigated in the research phase to strengthen my graduation project on borders & territories 22/23, which of them include:

1. Spatial analysis of existing projects
2. The methodology used in architectural practice is to create “atmosphere,” “perception,” and “sensory.”
3. Further reading into two different directions; First, “sensory” as a technique of receiving information; Second, “sensory” as a phenomenon event of the human body.

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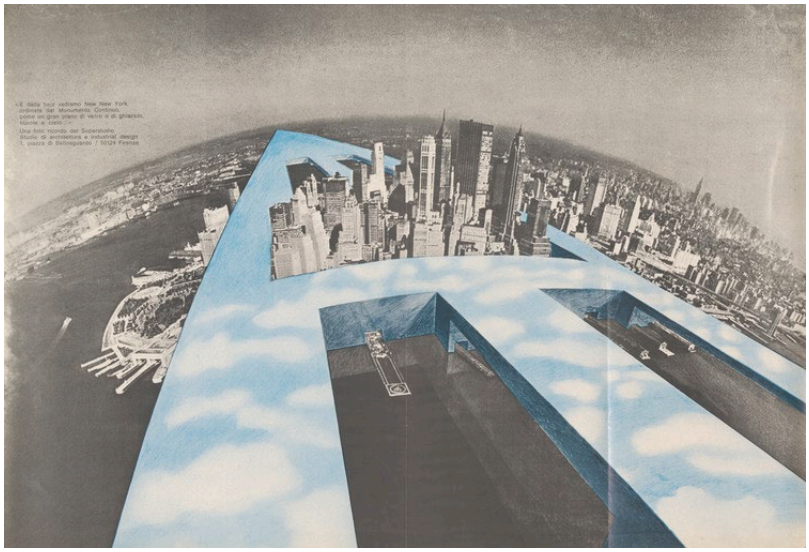

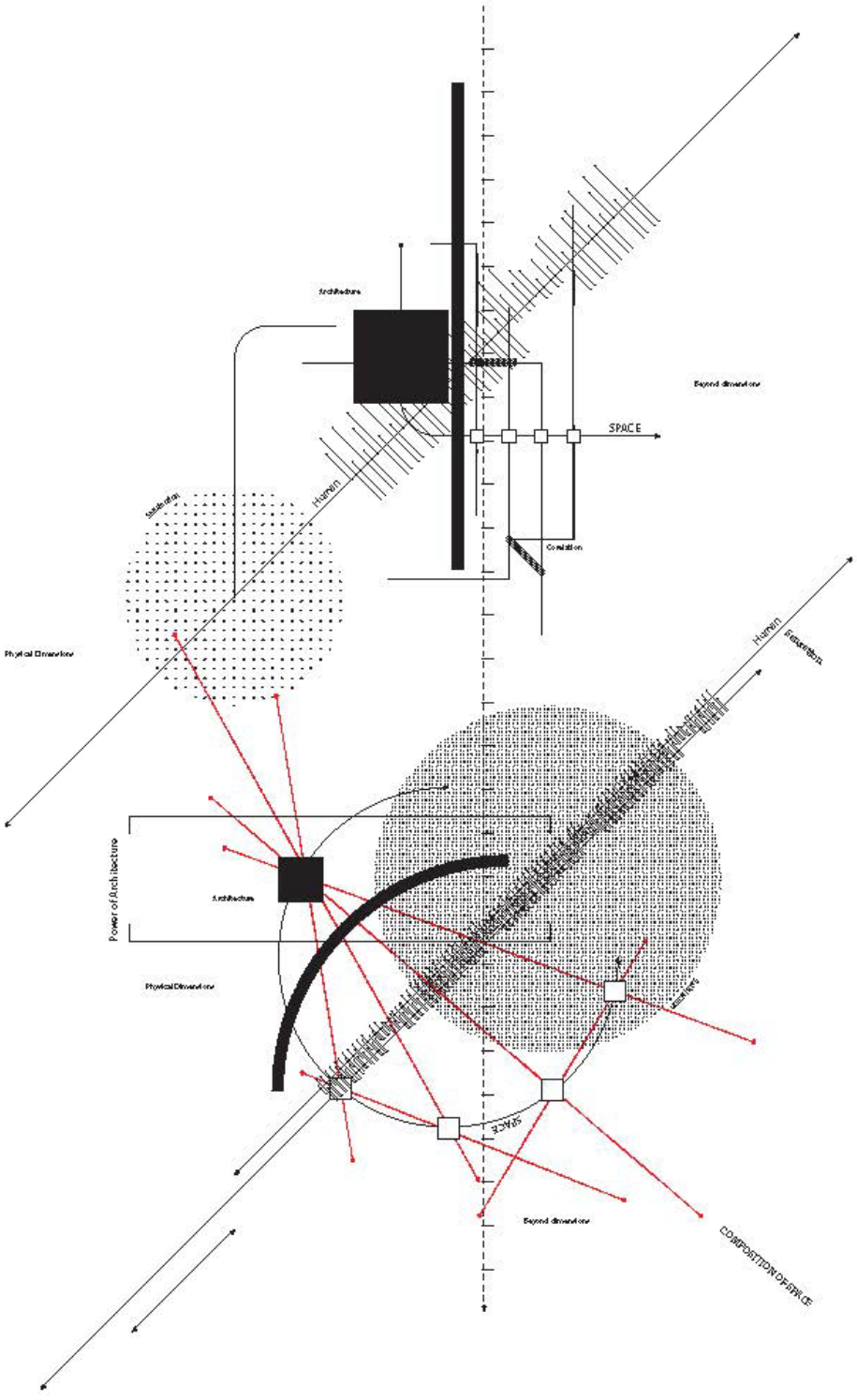
Architecture
Beyond dimension
SPACE
Human
Correlation
Physical Dimension
Human
Interaction
Power of Architecture
Architecture
Physical Dimension
SPACE
Beyond dimension
COMPOSITION OF SPACE

Appendix. 01

1. There are only 5 senses, and no more
2. There are hierarchically ordered in terms of their importance to knowledge
3. They operate separately from one another

Table 01.

Contents		
Environmental Stimuli	Morphological Factor (Form and pattern)	volume, scale, rhythm, order, proportion, contrast
	Sensual Factor (Material connection)	texture, light, shadow, color, temperature, sound, smell
	Influential Factor	cultural symbolism, local/social issue
Container	• Interior space is a container where various elements, such as the body, objects, and materials, are involved. • Interior space engages the body as a form to interact with. • Interior space can be transformed into a place through bodily experience.	

Table 02.

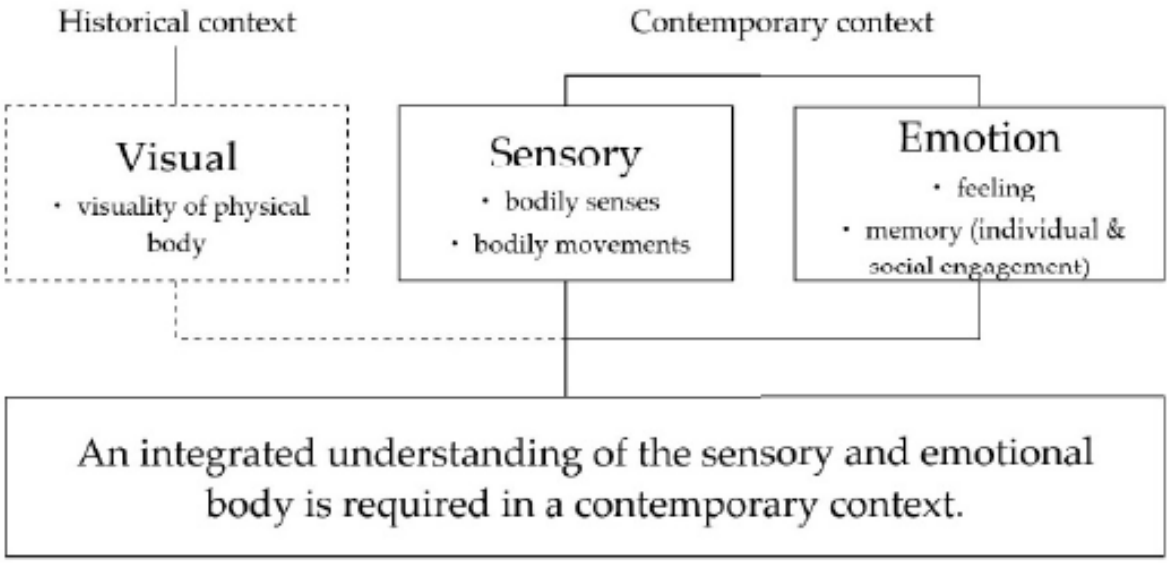

Table 03.

	Morphological Factor							Sensual Factor					Influential Factor		The Body	
	Volume	Scale	Rhythm	Order	Proportion	Contrast	Texture	Light	Shadow	Color	Temperature	Sound	Smell	Culture	Local	Senses	Movements
BKC	○	○				○	○	○	○		○	○	○		○	○	○
SP	○	○			○	○		○	○	○	○	○				○	○
SS			○	○	○				○				○	○		○	
PM	○	○	○	○	○		○							○		○	○