

Placemaking in Architecture through Modifying Elements

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Abstract

In the current context of architectural theories and literature pertaining to design and creation of places, there needs to be more inclusion of modifying elements and authoritative elements as influencers of placemaking in architecture that function as form or space determinants without ignoring the physical elements that comprise the form. Modifying elements are user - designer specific while authoritative elements are site - program specific. These elements are as fundamental as physical elements in the constitution of places. This research seeks to investigate and establish the impact of modifying elements on the form and space to achieve placemaking.

Following a comprehensive literature review on the different components of modifying elements, a questionnaire was administered to understand the impact of modifying elements. The results were analyzed and the impact of modifying elements on architecture was established as fundamental to the creation of places.

Keywords: Theory of Architecture, Modifying Elements, pedagogy, form, space.

Introduction

Architecture encompasses the environment around us – the built and the unbuilt – and is timeless. Pevsner (1963) famously distinguished between a building and architecture referring to a bicycle shed as a building and the Lincoln Cathedral as a piece of architecture. If we delve more into this difference, we arrive at the concept of spaces and places. Farrelly (2007) offers further insight into their difference through the following statement. “A space is physical... A place is somewhere that activities, events and occasions happen”. In its study as a discipline, there is a wide body of research that lays out the various principles, elements and theories of architecture that are an intricate matrix, reliant on each other. There are tangible / quantifiable and intangible / non-quantifiable concepts that comprise the fundamentals of architectural theory (Farrelly, 2007). If we understand elements to be ‘the simplest principles of a subject of study (rudiments)’ as defined by Merriam Webster dictionary (2023), architecture can be identified as a complex vessel comprised of interdependent elements, contributing to its value and perception. Unraveling the process of architectural design begins with the physical elements. They have been understood as points, lines, planes and volumes or mass. These elements are composed within a field at a macro or micro level through an array of spatial organizations using principles of architecture such as balance, proportion, hierarchy, etc. (Ching, 2015).

However, there are other layers of elements that to a large degree affect human experience, cognition and visual perception of the user experiencing a space that are superimposed to the existing content of the subject, while simultaneously exerting considerable influence on the creation of places or placemaking. One of the layers that exerts a considerable

impact on placemaking comprises of elements which may be referred to as ‘modifying elements’ (Unwin, 2014). According to Unwin (2014), “In their (additional factors) realization and our experience of them, the basic elements and the places they identify are modified: by light; colour; sound; temperature; air movement; smell (and possibly taste); the qualities and textures of materials used; use; scale; and the effects and experience of time... Though use of the basic elements may be the primary way a designing mind conceptually organizes spaces into places, modifying elements contribute a great deal to the experience of those places”. Hence, modifying elements modify or condition the design and construction of architecture, adding the component of human experience and preference to it.

The physical (basic) elements are rooted within the framework of relevant modifying and authoritative elements (Esther et al, 2021) to include factors such as cultural, anthropological and the metaphysical. In this purview, understanding of the physical elements while vastly important, is not all-encompassing. The study of authoritative elements – history, context and culture (Johnson, 2018) - and modifying elements is crucial in understanding the cause behind the difference in form and spatial arrangement in the case of Villa Rotunda from the Renaissance and Taj Mahal of the Mughals although both adhere to strict geometry within a framework of axial and symmetric composition. Considering these two examples, we can conclude that without a sound understanding of the latter elements, the employment of physical elements in isolation, regardless of their grandeur, would produce no more than soulless architecture irrelevant to its time and people. This can be conversely paraphrased to imply that placemaking is a prime requisite in an architectural endeavour. This is in concurrence with Rapoport (1969), who stated “Little attempt has been made to link forms to life patterns, beliefs and desires, although form is difficult to understand outside the context of its setting, culture and the way of life it shelters”. There are many theoretical discourses that propound the various factors, principles and elements that contribute to creating buildings in a manner that are complete in and of their own in a physical sense and yet fragmented in the aspect of placemaking. This research, while specifically focusing on modifying elements as bearing significance on the environments we inhabit, forms part of research that seeks to consolidate the various influencers of place creation assisting in the gain of a comprehensive understanding of architectural endeavours - in general to those presently pursuing it in practice / theory and in particular to students of architecture. Of the three elements discussed (physical, modifying and authoritative), the components of modifying elements, their impact on placemaking will be explored in the course of this paper through a questionnaire that validates the impact of modifying elements.

Modifying Elements in Architecture

Most architecture, if not all, can be believed to arise out of a requirement proposed by a client and terminates at a solution that integrates itself holistically with the user’s inhabitation and / or employment and / or experience of a space. Therefore, there exists distinctive a narrator(s), a cohesive narrative and a procedural sequence to the design, all serving to create places. The current scenario wherein the praxis of architectural profession produces architecture that is largely impersonal is severely criticized by Pallasmaa (2019) who says, “The inhumanity of contemporary architecture and cities can be understood as the consequence of the neglect of the body and the senses, and an imbalance in our sensory system”.

Modifying elements are key contributors that personalize the narrative for a user; and while enabling the choice of materiality, form and space make that choice out of the existing anthropological context and milieu. According to Unwin (2014), the modifying elements are light, colour, sound, temperature, air movement, smell, materials, use of the space / experience, and the effects and experience of time (narratives and memory). Amongst the listed elements, sound and smell have been consolidated as sensory elements. This is also in concurrence with Farrelley’s (2007) position that aspects of the senses are fundamental in one’s experience of architecture. Similarly temperature and air movement have been consolidated under the term ‘thermal comfort’ since conditions of these terms vary interchangeably between qualitative (such as descriptions of feeling hot, cold, stuffy) and quantitative (measurable by thermometer

and anemometer) spheres with the qualitative aspects being essentially phenomenological - in spirit with the essence of modifying elements. Following this line of observation, it may be argued that light, shade (absence of light) and colour are elements that possess primarily quantitative units of measurement similar to the other physical elements and have therefore been categorized as physical elements. However the appreciation for various conditions of light / shade and colour are largely cultural and such a socio-cultural perspective has been included in the study of modifying elements. For example, according to Tanizaki (2001), praise is heaped on an architecture and environment of shadows largely prevalent in erstwhile Japan while he speculates that the West is enamoured by the brilliance of lustre which pervades all aspects of the western culture, and they are thereby inclined to create and favor spaces that are well-lit.

Amos Rapoport (1969) employs the term ‘modifying factors’ to include aspects that condition the physicality architecture in his study of house forms. The term ‘factor’ is synonymous with ‘elements’ as defined in Merriam Webster dictionary (2023). His study elaborates on climatic variables in a qualitative sense (temperature, humidity, wind, rain, radiation and light), materials, construction and technology as modifying factors. Basing his study on vernacular settlements more than five decades ago, Rapoport opines that in most cases social and cultural forces are fundamental design drivers, while the rest of the factors play a secondary role. However with the advent of mass communication such as television, internet / computer / smartphone penetration, transport connectivity and rapid urbanization, a state of global uniformity in terms of lifestyle is emerging in a broad sense (Mackay-Lyons, 2014) and the distinction between the primary and secondary factors tends to be one of ambiguity. Consequentially, the need for an edifice for purposes of shelter and habitation has transformed into one that is primal as a social norm. Therefore the term ‘socio – cultural context’ finds itself situated within the larger confines of modifying elements that are holistically categorized to denote elements that condition / modify the experience and perception of a space, drawing on humanistic preferences and as a result, influence placemaking. Considering the effect of these aspects on ‘placing’ architectural form (Farrelly, 2007) and translating it to ‘mean’ something to the user (Unwin, 2014), these humanistic preferences have been coalesced to comprise the category ‘modifying elements’ (derived from theories proposed by Unwin, 2014, Farrelly, 2007, and Rapoport, 1969) in the following chart (Fig.1).

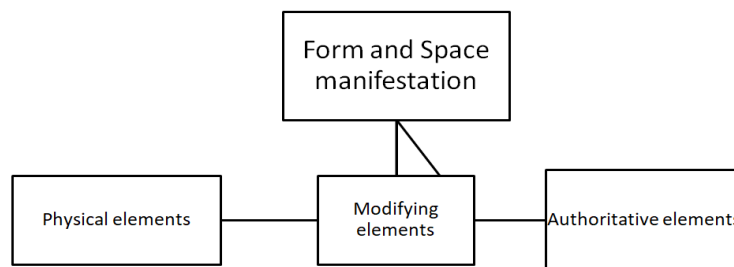


Fig. 1: Fundamental Elements That Cause Form and Space Manifestation in Architecture
Source: Author

Further, Fig. 1 illustrates the proposal of the author to systematically categorise the interdependent matrix of elements that cause form and space manifestation. The intensity of the relationship of each of the elements and their components on placemaking in architecture is illustrated in Figure 1 and they possess the scope for exploration and further research in themselves. However this research is limited to establishing the hypothesis that the individual components of modifying elements bear heavily on the manner of a user experiencing a space and afterward incorporating these elements into a design exercise that allows students use these elements as a frame of reference and layer them over the physical elements (as taught in classrooms) to personalise their design concepts and achieve unique narratives and spaces that they are able to resonate with on an intimate level – observing the essence of placemaking.

Socio-cultural context

The Social / Cultural section was framed to assess the social background of the respondents. It was aimed to bring out the personal worldview of the respondent. ‘Students (of architecture) have to work consciously with their personal biographical experiences of architecture’ (Zumthor, 2017). Zumthor states that understanding architecture is drawn from experiences of one’s context and is therefore unique for everyone. Home was taken as the basic unit of study for the research as it the most direct expression of a society’s views and way of life (Rapoport, 1969). Research supports the fact that societies continuously evolve and bring with them lifestyle changes. However, in practice, within city and town confines, a certain ‘status-quo’ is maintained by building regulators / planners that prescribe quantitative regulations that ignore the evolving user requirements (Lau et al, 2006). While this observation is true in a broader sense, regarding the mass housing developments elaborated in the paper by Lau (2006), it is also specifically and intimately applicable to individual residential units as postulated by Reza Askarizad (2019). Askarizad uses depth map software to analyse the relationship between the built form of residences and socio-cultural aspects of the Iranian culture using the Space Syntax method. The Space Syntax theory was originally developed by Hillier and Hanson (1984) which discusses spatial configurations across various building typologies and human interactions with these buildings and currently uses tools and software to develop and analyse patterns of human occupation and behaviour. This technique of spatial analysis was employed in the design of the master plan for Trafalgar Square and parliament Square in England in 1996. The analytical diagrams of the project are illustrated in Figure 2. Foster (1999) who was involved in its design observes that the symbiosis between analytical findings in conjunction with personal public input demonstrated the creativity of Space Syntax model. In its essence, Space Syntax theory expresses theoretical understanding of socio-cultural meanings with respect to spaces. This type of research is critical in shaping environments since the analysis of such exercises can inform quantitative research that constitutes the ‘humanistic component’, in the same way that empirical research generally supports concepts of energy, cost, lighting, etc. (Pellin Dursun, 2007).

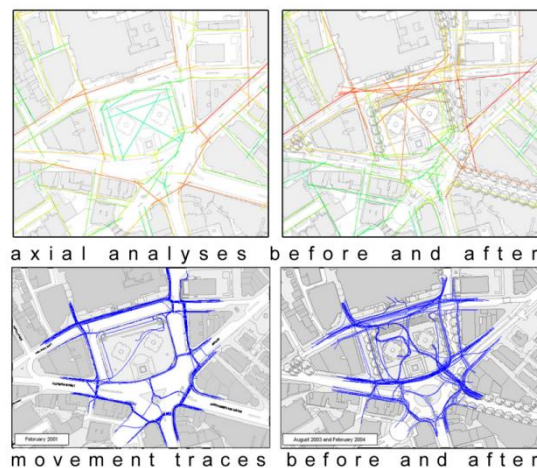


Fig. 2: Spatial analysis for Trafalgar square
Source: Dursun

Thermal Comfort

Amos Rapoport (1969) acknowledges that climate is a modifying aspect with respect to form generation and lists the following variables as components of climatic influence – temperature, humidity, wind, rain (and ventilation), radiation and light. Rapoport carries out an extensive study across various geographies to analyse and understand architectural responses to these variables manifested through vernacular shelters. The following diagrams in Figure 3, illustrate spatial planning measures that combat critical / uncomfortable / harsh attributes in hot

arid climates and cold climates respectively (Rapoport, 1969). It can be observed from the sketches right from siting the house to careful design of its envelope and finishes, comprehensive aspects of the environment are considered to facilitate passive climate control within dwellings. The employment of such passive climate control measures are more pronounced in the developing nations as compared to the developed nations due to minimal and judicious reliance on expensive mechanical climate control / modification systems.

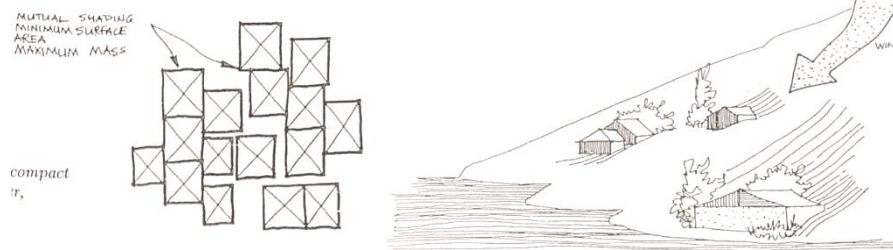



Fig. 3: Form and space planning for hot and cold climates
Source: Rapoport, 1969

In this light, thermal comfort can be understood as the ambient climatic conditions which are particularly preferred by an individual. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) defines thermal comfort to be ‘the condition of mind that expresses satisfaction with the thermal environment and is assessed by subjective evaluation’ (Auliciems and Szokolay, 2007). This satisfaction, although seemingly psychological has significant physiological bearing on the use of a space or engagement in a task (Health and Safety Executive, UK), and HSE recommends a checklist to assess thermal comfort conditions at workplaces as illustrated in Figure 4. One of the examples discussed as a potential hazard at workplaces is the improper wearing of safety and protective equipments due to hot / humid environments. Likewise, the concept of sick buildings occur due to suboptimal conditions in ventilation, temperature and lighting (NHS, UK) and this in turn can cause varying degrees of detrimental effects on the skin, respiratory and neurological symptoms of a person inhabiting the sick building resulting in the sick building syndrome. Hence Green Rating systems such as LEED- USA, BREEAM –UK, IGBC – India include thermal comfort as influential factor on the health and well being of users.


Health and Safety Executive

Thermal comfort checklist

This table will help you to carry out a basic thermal comfort risk assessment.

Factor	Description	Yes
Air temperature	Does the air feel warm or hot?	
	Does the temperature in the workplace fluctuate during a normal working day?	
	Does the temperature in the workplace change a lot during hot or cold seasonal variations?	
Radiant temperature	Is there a heat source in the environment?	
	Is there any equipment that produces steam?	
	Is the workplace affected by external weather conditions?	
Humidity	Are your employees wearing PPE that is vapour impermeable?	
	Do your employees complain that the air is too dry?	
	Do your employees complain that the air is humid?	
Air movement	Is cold or warm air blowing directly into the workspace?	
	Are employees complaining of draught?	
Metabolic rate	Is work rate moderate to intensive in warm or hot conditions?	
	Are employees sedentary in cool or cold environments?	
PPE	Is PPE being worn that protects against harmful toxins, chemicals, asbestos, flames, extreme heat, etc?	
	Can employees make individual alterations to their clothing in response to the thermal environment?	
	Is respiratory protection being worn?	
What your employees think	Do your employees think that there is a thermal comfort problem?	

Read the descriptions for each thermal comfort factor, and tick the appropriate box. If you tick two or more 'YES' boxes there may be a risk of thermal discomfort and you may need to carry out a more detailed risk assessment.

Fig. 4: Checklist to assess thermal comfort at workplace
Source: HSE, UK

Currently, PMV (Predicted Mean Vote) model of thermal control and PPD (Predicted Percentage of Dissatisfied) developed by P.O Fanger (1934-2006), discuss the sensation of thermal control on human beings. Hoof (2008) questions the thermal neutrality proposed by Fanger's (1967) model, debating the notion of absolute values of 'comfort' on sample populations and argues for a more varied definition of the term 'thermal comfort'. For example, preferred temperatures tended to vary by 1- 6 degrees Celsius across populations (based on geographical locations due to acclimatization) indicating that thermal comfort was subjective (Zheng et. al, 2021 and Auliciems and Szokolay, 2007). Nevertheless, Hoof (2008) concludes that the PMV model may be suitably adapted for differing categories of geographies and ethnicities to investigate preferred thermal conditions. While there are components of the environment that factor in the calculation, personal preferences / humanistic components also feature in the calculation as depicted in Figure 5 below. These criteria are important for spatial planners to bear in mind while designing spaces since thermal experiences are vitally engaged in the manner of perception of / interaction with an environment and therefore in the transformation of spaces to places.

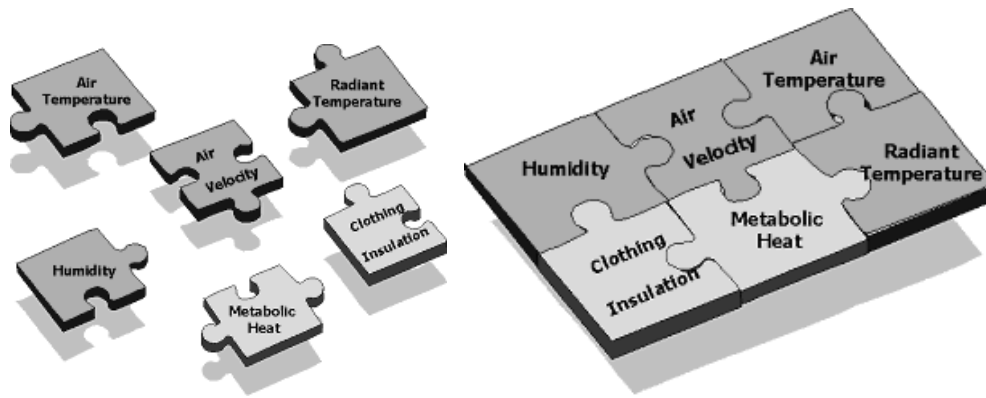


Fig. 5: Factors contributing to thermal comfort
Source: HSE, UK

Materials, Construction and Technology:

Lorraine Farrelly (2007) discusses construction as ‘the making of architecture – its physicality and materiality’. Material choices arise from many parameters that operate individually or in tandem with others (personal aesthetic and sensorial preferences, economy, function / technological innovations and culture). Rapoport (1969) opines that materials are the structural response to mechanical stresses such as gravity, wind, rain and snow. The technological developments of a society also bear significantly on the choice of materials as tools for manifestation of spaces and their relevance to it. For example as industrialisation, mass productions and the flexible use of reinforced concrete came into vogue in the early 20th century, Le Corbusier planned for ‘Maison Dom-ino’ in 1915 as a ‘machine for living in’ where the house could be mass produced and the internal walls could be moved around in a flexible manner. One look at the skyscrapers in downtown New York sheathed with steel and glass, helps one designate them as outcomes of the industrial era. On the other hand, Tadao Ando’s architecture stems from a preference of exposed concrete shuttered by timber to bequeath a spatial quality of stillness and neutrality on his architecture that finds itself aligned to the Japanese cultural aesthetic of tranquility, geometry, light and shadows.

Each material employs (sometimes unique) construction techniques that are most conducive for their use. This proclamation may be further expanded to accommodate the convenience of their availability especially in non-urban settlements. Such a dogma informed the work of famed architect Laurie Baker in India, wherein he traded a life of possible luxury in England to design and build homes for the poor and outcast in India – starting out with a colony of lepers who had been shunned by their communities - that consisted of locally available materials, inventing techniques that reduced the quantity of materials, thereby lowering their cost. He is acclaimed in India for experimenting with brick and mud construction, translating his professional knowledge of architecture into service for the needy through low cost construction, most often than not, collecting no fee from his ‘clients’. Figure 6 represents the quality of his architecture which is earthy (acquired from the site or its immediate environment), raw and unpretentious as manifested through materials – thereby sincerely addressing the need for shelter and rooting it literally to context. Atul Deulgaonkar (2014), upon analysis of Baker’s famous vernacular and economical architecture, commended Baker’s architecture as appropriating the essence of Mahatma Gandhi’s adage, ‘... the ideal house in the ideal village will be built using material that is found within a five-mile radius of the house.’



Fig. 6: Typical example of Laurie Baker's architecture – Centre for development studies, India
(Source: Deccan Herald)

Another manner in which materials can inform design humanistically is discussed by Zumthor (2010) where material applications influence tactile and sensory experiences, contributing to the (often subconscious) assessment and attachment of a place. Materials also have the capacity to convey symbolism (Mishra and Das, 2014) such as the effect obtained by light filtering through stained glass paintings in a church, bequeathing an air of divine serenity and mystery to the sacred spaces contained within. Thus it can be concluded that while materials reflect the socio-cultural, economic and technological innovations specific to the brief and the context in which they are situated, they also contribute to the perception and cognition of a space by a user (Soliman, 2013), personalizing the experience within the space and consequently elevating it to a place. The study illustrated in this paper seeks to understand the importance of perception of a building with regard to its choice of materiality by comparing two shopping malls in Chennai which primarily function in a similar manner and even have a similar layout, yet differ vastly in the amount of shoppers they receive.

Time

The passage of time creates occasions and memories that are constructed and / or confined within the designed environment in a positive or negative manner and the capacity to create and recreate them rests within the confines of architectural design. As much as architecture operates to create conducive environments for memory, it is also often tasked with responding to the history and memory of environments appropriately (Farrelly, 2007). Farrelly discusses the idea of architecture as arenas for events to unfold and memories to form, sometimes in tandem with the existing fabric that encompasses it. She states that it is necessary to possess a holistic understanding of possible events that are likely to occur and that those that have already occurred to transform spaces to places. In this light, Farrelly illustrates the restoration of Castelvechhio (1954 -1967) by Carlo Scarpa that blends the historicity of the site with modern architectural and sculptural design, thereby linking memory with an event at hand as illustrated in Fig. 7.



Fig. 7: The restoration of Castelvecchio (1954 -1967) by Carlo Scarpa with a sculpture garden and modernist interiors. (Source : Internet)

Unwin (2014) discusses how sequencing spaces in architecture helps one to appreciate a space as they experience it through different frames at different points in time. Sequencing spaces also facilitates the gentle unfolding of architecture for a user – creating narratives, memories and places. Zumthor (2017) also opines that it is possible for a space to assume different meanings in our memory across time. He further states that memories are vital for him to draw inspiration from as they allow him to revisit aspects of elements that he found agreeable or disagreeable in environments he had previously experienced. Poortman (2014) presents a detailed explanation regarding the impact of memory on the works of architecture and craftsmanship by Aldo Rossi, Rem Koolhaas and Richard Sennet, arguing that positive memories revive and reinforce our likes that are manifested through our design decisions while negative memories help us critique spaces and enable us to create spaces that avoid disagreeable aspects of an environment. The significance of memory on architecture assumes a primary role especially in works of memory – museums and memorials. This ideology is investigated by Bonder (2018) who states that memory and history are inter-related and the obligation to honour memory as a key marker in works of architecture is one of ethics. This study of the impact of memory on spaces highlights the necessity of attributing the element of memory associations as an enabler of placemaking. A simple question was included in the survey to understand the likelihood of inhabitation of spaces that held positive and negative memory associations with the respondent.

Sensory Association

‘To experience architecture in a concrete way means to touch see, hear and smell it’ Zumthor (2017). Such sensorial experiences are internalized to shape preferences that integrate into our inherent being and aid us in categorizing spaces as desirable / beautiful or otherwise. This can be gathered through Sennet’s (1994) observation “..sensory deprivation which seems to curse most modern buildings; the dullness, the monotony, and the tactile sterility which afflicts the urban environment”. Biologically speaking, we engage with our environment through our senses that transmit signals to our brain which in turn dictates our manner and scheme of response. In his book, ‘The eyes of the skin’, Pallasma (2019) argues that the sense of vision has been traditionally endued with isolated importance and plays a dominant role in our experience of life, because the fabric of the world around us has been designed to please the eye – that is to say, visual aesthetics dominate the concept of beauty. Often this leads to an imbalance in the treatment of the other senses, causing inhumanity in architecture (Pallasma, 2019). At the same time, this also causes us to process only fragments of our environment. For example, double glazing in buildings detaches the occupant from the sounds around them. This can be a positive or negative aspect of engagement depending on the context of the building’s situation. Tenzaki (2001) elaborates on the experience of using a Japanese toilet where the being focuses on the rain falling to the earth. ‘There one can listen with such a sense of intimacy

to the raindrops falling from the eaves and the trees, seeping into the earth as they wash over the base of a stone lantern and freshen the moss about the stepping stones'. Although the sense of hearing is primarily at task, the architecture of the toilet facilitates the connection between the interior and exterior, evoking of a rich dynamic mental imagery of the context, replete with textural conjectures. Our sensorial constructs of our environments determine the strength of our ties to spaces, promoting some to 'places' by mantling them with meaning and relevance. The sights, sounds and smells we experience, take root in our sub-conscious and contribute significantly to our memory (Zumthor, 2017). Within an environment, our sensorial inputs also directly affect our well-being and productivity (Clements-Croome, 2018). The former is qualitative, much like all the elements that modify architecture while the latter is quantitative and the two characteristics are dependent on each other with the relationship between the two straightforward in its essence. Spence (2020) critically reviews literature pertaining to architecture that could engage in the integration of all the senses and proves that lack of engagement and stimulation of the senses could result in medical conditions of the users. He concludes his study appealing to architects to prioritise experience over appearance and highlights the benefits of designing for a multisensory experience so it will "promote the development of buildings and urban spaces that do a better job of promoting our social, cognitive, and emotional well-being".



Fig. 8: Paley park, New York.
Source : Spence, 2019

Fig. 8 depicts Paley Park, New York which was designed specifically to drown out the negative noise produced through traffic by countering it with the sound of the waterfalls. Adding a green buffer through vegetation further seeks to cancel noise from the adjoining neighbourhood. In the survey undertaken, the questions pertain to the likelihood of engaging with spaces with positive and negative sensorial associations to understand the impact that external stimuli can have on our spatial experiences.

Research Method

A survey questionnaire was prepared to find out the importance of five of the modifying elements in rendering spaces personal to the respondent. This would help in consolidating these elements as significant contributors in the pursuit of placemaking during design generation. The survey was designed to analyze the spaces in and around built spaces in terms of the metaphysical and anthropological and record the perception of the respondents in various settings. The survey was conducted among seasoned architects, teachers of architecture, recent graduates from the undergraduate program in architecture and others from a non-architectural background in India. The respondents were aged between 17 years to 50 years, including both

genders. The survey was collected in Chennai, India. The number of responses recorded for the survey totaled 50.

The questionnaire consisted of five sections (corresponding to the modifying elements):

- Social / cultural context
- Thermal comfort
- Materials, construction and technology
- Memory Association
- Sensory Association

Findings and Discussion

Social / cultural elements

The Social / Cultural section was framed to assess the social background of the respondents. It was aimed to bring out the personal worldview of the respondent. Home was taken as the basic unit of study as it the most direct expression of a society's views and way of life (Rapoport, 1969). It is a study that is similar to the Space Syntax theory originally developed by Hillier and Hanson in 1984 which discusses spatial configurations across various building typologies and human interactions with these buildings and currently uses tools and software to develop and analyse patterns of human occupation and behaviour. This technique of spatial analysis was employed in the design of the master plan for Trafalgar Square and parliament Square in England in 1996. Foster who was involved in its design observes that the symbiosis between analytical findings in conjunction with personal public input demonstrated the creativity of Space Syntax model. In its essence, Space Syntax theory expresses theoretical understanding of socio-cultural meanings with respect to spaces. This type of research is critical since the analysis of such exercises can inform quantitative research that discusses the 'humanistic component', in the same way that empirical research supports concepts of energy, cost, lighting, etc. (Pellin Dursun, 2007). The author has undertaken a type of parallel research to assess how the concepts of living, dining, kitchen, bedroom, verandah / balcony and gate / entrance were used / perceived and experienced within their homes. The activities that occur in these spaces and the emotions they evoke were requested to be listed out. The results as depicted in the figures below, Fig. 9 (A - E), point out that the formal concepts of dining, working, relaxing and even sleeping have transformed to be more fluid in this day and age.

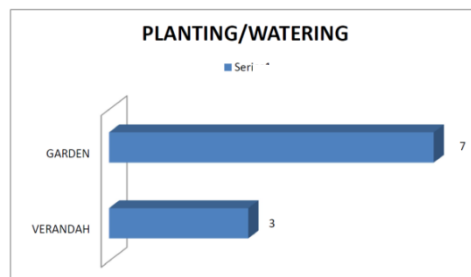


Fig. 9 – (A): Study of spatial configuration, activity and behaviour

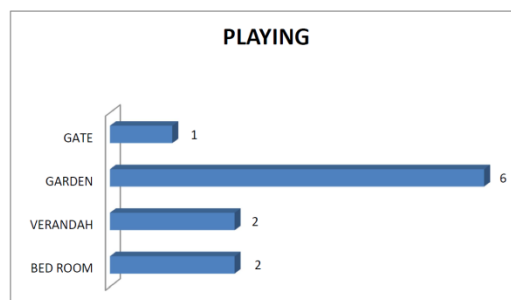


Fig. 9 – (B): Study of spatial configuration, activity and behaviour Occurrence

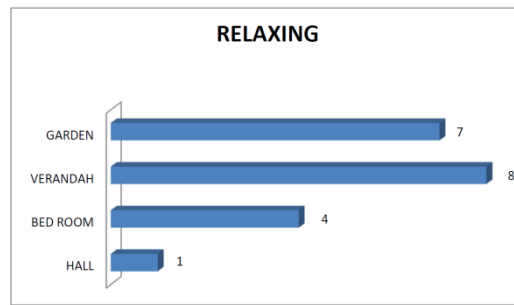


Fig. 9 – (C): Study of spatial configuration, activity and behaviour

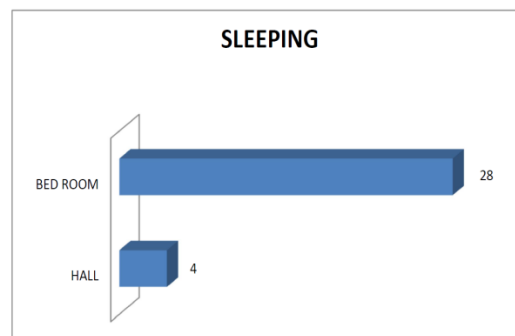


Fig. 9 – (D): Study of spatial configuration, activity and behaviour

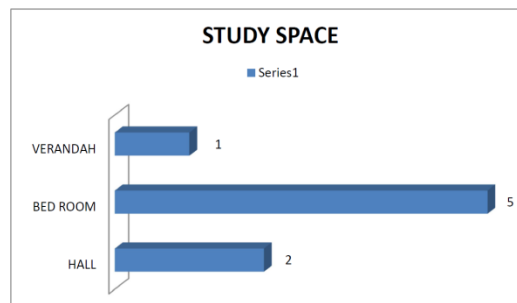


Fig. 9 – (E): Study of spatial configuration, activity and behaviour

Source: Author

The results derived and depicted pose a significant challenge to spatial planners. They challenge and question the formality of the typology of residences in urban India. This is a valuable insight that can be a terrific tool in the hands of the architect if applied. On the other hand, the absence of application of this knowledge would result in adaptation of spaces planned for different activity.

Thermal Comfort

The section under Thermal Comfort aims to assess the role of natural ventilation during the occupation of the residence. It seeks to establish whether the feeling of comfort would go as far as to determine the avoidance of places of discomfort. In Fig. 10, it is seen that 40% of the respondents were directly impacted in their use of a space by the humidity and dryness in the air, 47% were impacted sometimes and 13% claimed to be oblivious to humidity and dryness.

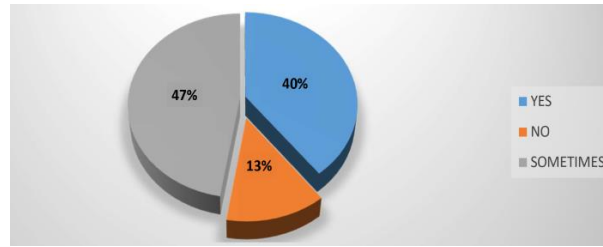


Fig. 10: Impact felt due to humidity / dryness
Source: Author

In Fig. 11, 63% of the respondents are seen to respond positively to the impact of shade, while 24% are impacted sometimes by shade while 13% of the respondents are not impacted by shade at all. Fig. 12 shows that 84% of the respondents felt the need for natural ventilation while 16% felt that ventilation was required at times. It is seen that none of the respondents felt it was unimportant in their use of a space.

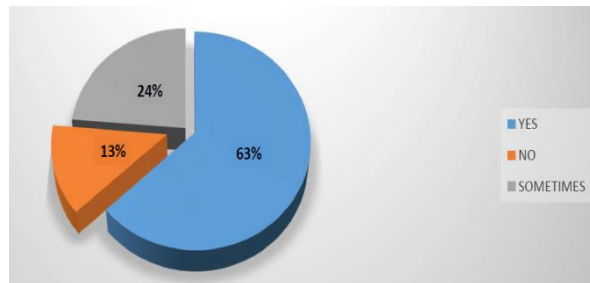


Fig. 11: Impact of Shade on the Respondents
Source: Author

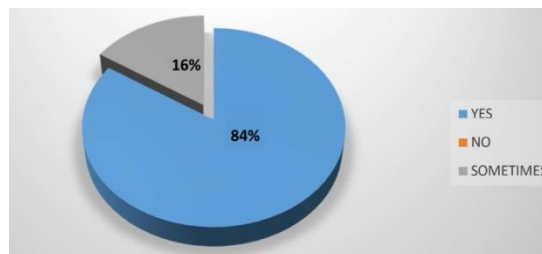


Fig. 12: Impact of ventilation on the Respondents
Source: Author

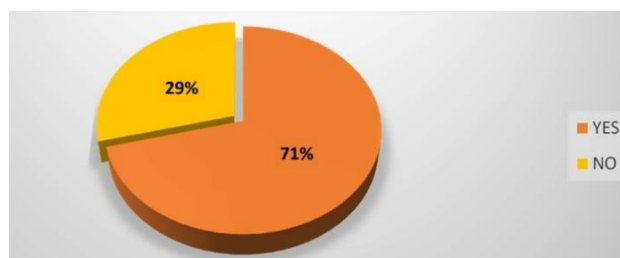


Fig. 13: Willingness to Completely Avoid Areas of Thermal Discomfort
Source: Author

Fig. 13 shows that 71% of the respondents were willing to completely avoid spaces which caused thermal discomfort. Overall, in the assessment of thermal comfort, it can be concluded that thermal comfort should be a prime influence on design of space and form, more so in the case of the warm, humid, tropical nature of Chennai city.

Materials

The respondents were asked to choose between two malls, namely, Phoenix Market City that opened in Chennai in 2013 and Spencer Plaza, a historic mall which has been one of the landmarks of Chennai since the early 1990's. The question was to assess the impact of association and use of buildings. The choice was based on which building they felt was a more positive shopping experience. Although both the malls are similar in terms of internal spatial layout and function, the high rating for Phoenix mall in Fig. 14, which is >7 in a scale of 10, makes it evident that the preference is largely due to the fact that it employs the a palette of the latest materials and presents a sophisticated and glamorous picture and therefore resonates more strongly from a cultural / social standpoint.

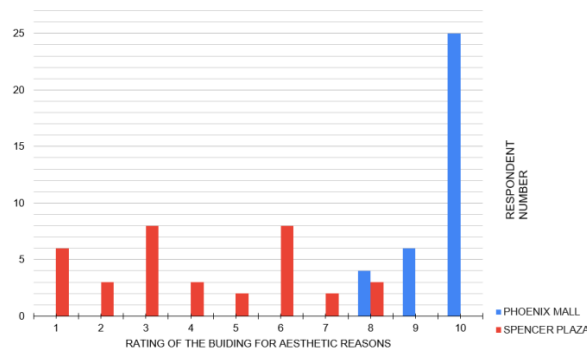


Fig. 14: Preference of Shopping Mall

Source: Author

Time

Spaces belong in the physical realm with geometric dimensions. If conducive to a cycle of events or even a particular event while hosting and creating memories, spaces become places. Placemaking is a crucial objective for those who aim to create spaces that have positive and / or lasting associations in memory. It is also a great tool for critical analysis of spaces that are vibrant and serves as a tool to analyze why spaces, even if well designed, fail to strike a chord with the users. "The concept of memory of a place is based on the premise that impressionable spaces are strongly remembered; they have significant characteristics, sounds, textures, events that make them memorable." (Farrelly, 2007). Under the section 'Time' of the survey, the respondents were first asked to recall two specific places of positive memory association and then asked if they would be willing to go back to the said places. The chart in Fig. 15 shows that the 92 % of the respondents were willing to go back, 5% were open to the idea while 3% were not interested in going back to a place of positive memory association.

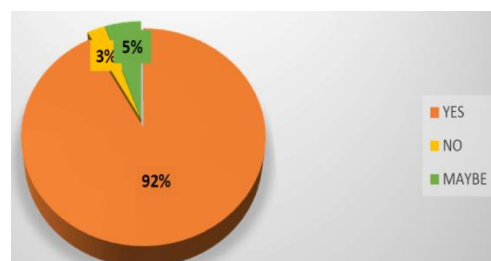


Fig. 15: Respondents on Whether They Would Go Back to a Place of Positive Memory Association

Source: Author

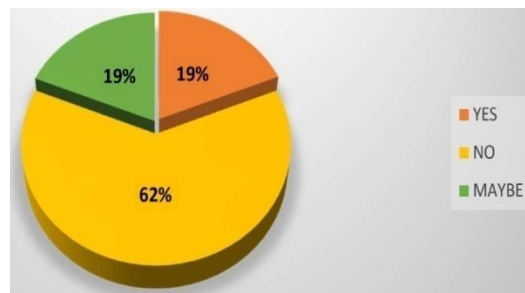
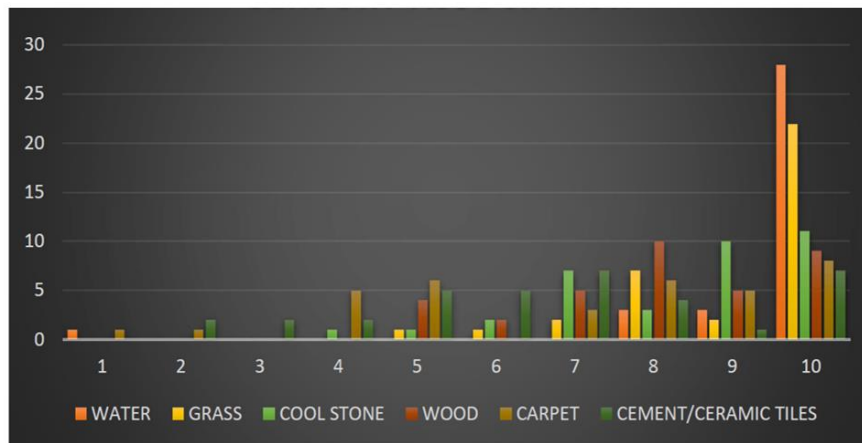


Fig. 16: Respondents on Whether They Would Go Back to a Place of Negative Memory Association
Source: Author

Next, they were asked to recall two places of negative memory association and then asked if they would be willing to go back to those places. 62% of the respondents were unwilling to go back, while 19% were willing to go back and 19% were open to the idea. Therefore 38% of the respondents did not seem to be hugely impacted by places of negative memory associations as illustrated in Fig. 16. We can effectively conclude that positive spaces create a strong tendency to return. For negative spaces on the other hand, while being prone to avoid them, a sizable minority of respondents are open to recreate new memories.

Sensory Associations

Sensory associations are the most metaphysical and intangible elements of the list since they are completely based on emotions. However, they still have a powerful influence in choice of preference of the manner in which an environment is perceived and experienced. Fig. 17 shows the rating of the following materials on a scale of 1-10 against the number of respondents. It can be seen that water tops the list in tactility being rated consistently high by a majority, followed by grass, cool stone and wood respectively. We can conclude that there is a definite inclination towards materials that are natural, especially ones that have a quality of texture to it.



Rating for the materials (Scale of 1-10)

Fig. 17: Preference of Material to Touch / Walk on / Have Any Kind of Physical Contact
Source: Author

Fig. 18 and Fig. 19 explain the response towards places associated with positive smell and negative smell. It is seen that the association with smell is very straightforward.

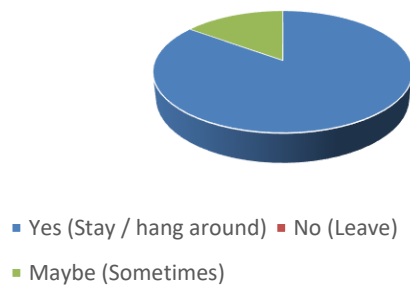


Fig. 18: Preference of Association with Positive Smell
Source: Author

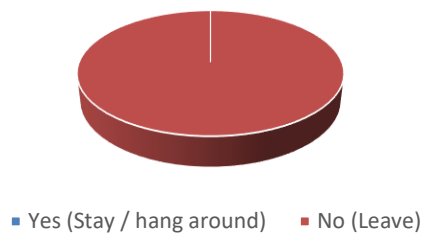


Fig. 19: Preference of Association with Negative Smell
Source: Author

While there is a definite preference for lingering or returning to places which have positive smells associated to them, in cases where it is not safe (the smell of petrol in petrol bunks), there is hesitation in willingness to return to the place. Smells such as those from food, rain on earth, temples and gardens were listed as positive. It has a direct correlation to a general feeling of well-being and relaxation. There is no inclination to leave such places as illustrated in Fig. 18. Tendency to avoid a place with a negative smell as much as possible is noted in Fig. 19. It might be important to note that negative smell is almost always tied to unhygienic spaces such as dump yards or decaying matter.

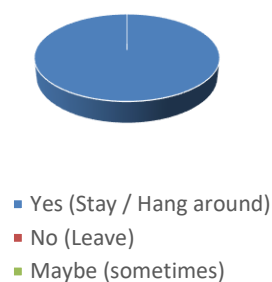


Fig. 20: Preference of Association with Positive Sound
Source: Author



Fig. 21: Preference of Association with Negative Sound
Source: Author

Similar responses were observed for positive and negative sounds. In Fig. 20, it can be noted that respondents tended to stay and visit more frequently the places which they associated with positive sounds such as waterfall, beach and sounds of birds in parks. Similar to places with negative smell, as illustrated in Fig. 21, the respondents wanted to have as little to do with negative sounds such as traffic and preferred to be absent in such places.

Conclusions

In the quest for placemaking, there is a need “for an overarching ethos that allows for non-formulaic context-responsive and adaptive approaches” Courage & McKeown (2018). The survey on modifying elements effectively establishes that it is as fundamental as the physical elements in ideating architecture. For example, under the socio-cultural study, it was seen that the concept of ‘rooms’ is fairly fluid with regard to activities that take place in them. Christopher Alexander (1979) notes that “On the geometric level, we see certain physical elements .. combined in an almost endless variety of combinations... If the elements are different every time that they occur, evidently then, it cannot be the elements themselves which are repeating in a building or town; these so-called elements cannot be the ultimate "atomic" constituents of space”. It becomes necessary then, to look at modifying elements in tandem to physical elements as form and space determinants in architectural theories so architecture can transcend the boundaries of the tangible dimension of space to the intangible timeless dimension of place.

References

- Alexander, C. (1979) *The Timeless Way of Building*, New York: Oxford University Press.
- Alwetaishi, M.S. (2016) “Impact of Building Function on Thermal Comfort: A Review Paper”, *American Journal of Engineering and Applied Sciences Literature Reviews*, Vol. 9.
- Auliciems, A. and Szokolay, S. (2007) “Thermal comfort”, *PLEA : Passive and Low Energy Architecture International* in association with Department of Architecture, The University of Queensland Brisbane.
- Bachman, L. and Bachman, C. (2009) “Designing student learning outcomes in undergraduate architecture education: Frameworks for assessment”, *Enquiry: A Journal for Architectural Research*, Vol.6 No.1.
- Bonder, J. (2018) “Ethics, Memory, Architecture (Memory-Works)”, *The Ethical Imperative*, 106th ACSA Annual Meeting Proceedings, 403 – 408.
- Ching, F.D.K. (2015) *Form, Space and Order*
- Clements-Croome, D. (2000) *Creating the productive workplace*, edited by Derek Clements-Croome, E & FN Spon: London.
- Courage C. and Mckeown A. Eds. (2019) “Creative Placemaking: Research, Theory and Practice”, *Routledge Studies in Human Geogeography*, New York: Routledge.
- Deulgaonkar, A. (2017) *Laurie Baker: Truth in Architecture*, Pune: Rich Print.
- Dursun, P. (2007) “Space Syntax In Architectural Design”, *Proceedings, 6th International Space Syntax Symposium*, İstanbul.

- Ellery, P.J., Ellery J. and Borkowsky, M. (2021) "Toward a Theoretical Understanding of Placemaking", *International Journal of Community Well Being*, Vol. 4.
- Esther, S. and Chander, S. (2021) "Role of Authoritative Elements in Design", in A. Chakrabarti, R. Poovaiah, P. Bokil, V. Kant, Ed.s., *Design for Tomorrow*, Vol. 2, (Series: Smart Innovation, Systems and Technologies, Vol. 222), Singapore: Springer Verlag.
- Farrelly, L. (2007) *Fundamentals of Architecture*, Switzerland: AVA Publishing SA.
- Havenith, G., Griggs, K., Qiu, Y., Dorman, L., Kulasekaran, V., Hodder, S. (2020) "Higher comfort temperature preferences for anthropometrically matched Chinese and Japanese versus white-western-middle-European individuals using a personal comfort / cooling system", *Building and Environment*, Vol.183.
- Hoof, J. (2008) "Forty years of Fanger's model of thermal comfort: comfort for all?", *Indoor Air* Vol.18.
- Johnson, P. A. (2018) *The Theory of Architecture*, New Delhi: Wiley India Pvt. Ltd.
- Lau, S. (2006) "Reconsidering Daylighting Design Parameters for Tall Buildings in a Densely Built City", *Architectural Science Review*, Vol. 49.
- Mackay-Lyons, B. (2015) *Local Architecture: Building Place, Craft and Community*, New York: Princeton Architectural Press.
- McDonald, J. K. and West, R. E. (2021) *Design for Learning: Principles, Processes, and Praxis*, EdTech Books.
- Partha, M. & Aseema, D. (2014) "Building Material: Significance and Impact on Architecture", *Time Space and People*, Vol.14.
- Pallasma, J. (2019) *The Eyes Of The Skin: Architecture and the Senses*, UK: John Wiley & Sons Ltd.
- Pevsner, N. (1963) *An Outline of European Architecture*, Harmondsworth: Penguin.
- Poortman, J. *Architecture By Memory - The Role Of Memory In Creating And Perceiving Architectural Experiences*.
https://www.academia.edu/6420254/Architecture_by_memory
- Rapoport, Amos (1969) *House Form and Culture*, New Jersey: Prentice Hall.
- Rasmussen, S. E. (1959) *Experiencing Architecture*, Massachusetts: The MIT Press.
- Ruskin, J. (2000) *The Seven Lamps of Architecture*, New York: Dover Publications Inc.
- Sennett, R. (1994) *Flesh and stone: The body and the city in western civilization*, New York: Norton.
- Soliman, O. (2013) "Perception Of Building Materials In Architecture", *Journal Of Engineering and Applied Science*, Vol. 60, Cairo University.
- Spence, C. (2020), "Senses of place: architectural design for the multisensory mind", *Cognitive Research*, Vol. 46.
- Simitch, A. and Warke, V. (2014) *The Language of Architecture*, Massachusetts: Rockport Publishers.
- Tanizaki, J. (2001) *In Praise of Shadows*, London: Vintage Books.
- Unwin, S. (2014) *Analysing Architecture*, Oxon: Routledge.
- Zumthor, P. (2017) *Thinking Architecture*, Switzerland: Birkhauser Verlag.
- Askarizad, R. (2019) "Influence of Socio-Cultural Factors on the Formation of Architectural Spaces (Case Study: Historical Residential Houses in Iran)", *Creative City Design*, Vol.1.
- Zheng, Z. & Zhang, Y. & Mao, Y. & Yang, Y. & Fu, C. & Fang, Z. (2021) "Analysis of SET* and PMV to evaluate thermal comfort in prefab construction site offices: Case study in South China", *Case Studies in Thermal Engineering*, Vol.26.
https://www.hse.gov.uk/temperature/index.htm?utm_source=hse.gov.uk&utm_medium=referral&utm_campaign=temperature-2022&utm_term=temperature&utm_content=home-page-popular
<https://www.merriam-webster.com/dictionary/element>