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PERPLEXING DISCOURSE OF INDONESIAN ARCHITECTURAL IDENTITY: AN UNDERSTANDING OF CONTEMPORARY NUSANTARAN ARCHITECTURE

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Abstract

The term 'Nusantara', which literary means 'the archipelago', has been revisited and adopted in a newly emerging terminology of 'Nusantaran architecture'. This new term is widely accepted among Indonesian architects and scholars as an alternative direction of Indonesian architectural identity and is currently employed by the Indonesian government as a centrepiece of the national tourism strategies. The notion is being challenged as it is considered as vouge and problematic in many fundamental aspects, and the necessity to use this term as the county's identity representation is also being questioned since it may fall short into superficiality and end into commodification. This paper scrutinizes the perplexity behind contemporary Nusantaran architecture as Indonesia's widely celebrated exclamation. Focusing on scholarly discussion, this paper aims to investigate both sides of supporting and opposing arguments, to get a more comprehensive understanding of the discourse Indonesian architectural identity.

Keywords: Nusantaran architecture, Indonesian architecture, architectural identity
Word Count: 8765

Introduction

The discussion of Indonesian contemporary architectural identity has emerged for one more time along with the Indonesian government's current national tourism agenda. Just like any other precedents in the history of Indonesian, architecture is once again employed as a tool to represent the regime's political choices, and this time, with the inclination towards traditionalism. Using a tagline of 'Nusantaran architecture' as a manifestation of what is deemed as the 'authentic' Indonesian architectural identity, the current massive propaganda has brought uproars in both professional and academic society in Indonesia. One main issue raised is that the terminology has an unsettling foundation in terms of definition and boundaries.

In this paper, I investigate the scholarly conception of what Nusantaran architecture is. The discussion is based on interviews I have done to ten Indonesian architecture scholars, who are professors and lecturers in four Indonesian architecture schools in four leading universities in Java, Indonesia. Analysing this dialectic opens up to a broader understanding of this discourse by comprising both supporting and opposing opinions. I open the discussion with a brief depiction of the contemporary architectural condition in Indonesia, including current national tourism agendas incorporating Nusantaran architecture as the main tagline of the strategies. I then explore the deeper conception of Nusantaran architecture, starting with discussing the term 'Nusantara' as the underlying idea on which the discussion of Nusantaran architecture is based. Lastly, I elaborate on the scholarly discussion of Nusantaran architecture before critically analyse how scholars position themselves in seeing this notion.

Nusantaran Architecture in Contemporary Indonesia

The discussion of Indonesian architectural identity is a severely complicated discourse for its connection with the much wider aspects of the context, including social, culture, history, economy, and also politics. The specific context of Indonesia, which consists of 13,487 islands and is a home for its 261.8 million people (in 2017) who possess more than 500 ethnic groups and 700 languages and dialects spoken (BPS, 2018, p. 85; Hargo, 2016; Hartawan, 2011, pp. 3-4), adds the intricacy when dealing with the issue of identity. The country's cultural diversity has been respected as a unique feature that can be a point of departure from which Indonesian architects delve the idea of translating the 'Indonesia-ness' into built form. Culture and tradition hence become an apparent option in

delineating the country's identity, and it is emphasised when Josef Prijotomo, an Indonesian influential architecture scholar, promoted the conception of Nusantaran architecture as an alternative direction in approaching Indonesian architectural identity.

In the recent development of Indonesia, there has been an urge among architects to refer back to local traditions in contextualizing architecture. It was popularised by Yori Antar, one of Indonesia's big-name architects, when in 2011 he initiated a movement to preserve the almost-extinct traditional architecture in Indonesia. He travelled to a very remote location of Wae Rebo in East Nusa Tenggara where he found Mbaru Niang, a group of traditional conical houses, with only four houses left standing after the other three had collapsed, and two of the remaining houses were in very bad condition. Yori Antar and his Rumah Asuh Foundation then gathered the funds and resources to help local people rebuild their custom houses (Figure 1). Antar also carried a mission to document the traditional construction methods from what was originally transferred through a spoken-language to become a universally accepted written-language. Upon completion, this preservation project was awarded The 2012 UNESCO Asia-Pacific Heritage Awards for Cultural Heritage Conservation (UNESCO, 2013) and appeared in The Aga-Khan Award Shortlists Cycle 2011-2013 for *"initiating and facilitating a community-led revival of traditional techniques enabling all the original houses to be rebuilt"* (AKDN, n.d.). Further, this preservation project not only brought back the Mbaru Niang houses from the threat of extinction but also successfully attracted more domestic and foreign tourists to come to Wae Rebo, that in 2016, the place had 100 times more visitors than before the preservation project (Ibo, 2016). After their success with Wae Rebo, Antar and the team have preserved many other traditional houses in different places in Indonesia (including Waetabula, Wainyapu, Ratenggaro, Komodo Island, Nias, Sintang, Suroba, and Sumba), and most of these projects, if not all, gave similar notable accomplishments in terms of becoming tourist destinations which then effected on the local economy revival. In the case of Sumba, after the preservation project, Antar initiated an exhibition called 'The Soul of Sumba' in September 2017 and successfully sold *tenun* (Sumba's traditional fabric) and locally made jewelleries for the total of 1.7 billion Rupiah (USD 125,000) in just three days of exhibition (Y. Antar 2017, pers. comm., 5 October). This attainment set an example of what culture preservation could bring to improve the economic aspect of the society, and for this achievement, Yori Antar was then crowned as The Warrior of Nusantaran Architecture *(Pendekar Arsitektur Nusantara)* (Martin, 2016).

Figure 1. Mbaru Niang houses in Wae Rebo (From: Untung Saroha Sihombing, 2015, reprinted with permission)

Antar's success story in injecting tourism to the previously unexplored places attracted the Indonesian government to adopt a similar approach for their tourism strategies. With the aim to double the number of foreign visitors to 20 million by 2019 as a target set by the President (Pratama, 2017), The Ministry of Tourism invited Antar together with the Indonesian Agency for Creative Economy (BEKRAF), Indonesian Institute of Architects (IAI) and PT Propan Raya as a private sector to help to pursue the goal. Focusing on developing 10 new tourism destinations as the 'New Bali', they set up series of design competitions inviting Indonesian architects to contribute in designing various functions (i.e. cultural housings, tourism villages, homestay units, restaurants, airports, and souvenir centre) while emphasizing the influence of local architecture. With the name of 'Nusantaran Architecture Design Competitions' *(Sayembara Desain Arsitektur Nusantara)* and offering prizes of 1 billion Rupiahs (around

USD 74,000) in total, the competition received an astounding enthusiasm from Indonesian architects, proven in hundreds of proposal submitted on each cycle. Even in its fourth cycle in 2016, there were 728 design proposals submitted to the competition and made the competition recorded in Indonesia World Records Museum *(Museum Rekor Indonesia–MURI)* as a design competition with most participants (Odin, 2016; Ramadhiani, 2016). From one side, this euphoria can be seen as a depiction of Indonesian people's eagerness to involve in delving their cultural identity and contributing to an effort to preserve it; but on the other side, one can also argue that the massive reaction was mostly triggered by the enormous prize offered and the enticing possible future projects.

Figure 2. The winning designs of Nusantaran Architecture Design Competitions 2016 for Homestay category (From: http://arsitekturnusantara.propanraya.com/pemenang/2016, accessed 26 June 2019)

In this tourism development scheme, it is agitating to see that the term Nusantaran architecture is merely used as a tourism branding that may easily fall into a gimmick. Nusantaran architecture is incorporated as the packaging of profit-oriented purposes, applied in a 'top-down' approach from the government to society. It is surprisingly contradictive to Antar's initial 'bottom-up' approach in many of his preservation projects. Moreover, the effort of preserving culture and tradition by proposing cultural tourism, to some extent, brings contra-productive results. Fatris MF (2016), an author and a journalist, expressed his concern that Antar's preservation project has left unprecedented changes to Wae Rebo's society. With the title of 'Wae Rebo's Threatened Originality' *(Orisinalitas Wae Rebo yang Terancam)*, Fatris opens his paragraph saying *"this sacred village is changing to be a recreational park and losing its magical touches"*. He narrates his experience visiting the village and describes many intriguing things he found during his visit: a uniform way of how local people greeted the tourists, as if they had been trained to standardize their hospitality; the requirement for tourists to do 'check-in' in the front office and pay some amount of money before entering the village; and how the elderly made their blessing using paper money to the tourists after they checked in, something that Fatris called 'pre-paid blessing'. The impact of tourism has also required the people of Wae Rebo to make some adjustments to their rituals. A ritual of Barong Wae, for instance, is a ritual of calling ancestors' spirits that was normally done in the evening, but after tourism entered the village, the ceremony has been altered to be done in the morning to adjust the need of the tourists. Local people are divided in terms of their respond towards these changes, they are either proud or anxious about it. Some were proud to have their village listed as an international tourism destination, but others concerned about too many alterations had been made to the rituals and traditions that made it lost its essence (Fatris, 2016). It is a depiction that any effort to intervene and create changes in society, even with an aim to preserve tradition back to its 'pristine' condition, will always bring further impacts, sometimes the unexpected one. It creates a chain of reactions that one small change can alter the bigger social, cultural, political and economic aspects of the society, and with all of the changes it creates, the claim of 'authenticity' promoted by this project is thus debatable.

Figure 3. The winning designs of Nusantaran Architecture Design Competitions 2017 for Restaurant category (From: https://www.facebook.com/Propan-Sayembara-Desain-Arsitektur-Nusantara-980060885356206/, accessed 26 June 2019)

Multiplying the 'Wae Rebo effect' in 10 tourism destinations in Indonesia, as what the government intends to do, is therefore quite concerning. Comprehensive studies are needed to see what has been happening in Wae Rebo before deciding to replicate the method to other areas in Indonesia. The fact that the winning designs of the Nusantaran Architecture Design Competition (Figure 2 and Figure 3) will be used as template designs for the local people's homestays and other tourism facilities in the area illustrates the government's perspective to see culture-making as a replicable process. They treat culture in a very pragmatic way, even similar to an industrial object, and oversimplify the interweaving tissues between architecture and socio-cultural facets of the place (Purwaningrum & Ardhyanto, 2018, p. 4). Moreover, it is alarming that the winning designs were created by architects and were selected by juries who happened to be outsiders to the local communities. The claim to represent an authentic local culture is thus problematic as the designs are solely the architects' design exercise. With no collaboration with the local people, the projects barely have a connection with the local culture aside from its visual resemblance. In this process, culture is stripped down to its formal shape and, therefore, the discussion of identity remains in the area of traditional form, ornament, decoration, or style (James-Chakraborty, 2014). This resonates with Kenneth Frampton's concern that appoints:

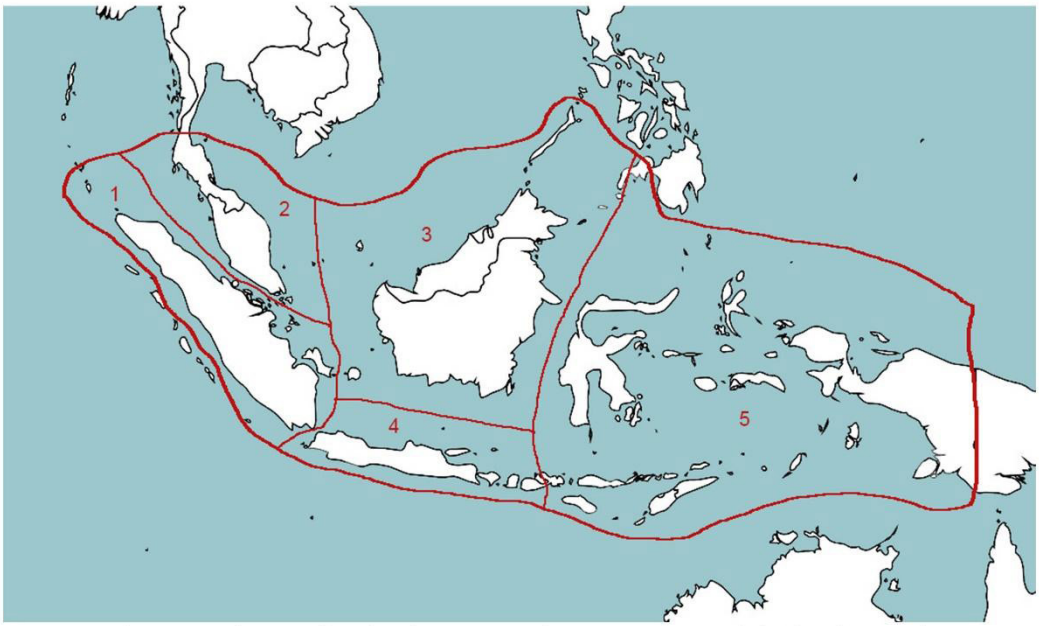
> *"…the rich seams of our cultural heritage will soon be exhausted, burnt out, particularly when a cannibalized lexicon of eclectic historical reference, freely mixed with modernist fragments and formalist banalities, serves as the superficial gilt with which to market architecture, to situate it finally as one more item within an endless field of free-floating commodities and image"* (Frampton, 1987, p. 377).

Despite the necessity for the country to develop its tourism programs, architecture and culture commodification through a tagline of 'Nusantaran architecture' needs to be challenged. The purpose was not only to get local people involved in the tourism activities so that they will get direct financial benefits from it but also to help people grow their self-pride that their culture is valuable and worth preserving. Yet the top-down method brings some disadvantages that might outweigh the positive impact, therefore this approach needs comprehensive reconsideration before actual application.

The Problematic History of Nusantara

In this part of the paper, I make a little step back from the discussion of contemporary Nusantaran architecture and shift my focus on the brief history of 'Nusantara' to give a broader depiction of the terminology. The term 'Nusantara' is a well-known and well-accepted notion among Indonesian people in a way that the definition has been taken for granted due to over-familiarity. The word Nusantara originally came from Kawi language and has a meaning of 'the whole archipelago' (*nusya* – means island, and *antara* – means in between) (Bakhtiar, Waani, & Rengkung, 2014, p. 37; Prijotomo, 2017, p. 59; Purwaningrum, 2017). This terminology carries the idea of the 'great and powerful' Indonesia, as it is associated with the Majapahit Kingdom which has always been considered as the golden period of Indonesia. Under the reign of King Hayam Wuruk, the Prime Minister named Gajah Mada envisioned to conquer the whole archipelago under the glory of Majapahit. He took an oath that was famously

called Palapa Oath *(Sumpah Palapa)* in 1336, saying that he would not taste any flavourings in food before he had succeeded to unify Nusantara ("Nusantara," n.d.; "Palapa Oath," n.d.). Based on the book of *Pararaton* and *Negarakertagama* as two main sources of the history of this kingdom, it is stated that Majapahit had successfully conquered not only the archipelago of Indonesia, but also the area of Malaysia, Singapore, Brunei, Philippine, Sulu Archipelago, southern Thailand, and East Timor (Arkandiptyo, 2016; "Majapahit," n.d.). Since then, the term Nusantara has always been referred to as the unity of the archipelago, although the meaning has been changing over time.



The Division of *Nagaras* (Kingdoms) in Nusantara during Majapahit Periods (13th-14th century) based on the book of *Nagarakertagama* (1365)

1. Nagara Melayu
2. Nagara Hujung Medini
3. Nagara Tanjungnegara
4. Nagara Jawa
5. Nagara Makassar

Figure 4. The area of Majapahit Kingdom (Redrawn from: Din, M. A. O., & Mohamad, M., 2016, p. 103)

In the more recent history, the idea to refer back to Nusantara was brought in the colonial time by Ki Hajar Dewantara, an Indonesian activist, writer, politician, and pioneer of Indonesian education, when he proposed the phrase to be the name of the country. He championed the term Nusantara as it did not contain any words that inherit foreign names, like India, Indies, or Insulinde (van der Kroef, 1951, p. 170). Although Indonesia was at the end chosen to be the name of the country mostly for its property to carry the spirit of nationalism, the popularity of Nusantara kept growing significantly, especially that it inspired people to unite under one nation and against Dutch colonialism. The term Nusantara was then highlighted by Mohammad Yamin, an Indonesian poet, politician, historian, and nationalist who later became the Minister of Education, when he wrote a book entitled Gajah Mada: The Hero of United Nusantara *(Gadjah Mada: Pahlawan Persatuan Nusantara)* (Jusuf, 2013; Nurdiarsih, 2016; Wood, 2011, pp. 36-37). Yamin's book marked the raise of contemporary Nusantara since the term was redefined as the area inside the national border of Indonesia. In this time, the term Nusantara was no longer seen as a trans-national terminology but rather used as an alias on Indonesia. Yamin's conception of Nusantara was then embedded in the national curricula to be taught at school, and it became the official definition that has been hitherto adopted by the government. The first two presidents of Indonesia, Soekarno and Soeharto consecutively, adopted this term as the core spirit of Indonesia, although they saw it in opposite perspectives: Soekarno saw it as an ideological and political instrument, whose diversity image was employed to unify the people; while Soeharto promoted it with his cultural bias with the purpose of eradicating people's political rights and eliminating threat of mass movements (Kusno, 2000, pp. 71-74; 2013, pp. 52-55).

It becomes a problem when Indonesian people are indoctrinated with the supreme idea of Nusantara and tend to idolize it in a way Joseph Campbell (2004) illustrates about hero: people praising their hero in a point of putting him or her as if *"he or she can do no wrong"* (G. Tjahjono 2017, pers. comm., 24 August). For decades, the history of Nusantara has been immensely glorified as people saw it with the eyes of worshippers, and this standpoint hindered them from questioning it further. In fact, recent studies reveal that referring to the triumphant story of Majapahit might be historically flawed, since some scholars believe that Majapahit's authority was not as vast as what it was claimed. C.C. Berg, a Dutch scholar, questions the validity of *Negarakertagama* book as the main source of information about Nusantara. He argues that the vast sovereignty of Majapahit is only a myth, a moral fable, an aspiration, a goal that was never achieved, or even better seen as a magical exercise to exaggerate the king's supremacy (Bosch, 1956, pp. 18-20; Sudrajat, 2008, pp. 41-42; Wood, 2011, p. 36). This terminology is also

considered as very subjective, since it carried a strong bias of the king's ambition (G. Tjahjono 2017, pers. comm., 24 August), especially that there is no concrete evidence to prove its glorious claim. With these disputes in mind, one can always question the legitimacy of putting Nusantara as the main reference in Indonesian contemporary architecture, since referring to a myth as a manifestation of the country's architectural identity is very much problematic. Furthermore, even if the history was true that Majapahit did conquer the whole archipelago including Indonesia, Malaysia, Philippine, and Thailand, then it made Majapahit a colonist (Putra, 2017; Rudiannoor, 2013). Thus craving contemporary identity from the era of the colonist is undesirable, remembering the fact that Indonesia itself had suffered under the Dutch's colonialization for more than 350 years.

Scholarly Discussion of Nusantaran Architecture

The rapid development of Nusantaran architecture in recent years has brought relentless debates among Indonesian scholars. The term 'Nusantaran architecture' was initiated in the 1980s by Josef Prijotomo, a professor in Institut Teknologi Surabaya (ITS) in East Java, when he offered a conception that could be an alternative direction in the search for Indonesian architectural identity. Prijotomo associates Nusantaran architecture with an era in the history of Indonesian that was before colonialism period, or before 1799, or in the other word it was the period of local kingdoms (J. Prijotomo 2017, pers. comm., 19 September). In explaining it further, Prijotomo mentions:

> *"Both terms 'Nusantara architecture' and 'traditional architecture' refer to the same object: the architectural characteristics of different ethnicities in Indonesia. The difference between these two terms refers to the two different ways of constructing knowledge for the same object. The knowledge of traditional architecture is built from the discipline of anthropology, whereas Nusantara architecture refers to a knowledge produced by the discipline of architecture"* (Prijotomo, 2017, p. 67).

From this statement, it is clear that Prijotomo associates the term Nusantaran architecture with traditional architecture, and his claim to see the term solely from the discipline of architecture means he aims to see it from a practical point of view. Therefore he comes with a list of characteristics that provides a tangible 'guideline' for architects to design Nusantaran architecture while arguing that architecture is a physical entity thus any representation should be physically visible on the appearance aside from its embedded values (J. Prijotomo 2017, pers. comm., 19 September). Prijotomo also sees Indonesian culture and tradition as the root of the country's identity for its capability to survive from generation to generation, something that van der Kroef mentioned as something that *"possesses a rich and varied cultural development, in which the basic ingredients of indigenous life remained unaltered despite the overwhelming pressure of successive waves of Hindu, Mohammedan, and Western civilization"* (van der Kroef, 1951, pp. 170-171). Moreover, Prijotomo makes an interesting claim that Indonesian traditional architecture is equal to Western classical architecture, and the only difference between the two is the way it was transferred: Indonesian traditional architecture was passed through spoken language, while Western classical architecture was transferred through written language (Kusno, 2000, p. 79; Prijotomo, 2008, pp. 1-3). He posits that both architectures possess distinctive characteristics that can be adapted to the present-day design, and for this, he asserts that the adaptation should be manifested in both tangible and intangible forms. He appoints an example that one cannot be assured of whether a building adopts the conception of Western classical architecture unless it shows any physical attributes that particularly speak classics, such as Doric or Ionic columns. By saying this, he validates the usage of traditional vocabularies in modern architecture in the form of decoration and ornament (Bakhtiar et al., 2014, p. 42), and this perspective distinguished him from the majority of the architects and scholars who commonly opposed a visual and physical representation in architecture.

This idea of Nusantaran architecture seems to be appealing for scholars in East Java, the place where the Majapahit Kingdom was once located. Scholars from Universitas Brawijaya (UB) in Malang, for instance, have very much welcomed the conception and have embedded it to the architecture school curricula, especially since one of its senior lecturer, the late Galih Widjil Pangarsa, had actively engaged to this discourse. According to Agung Murti Nugroho, who were the Head of Department when I conducted the interview, Nusantaran Architecture was chosen for its capacity to represent the country's identity as the terminology delineates the cultural space of the archipelago, compared to the term Indonesia that cannot escape from political discussion (A.M. Nugroho 2017, pers. comm., 6 September). This framing of Nusantaran architecture around the cultural aspect does generate a connection to traditional houses as a point of departure in architectural exercises. In this part, Antariksa, a professor in the same school, emphasizes that the aim of Nusantaran architecture is *"preserving the past while following the future development"* (Antariksa 2017, pers. comm., 8 September), thus more innovative design vocabularies are needed to bridge the traditional elements to the modern context, so that it would not be trapped in repetitive visual attributes. Yet, he admits that it is difficult to escape the Western influence since almost everything that encircles contemporary architecture, including the building materials and the construction methods, are originally developed in the West and carry Western values, measurements, and requirements. Therefore he suggests not to problematize any outcome of Nusantaran architecture design, as there is no single variable to assess it. Regardless of his subtle inclination to contrasting the East and the West, at least compared to Prijotomo's strong dichotomy of the two, Antariksa's assertion here portrays his looser standpoint in accepting any inevitable fusion between the two in the adaptation of Nusantaran architecture. This stance is quite similar to the perspective offered by Abraham Mohammad Ridjal, a lecturer from the same school. Aside from agreeing on the cultural focus of the term, Ridjal

emphasizes two distinguished attributes, which are 'empathy' and 'humanity' (A.M. Ridjal 2017, pers. comm., 7 September). By stating this, he tries to connect the terminology to social consideration and to keep it away for the trap of ocular-centrism. He highlights the importance of Nusantaran architecture to accommodate local people's characteristics and everyday living habits, regardless of any forms and shapes adopted in the design translation, and therefore the identity of the users becomes an important aspect to consider rather than exercising the formal resemblance. This argument is in contrast to Prijotomo's preference for translating Nusantaran architecture in both value and appearance. This dialectic portrays that the term Nusantaran architecture is understood quite differently among the supporters, and that the term has an unsettled definition which has been further problematized especially by the opposers of the term.

Outside East Java as the place where both the terms Nusantara and Nusantaran architecture were originated, Indonesian architecture scholars tend to be very critical towards the development of this discourse. Especially for Nusantaran architecture terminology, the vague definition is what is mainly questioned and becomes a point to problematize in many scholarly discussions. Yet interestingly, the supporters are unwilling to address this question and avoid to make further theoretical exploration of this problematic term, and instead, they prefer to jump to the discussion of a pragmatic and practical application of this term to the everyday architecture. This is evidence that the supporters of Nusantaran architecture have been unsuccessful to ground this acclaimed terminology to a more settle theoretical foundation. The definition tends to be discussed very loosely, even in some of the papers, one refers to the definition that was taught in the primary school (Bakhtiar et al., 2014, p. 43), and other uses the term interchangeably with other terminologies such as Indonesian archipelago, Southeast Asia, *Bumi Melayu* (Malayan world), *Bumi Pertiwi* (motherland of Indonesia), and Austronesia (Hidayatun & Wonoseputro, 2005, pp. 309-310). This is a sign that the definition of Nusantaran architecture has been taken for granted since the supporters rely on people's overfamiliarity with the term. The definition of Majapahit's Nusantara, Mohammad Yamin's Nusantara, and contemporary Nusantara have been mixed up altogether, while I argue that each of them, either the pre-colonial, the post-colonial, and the contemporary Nusantara, are actually three different entities; refer to different histories; were constructed for different purposes; and focus on different things. Therefore, it needs further clarification of which definition of 'Nusantara' that the term 'Nusantaran architecture' is based on, and it emphasises the needs for the supporters to add more specificity when discussing it. If it turns out that the term has nothing to do with the established pre-colonial or post-colonial Nusantara, thus exploring the theoretical definition is critical to firmly position this new term in the wider discussion of Indonesian architectural identity.

More question is proposed by Iwan Sudradjat, a professor in Institut Teknologi Bandung (ITB) in West Java. He critically challenged the conception of Nusantaran architecture and demanded further elaboration of whether this articulation is associated with geographic location, or range of culture, or series of history, or identity concept, or ideological belief. He also expressed his puzzlement of why the term Nusantara was chosen in the first place. He questions how the phrase of Nusantara, which came from the Hindu-Buddhist period long before Indonesia even existed in 1945, is now employed as a representation of Indonesia's contemporary identity (I. Sudradjat 2017, pers. comm., 29 September). This is an important question that problematizes the 'forced' connection between Nusantara and Indonesia, since the two are established in two different historical and temporal contexts, thus using one to represent the other is very much debatable. Between these two terms, Gunawan Tjahjono, a professor from Universitas Indonesia (UI) in Jakarta, suggests that regardless the hazy definitions of both terms, yet he argues that the term Indonesian architecture creates a deeper connection to the Indonesian people as a citizen since it provides a clearer historical and political background compared to the articulation of Nusantaran architecture. In representing Indonesia identity, Tjahjono prefers to seek for an idea that unites the archipelago and possesses deeper value to the society, rather than exercising on forms and ornaments for architecture. He appoints that there are many shared values that one can find in Indonesian society that can be the drive in making architecture, but no matter of what label or form employed, he emphasizes that any architecture should answer two main questions: 'for what' and 'for who' (G. Tjahjono 2017, pers. comm., 24 August). Both Sudradjat and Tjahjono have a similar predilection to see identity beyond its tangible aspect and focus more on the contemporary values that might change over time. This is a contrast standpoint to Prijotomo as the founding father and other supporters of Nusantaran architecture who mostly refer to tradition for its capability to remain stable after being passed for generations.

Pros and cons arguments above evoked an interesting dialectic, adding to a complication of the on-going contestation of Indonesian architectural identity. Scholars from both sides have a very strong opinion on the discourse of Nusantaran architecture, either to support or oppose to the term. From the interviews I did to these scholars, I got a sense that people from both sides have established very strong opinions about this discourse, in a way that they are reluctant to accept the possible veracity from the opposite party. My assertion here is supported by Indah Widiastuti, a scholar from Institut Teknologi Bandung (ITB) in West Java (2017, pers. comm., 6 October), and Ikaputra, a scholar from Universitas Gadjah Mada (UGM) in Yogyakarta (2017, pers.comm., 10 October). In their perspective, the current condition of Indonesian architectural scholarship is a little 'unhealthy' since it is more like an opinion war dominated by a few influential people instead of a dialectic. Widiastuti observes this condition as a result of a very little attempt to map different school of thoughts in Indonesian architectural scholarship, and very little eagerness to understand other parties' standpoints. I argue that these heated debates

over this discourse depict that the conception of Nusantaran architecture does have some inadequacies, especially in theoretical and philosophical aspects. Yet regardless, it does not change the fact that this terminology has been massively developed in contemporary Indonesian society and has become part of Indonesian architectural history. The question now is what to do from here? Do we need a new definition of the term to inclusively fit with contemporary reality in the current Indonesian architectural identity development? Or do we need to refer back to the long-established definition and redirect the contemporary development so that the term would have a stronger theoretical foundation? Regardless of the direction chosen, settling down this terminology, if it is even possible, still requires a long process and numerous researches.

I myself see some issues in the argument that supports the conception of Nusantaran architecture. Firstly, the intention to de-politicize architecture by adopting the phrase 'Nusantaran' instead of 'Indonesian' architecture is problematic, since *"architecture was inherently political"* (James-Chakraborty, 2014, p. 2). It is important to note that architecture is *"culture politics"* (Frampton, 1987, p. 380) and people as part of the society *"continue in subjection to political practice - that is, to state power"* (Lefebvre, 1991, p. 8). Expecting to detach the political aspect, if it is even possible, just by changing the terminology is too simplistic and disregards the tight entanglement between architecture and power. If we see further back through history, we will see that the colossal monuments, like the Pyramids and Borobudur, were tools to showcase the Kings' extensive power. Architecture became a media and status indicator, to make statements and to exhibit the Kings' supremacy that he controlled enormous human and natural resources (Glenn, 2003, p. 13). In Indonesian post-independence history, the first President, Sukarno, utilized the language of modern architecture to speak his political ego: to show the world what a new nation could build (Figure 5). The second President, Suharto, employed the power of traditional architecture to win sympathy in a way to detach politic from the people (Kusno, 2000, 2013). Moreover, if we focus particularly on the history of pre-colonial Nusantara, then we cannot disregard that Nusantara itself was a political terminology, introduced by someone who entitled a political position, through a political oath, and was used to illustrate the conquered area for a political reason. And it is not different from the post-independence Nusantara that it was utilized as jargon to inspire people to unify under one new nation. Sukarno used this term as an elucidation of great Indonesia and to further justify his political manoeuvre to confront Malaysia (Jusuf, 2013). And in today's Indonesia, as I have portrayed earlier in this paper, the articulation of Nusantara has inspired the emergence of the term of Nusantaran architecture that is then utilized by the Indonesian government to achieve their political agenda in tourism.

Figure 5. The National Monument in Jakarta, one of Sukarno's nation-building project (From: Ghozian Hakeem, 2019, reprinted with permission)

Furthermore, I suspect that the emergence of this Nusantaran architecture has a strong political drive behind the claim of its cultural focus. In Indonesia academic constellation, there has been a concealed competition between universities in the West and the East of Java. Two universities in the West side of Java, Universitas Indonesia (UI) and Institut Teknologi Bandung (ITB) have been under the spotlight for a bit too long as two of the most prestigious state universities in Indonesia. Being close to the capital city of Indonesia, UI and ITB have been exposed to the rapid development of architecture, and it is reflected in the brisk contemporary discourse that dominates the direction of the schools. Meanwhile, in the East of Java, the emergence of Nusantaran architecture discourse creates a platform on which the East Java-based universities, Institut Teknologi Surabaya (ITS) and Universitas Brawijaya (UB), can steal the national attention. This drift shifts public recognition from the West to the East of Java, especially after the massive

national adoption of this terminology that corroborates the direction taken by ITS and UB. It is hence no surprise that, from my interview, I see a strong acceptance of the conception of Nusantaran architecture from scholars from East Java, while it gets intense opposition from scholars from Western Java. This interestingly helps to map the politics in Indonesian education, that not only Indonesia has suffered from Java-centrism in the national discussion, but there is also a strong political contestation inside Java Island, and the term Nusantaran architecture somewhat has become a political instrument for this dispute. This elucidates the intertwined connection between Nusantaran architecture and politics that not only this term has a political inclination embedded in the definition, but also this term has been utilized for political purposes and contestations, and therefore depoliticize the term would be almost impossible to do.

Aside from questioning the attempt to depoliticize architecture in Nusantaran architecture discourse, I also need to challenge the intention to intertwist this term with culture and tradition altogether. It is clear that Prijotomo as the initiator identifies this term as architecture in the period of local kingdoms and associates it with traditional architecture. This is a pragmatic, if not essentialist, perspective that develops because of his confined view in seeing this discourse solely from the perspective of architecture while discounting other aspects like anthropology, history, social science, or political science (I. Widiastuti 2017, pers. comm., 6 October). In this case, I criticize Prijotomo's paradigm of putting this specific time frame as 'the most legitimate period', if not 'the only period', where Indonesian people can crave their identity from. It is worth noting that the idea of Nusantaran architecture came into being in the first place to provide a counter-power to oppose the hegemony of Western architecture which has long been treated as *"the only truth and the only knowledge available"* (Prijotomo, 2017, p. 79). It is thus agitating that after the development of this discourse, the supporters of Nusantaran architecture have started to create a similar view to what they tried to challenge in the first place. Nusantaran architecture with its affiliation to traditional architecture has been promoted as the only valid reference that offers 'genuine' and 'authentic' ideas for architectural identity. Referring to Nusantaran architecture as *"architecture that was developed by enormous numbers of people from different tribes and races in Indonesia"* (Bakhtiar et al., 2014, p. 32), it is then contradictory that the newer Indonesian architectural history tends to be forsaken. The modern part of Indonesia, like the corridor of Jakarta's Sudirman and Thamrin Street which had been built for decades by Indonesia's first and second presidents, or the 'Golden Triangle' *(Segitiga Emas)* area in which many important buildings are located (Figure 6), has not been discussed as if it is not part of Nusantaran architecture. And regarding this case, many questions can be raised: what exactly is Nusantaran architecture? Is it possible to appoint that one building is more 'Nusantaran' than others? Are there any criteria to assess it all? Why does the term exclusively and persistently refer to traditionalism while most Indonesian contemporary people are now living a modern life? Then, where is the position of Indonesia's 'modern' architecture in this discourse? Furthermore, on seeing this evidence, there is a strong inclination to focus merely on the 'glorious past' of Indonesia and omit other series of history, something that appears to be 'cherry-picking' history to find one that is beneficial to be developed without having a solid justifiable reason. In this case, Sudradjat expresses his concern that Indonesian people are too gravitated to a particular history that can evoke self-pride and the one that makes them feel *"related to their glorious past"* (Sudrajat, 2008, p. 41).

Figure 6. Mega Kuningan as part of Jakarta's Golden Triangle area (From: Herry Tjiang, 2019, reprinted with permission)

The stance to contrast traditional and modern architecture is also problematic as it may easily fall into dichotomous thinking. It becomes paradoxical that the intention to garner the essence of Indonesian architectural identity, to distinguish the country from the West, is employing a Western colonial way of thinking. This binary outlook contrasts the 'traditional' and the 'modern'; 'marginalised' and 'centralised'; 'thesis' and 'anti-thesis'; the 'East' and the 'West' (Kusno, 2000, pp. 26-31; Said, 1979, p. 7; Tjahjono, 2017, p. 51). The Dutch as the colonizer put out the term East to represent Indonesian native coloured people who were considered marginalized, illiterate, uncivilized, ignorant, and backward, while the West was the exact opposite. This stereotypical thinking, by segregating the modern as 'theirs in the West' and the traditional as 'ours in the East', according to the famous political scientist Benedict Anderson, is a facile serialisation, which means that things are treated as a replicable plural that could be categorized in certain grids, saying *"it was this, not that; it belonged here, not there"* (Anderson, 2006, p. 184). This thinking mode applies to the way Nusantaran architecture is framed which leads to the trap of 'exoticizing' architecture. Moreover, a recent study reveals the complexity to put classification on contemporary culture, as Aninda Moezier finds out that contemporary Minangkabau people have included their 'modern house' of *rumah ketek* as part of their customary house, together with *rumah gadang* (Figure 7) which has been previously perceived as the 'traditional' (Moezier, 2017). It depicts how modern and traditional architecture have mingled together in a real-life culture, thus making a strict separation is extremely difficult, if not impossible, especially when the classification is not necessarily reliable (Ashforth & Mael, 1989, p. 21). Romantic and nostalgic attachment to the stylistic traditional architecture somehow conceals a *"very ugly realities of colonialism and its legacy"* (James-Chakraborty, 2014, p. 2), and is a sign that Indonesia has not fully escaped from the colonial way of thinking. Therefore I emphasize that there should be a fundamental paradigm shift in dealing with Indonesian architectural identity discourse: from 'either-or' to 'both-and' thinking; employing critical emancipatory thinking as a liberation from the established rigid and compartmentalize framework; and mindfully map various kinds of architecture in Indonesia so one would not 'pigeon-hole' architecture based on unclear categorizations.

A recent study unveils interesting facts that contemporary Indonesian people still needed symbolism in architecture to allow them to relate to their culture and tradition. Feni Kurniati studies The Grand Mosque of West Sumatra and finds out that the mosque has been widely accepted by the majority of the local people, mostly for its appealing design which portrays an outline of their traditional architecture (Kurniati, 2016, pp. 68-75; Purwaningrum, 2017, p. 6). Anderson, in his famous book Imagined Community, points out an interesting analysis about 'logoisation' which might relate to Indonesian people's inclination to see traditional architecture in a symbolic manner. Logoisation started as a reductive way used by the imperialists to represent their sovereignty, by giving certain colour on the map on the area they colonized. This coloured area was then detached from the actual map and was treated as a pure sign, a logo, an emblem that was ready to be reproduced on their various identity symbol, such as stamps, posters, official seals, letterhead, book cover, or even tablecloth (Anderson, 2006, pp. 175-176). This logoisation was then slowly adopted in their colonized countries. In Indonesia, it was firstly shown in the drawing of Borobudur, that instead of adopting naturalist style which was common in that time, Borobudur was drawn as a silhouette without any trace of sculptures: it was emptied, reduced as an outline and a logo (Anderson, 2006, pp. 183-184). This logoisation process is similar to how contemporary Indonesian architects gaining significance to 'contextualised' their design to the local culture of the place in which it is located. Adopting silhouette in design can be an effective approach in creating an attachment with the local people, and it is proven in some of the contemporary architecture works in Indonesia. Phinisi Tower in Makassar (Figure 8), for some scholars, is considered a successful example of Nusantaran architecture in translating a traditional artefact into design inspiration. This hyperbolic-shaped tower adopts the silhouette of the sail of Phinisi traditional sailboat and it appears to be 'successful' in capturing people's acceptance over the building, aside from any criticism that follows.

'Logoisation' becomes a popular method employed by many contemporary Indonesia architects in approaching Nusantaran architecture, as they treat traditional architecture largely as a symbol to anchor a building to its local context. Symbolism has always been a part of Indonesian culture and a part of the local value invested in the local houses. Yet depicting it as a logo and silhouette might lead to a trap of kitsch, where visual representation became the most important consideration overlooking other interweaving aspects in the context. Adopting traditional architecture as a design precedent might lead to ocular-centrism that puts forward the presence of traditional form, ornament, decoration, or style. The problem appears if one adopts the traditional forms and shapes as it is, without putting any curiosity and critical thinking on it. In that case, culture and tradition are treated as a frozen language, something given instead of something composed (Kusno, 2017, p. 25; Tjahjono, 2017, p. 52). With this kind of translation, an architecture may lose its value and any visual forms and decorations incorporated become meaningless since it *"gives no contributions in the continuity of people's self-belonging to their tradition"* (Widiastuti, 2014, p. 12). It is important to note that the forms and ornaments that present in traditional architecture have nothing to do with an aesthetic consideration; it was inherited by the local people from their forefathers without any concern of whether it was beautiful or ugly when accepting it (Frampton, 1987, p. 378). Therefore, the attempt to preserve Indonesian culture and tradition through architecture should shift its focus away from the burden of aesthetic and visual beautification, and rather focus on delving deeper into strengthening the value in society.

Figure 8. Phinisi Tower in Makassar, South Sulawesi used the silhouette of Phinisi Sailboat to 'contextualise' the modern building (From: Yastrib Taufiq, 2017, reprinted with permission)

Conclusion

The question of 'what is Nusantaran architecture' still requires comprehensive answers, especially to explain why choosing traditional architecture as the main design vocabularies while at the same time disregarding more recent histories that also happened in Indonesia. Scholars have raised valid and fundamental questions that need to be addressed to strengthen the theoretical foundation of this Nusantaran architecture. The perspective in seeing this conception should be liberated from any rigid mold and should be critically challenged to gain improvement in the discourse. The choice to go exclusively with traditional architecture as a point of departure for Indonesian architectural identity needs to be questioned since culture and identity are always moving and changing. Over-simplifying people's identity by putting traditional face as the only representation of local culture is seen as an imposition rather than a stimulation for people to write their own culture. Furthermore, exerting the conception of Nusantaran architecture in the society should be done very carefully, and should not be executed solely for the sake of short-term targets. Quantitative counting should be followed by qualitative analysis in studying people's conditions and behaviours before and after the implementation since many facets in people's life cannot be measured by numbers. The recent Nusantaran Architecture Design Competition is very engaging in terms of promoting design and enhancing the architectural atmosphere in Indonesia, but making the winning designs as templates for local architecture is very concerning. Further study is needed to either refine the current programs or to formulate an alternative solution to achieve the country's economic and tourism targets without heavily disrupting society's social and cultural fabrics.

Despite the idea of putting Nusantaran architecture as a manifestation of Indonesian architectural identity is considered captivating since it provides something 'different' compared to the Western culture, yet I argue that it will be very difficult for this conception to go beyond architecture kitsch and commodification. A comprehensive explanation is needed to explain when a design is labelled as contemporary Nusantaran architecture; how it is considered representing local culture; and how it touches other intertwined aspects in society beyond the artistic façade. Therefore I strongly suggest that social, cultural, historical and political factors of the society should be proportionally considered in any decision making so that this new Nusantaran architecture will not be an 'alien' among Indonesia's real-life cultures and traditions.

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A NEW FUTURE FOR ARCHITECTURAL PRAXIS: CONTEMPORARY ARCHITECTURE AMONG CONCEPT, THOUGHT AND RHETORIC

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Abstract

On one hand, architecture praxis includes two inherent aspects as the architectural thought which lays at the background of the profession and the practice on the field, and on the other hand, it also has two methods on its' communication, rhetoric and drawing. From another perspective it uses signs to communicate its function and meaning. This communication is rhetorical, when it induces its perceiver to use or to understand its' nature. Movements in architecture, such as the Gothic, Baroque or the Revivals Style, promote certain values and beliefs, and can be studied as rhetorical movements. Without any doubt, architecture is a language. Like linguistic communication, architecture consists of codes, meanings, semantic shifts, and syntactic units. It seems that most visible in recent arguments of the designing space and definition of architectural concept is creating an argument of "A New Future for Architectural Praxis", which argues that making the connections among the complexity and contradiction on the nature of the architecture and other disciplines related with creating a space. On contemporary architecture, architects are interested in concept creations more than articulating a theory of architecture on its' rhetoric comparing to the early 20's modernism; it seems that recently the single most important challenge is confronting eco-friendly and easy living spaces on a future-sight of the world, whereas mostly architects are focusing on Utopic concept creations including almost on Baudrillard's simulacr and simulacra theory. Thus, the paper will have the story of contemporary architecture among concept creations, architectural thought, confronting eco-friendly and easy living spaces on a future-sight of the world toward rhetoric of architecture.

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Introduction

Architecture has been formed under movements such as Gothic, Baroque, Revivals, and etc. during pre-modernity, while inside a movement similar architectural features have been shaping on building stock. During this

period, architecture was a practice, which was put through by using of local materials and traditional production methods. On the other hand, before Modernism, architects used architectural representation on a rhetorical reason since Renaissance. Beginning since Modernism, architectural production started to be changed into praxis as having two aspects as the architectural thought, which lays at the background of the profession and the practice on the field, that were inherently included. It is seen that it also acts over two methods on its' communication, rhetoric and drawing. It can be said that there is a paradigmatic structure on architectural representation and as a profession, architecture became an integrity/ unity of expression on inherent professional jargon, design thought and practice, which is known as praxis. The architectural thought of modernism included an international overview, which was timeless and beyond the context, whereas contemporary architecture can be defined as colourful, as full of forms, moreover than this it can be characterised as searching of concept rather than sensitivity of including context on different personal point of views of architects. On some examples, it can be also said that searching of conceptual creation brought architects to create projects almost up to utopical designs. Thus, it can be said that the contemporary architectural production included some examples that are formed almost as if they are a part of Baudrillard's simulacr and simulacra theory and current building stock is formed under timeless extravaganza.

Historical Background of Design and Rhetoric in Architecture

Beginning from the Ten books on Architecture of Vitruvius, including the Four Books on Architecture of Palladio, De Re Aedificatoria known as On the Art of Building of Alberti, till Delirious New York of Rem Koolhaas, and Yes is More of Bijark Ingles there has been always one masterpiece book of the era, sometimes a treatise but mostly a text to criticise the soul of the architectural praxis of its' age, along with the developments on architectural styles, at first during the pre-modernity as long period effects of styles, and after modernism even as individual attempts of personal choices. There have been important 18th century architects, who were also authors, such as Horace Walpole, without any doubt their exchanges between literature and architecture offer, by the definition of Morrisey (1999), "a rhetoric of architecture" to contemporary architecture. On his book, From the Temple to the Castle, he interested in articulating a theory of architecture, which might facilitate a way of making connections between architecture and other disciplines. It seems that Gelertner's (1995) synthesis can be an entrance to understanding how literature might contribute to architectural design theory. Here Morrisey (1999) makes a suggestion, the idea of an architectural form is shaped by its intended function, which can be understood as *form is function*, and that suggestion overlooks that many buildings have a form that is more than what is required by their function. He suggests that according to another theory of architectural design, architectural form is generated within the creative imagination, or in Morrisey's (1999) words architectural genius. According to Gelertner (1995), there are nevertheless similarities between buildings, and according to Morrisey (1999) this makes it difficult to cite them as isolated examples of architectural genius. He argued that architectural form is determined by the prevailing social and economic conditions; however, Morrisey (1999) puts through that similar economic conditions can produce a variety of different forms and defines that as for the belief that architectural form derives from timeless principles of form that transcend particular designers, cultures, and climates. Here it should not be forgotten that according to Gelertner, today only a few architects would argue that the Five Orders provide all the architectural knowledge of a practicing architect needs. On the other hand, there is a general point of view that the prevailing Spirit of the Age is shaping the architectural form. As the history of architecture invites both spatial and stylistic consideration of form of shaped spaces out of styles, such as Romanesque, the Gothic, Baroque, etc. as Mies van der Rohe claimed that, "architecture is the will of the age conceived in spatial terms."" Thus, in the terms of classicism of 17th and 18th centuries, as a mechanism for creating spaces with reference to shapes -a ratio of human height to the built height, or of the built height to built width, etc.; therefore, the proportion would then be one way of understanding architecture historically. Horace Walpole's critique of proportionality points out that by the mid 18th century in England architecture no longer uses form to resolve determinate historical conditions, that architecture is no longer the will of the age expressed in spatial terms per se, says Morrisey (1995). He adds (1995) that what is called as a form, created the impression and that which is called form could disprove it. It is for sure, according to Franco Moretti (1988), the study of historical products organized according to rhetorical criteria, and he also offers a way around this impasse in design theory a treat form as rhetoric. Morrisey (1999), suggests that, "the problem that then haunts literary and architectural theory after Walpole is that people mistake rhetoric for form". Then he touch to Walpole's work and says that he suggests that form is rhetorical. That is why form can be apprehended as content; both form and content are rhetorical. Moreover, it is precisely because form is rhetorical that it can be apprehended as content or that there can be a content of the form. Therefore a suggestion is came through, both form and content are rhetorical.

It seems that architects are concerned that linguistic approaches to architecture would separate architecture from what is thought to be its most important part, the hierarchical harmony on parts of the whole composition, with another words on forms and their total imaginative integrity. During 20's, Le Corbusier articulated modernist legacy. According to Boyer and Mitgang (1996), "It is a question of building which is at the root of the social unrest of today." Here Morrisey (1999) says that the concern is which considering architecture in literary, terms means a loss of architecture's social commitments. Thus, it is clear that what is rhetoric is also social and is also political, just like as architecture is too. According to Frampton, as in literary-architectural terms, rhetoric is "critical" and

"contextual". Here Morrisey (1999) tells, "Saying that literature or architecture is rhetorical does not mean that either one of them is somehow separate from social or political situations; instead, it affects how one imagines connections between the aesthetic and the historical". Burke (1967) says that, "critical and imagination works are answers to questions posed by the situations in which they arose, with the important proviso that, and adds, the situations are real" (1967).

Thus, here it should be noticed that theoretical means, concerning with or involving the theory of design, rather than its practical application. It is based on theory, therefore it is based on words for sure. As rhetoric also based on words. However, there is a sharp difference in between the theoretical and rhetoric. Rhetoric is the art of using words, while speaking or writing on the architectural process, whereas theoretical can be understood shortly as the defining of the architectural thought, that lays down at the background of the architectural production process by words, such as a manifesto, that is decelerated by the master architect of the architectural application before it starts, including the theme of how should it be foregoing and how important it will be for the field from an architectural point of view.

In architectural production process, which started to be formed by personal preferences/ choices in Modernism, a design thought background was formulated and acceptances were the first born ones, then manifestos appeared as the part of the theoretical spine of the design and project process only then could started to be formulated as affirming manifestos. The form is important in International Style, but it is also far from the context, rather than being relevant to the location and contextual preferences of the place, it emphases the simplicity and innovation. On the other hand, the ornament could not pass away to the other side as being *old*, or being a symbol of *the other,* remaining from the past; the ornament was equivalent to *the murder* in architecture. The form would now take the road alone. In this context, the choice of materials became more important, and, the black-and-white harmony reached forward with the sibling in addition to the basic colours such as red, blue and yellow. While de-forming is popularized with Deconstuctivism, the histographic background included re-form, de-form continuity / or controversy in different examples. In contemporary architecture, the concept seems to be *the dominant runner* on the race in between the concept and the context. Such a conceptual based perception has been born that the relationship with the ground put to the shelf. For this cause, by a Baudrillarist approach it can be discussed that the concept becomes simulation full of simulacrs in different sizes, little or big, but always in *the game*. However it should not be forgotten that, every approach has been put forward as a part of architectural thought background of manifestar point of view all through these epochs, as rhetoric moves by the conceptual victory on project production in architecture.

Contemporary Architecture Among Concept, Thought and Rhetoric

On his masterpiece Leach (1997) suggests that, "The discipline of architecture has gone through something of a metamorphosis in recent years. There is evidence of a clear shift both in the nature of debates within architecture and in its relationship with other academic disciplines. Not only are architects and architectural theorists becoming more and more receptive to the whole domain of cultural theory, but cultural theorists, philosophers, sociologists and many others are now to be found increasingly engaged with questions of architecture and the built environment. This volume was born of a desire to support this development, and to reinforce these links. It attempts to situate architecture within a broader cultural context, and to consider not only how debates from cultural theory, philosophy and so on might begin to inform a discussion about architecture, but also how architecture and the built environment might offer a potentially rich field for analysis for cultural studies and other disciplines".

Parallel to the demeanor of architectural project in pursuit of concept, it does not mean that the final architectural production is always in success and/ or becoming a succeeded one. As defining the process of designing as a triangle, which has three corners of the project itself, produced structure/ architectural result and searched concept, is thought that the basic foundation formula of triple sheet pillar, as the sub-pieces of an architectural meaning; it is not always seen that there is a harmony among these three endpoints, which means there should not be a succession in an architectural point of view always. The essence of the architectural expression which exceeds representation and surpasses to rhetoric, from a Baudrillarian point of view, could have simulative results; the results that acts as if they are something else; they pretend to be something else; there can be replica productions; architecture in that point pretends to be like something, but actually at the end it produces something else in a result; it can be said that there is a copycat in the garden of producing; there is an architectural synthesis in the shape of *mimesis*. Thus, it can be said that what once with modernism and the avant-garde, postmodernists reject realism, mimesis, and linear forms of narrative, once again was born in contemporary architecture.

Here, it seems that it comes to a point where Ingles (2010) said once as "Yes is more", and touched to the suggestion of Darwin, "It is not the strongest of the species that survives, nor the most intelligent. It is the one that is the most adaptable to change". Thus, he can make a contemporary suggestion to not only the design side of the architectural praxis, but also to the rhetoric side of the field, too, as suggesting *a theory of evolution* in an architectural point of view. He says that, "The traditional image of the radical architect is the angry young man rebelling against the establishment. The avant-garde is defined by what it is against rather than what it is for. This leads to an oedipal succession of contradiction where each generation says the opposite of the previous". Without any doubt, it means that this contradiction comes forward with its' twin-sister complexity in the words of Venturi.

Ingles added that, “And if your agenda is dependent on being the opposite of someone else’s- you’re simply a follower in reverse”; which means you remain avant-garde on your profession. Thus, it seems there are many architects who would like to be named as a pioneer of their ages by making some avant-garde projects on their point of view on contemporary architecture; whereas each and every project should be evaluated by well known worldwide critisesers of course. There is a highlighted complexity lays down at the background of being avant-garde here, contemporary architecture can be seen as *a catwalk of concept contest*, where architects of today would like to catch the best visibility and fast access to be a star architect of contemporary architecture.

Selected Projects and Comments

Antalya Lara Region of Tourist Resort Projects

The most important feature of the Lara-Kundu coastal band, which distinguishes it from other tourism regions in Antalya, Turkey, is the frequent introduction of its’ thematic hotels. Starting of the construction of WOW Topkapı Palace Hotel, which was built by MNG Holding in 1999, followed by the constructions of conceptual search based thematic hotel buildings without slowing down any day. As someone wonders about the area, it can be seen that one may find himself on board of a Concorde or on famous transatlantic Titanic, or can go to another planet in Saturn, or make a visit to St. Mark’s Square in Venice, or be a character in Kremlin Palace. This touristic resort region offers a Baudriallarian simulation with many little-big simulacrs as surreal atmosphere on Antalya to clients.

Figure 1. Lara Region, Antalya (from authors’ personal Archive)

The construction of eight of the twenty touristic resorts, one of which are still under construction, belongs to architect Hasan Sökmen. Alper Erden Engiz is also an architect of these thematic point of view, who designed four hotels on this resort-land.

WOW Topkapi Palace Hotel

WOW Topkapı Palace, which was the first constructed of the thematic hotels in Lara region of Antalya, Turkey, was built in 1999. The architect of the project is Hasan Sökmen, explains why he built a hotel similar to Topkapı Palace in 2004 in the Hürriyet newspaper Cahit Akyol’s report in the following way: ‘It would draw attention with its architecture, and it would create the happiness of staying in the palace instead of the concrete mass in the eye of the tourist (www.hurriyet.com.tr). The hotel’s features are described in the WOW Hotels website as follows: “Accommodation in comfortable rooms resembling to Harem buildings, eating in Palace Kitchens and Aya İrini, to become cool off by Soultan Ahmet the 3rd Fountain, drinking a wine inside of Justice Tower by the magnificent view of Bosphorous and tasting the Ottoman type water-pudding in the Mecidiye Mansion and for having many more experiences..” This resort has 1500 bed capacity in 65.000 m2 land.

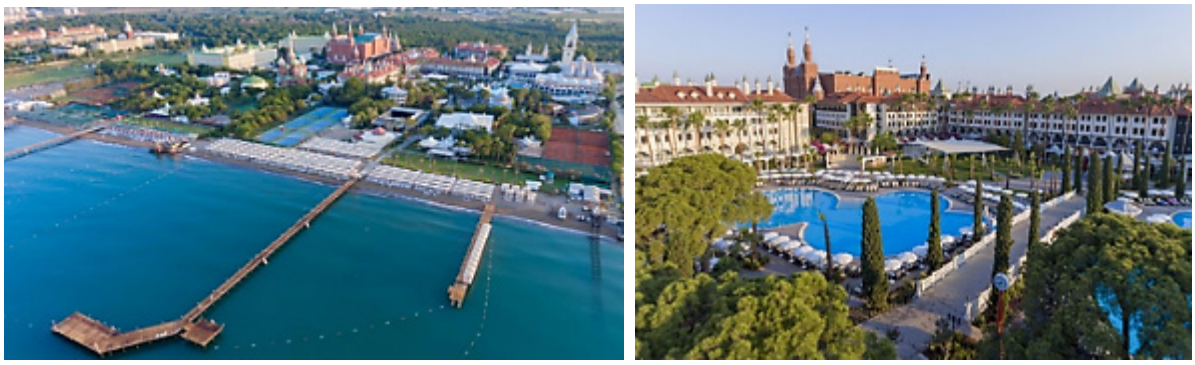

Figure 2-3. WOW Topkapi Palace (from authors’ personal Archive)

Figure 4-5. WOW Topkapi Palace (from authors' personal Archive)

WOW Kremlin Palace Hotel

The entrance of the WOW Kremlin Palace Hotel is named after the Resurrection Gate at the entrance of the Kremlin Square. The main building, with its stylish lobby, main restaurant, reception and conference center, is almost a copy of the History Museum. 2002 is the date of the project, which is located on 80.000 m2.

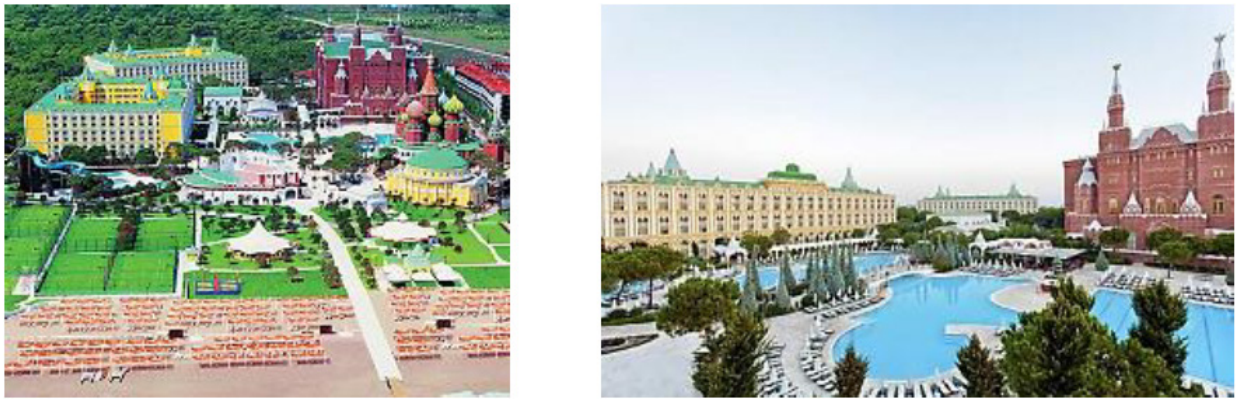

Figure 6-7. Kremlin Palace Hotel (from authors' personal Archive)

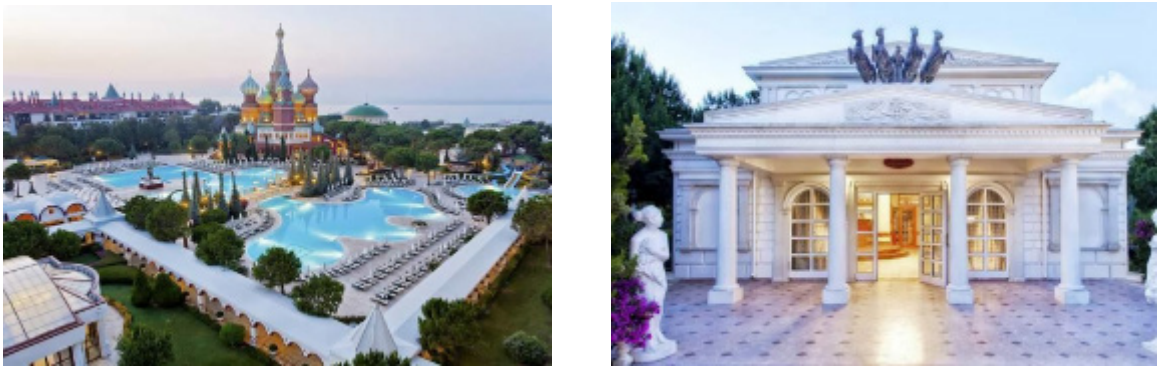

Figure 8-9. Kremlin Palace Hotel (from authors' personal Archive)

Venezia Palace Deluxe Resort

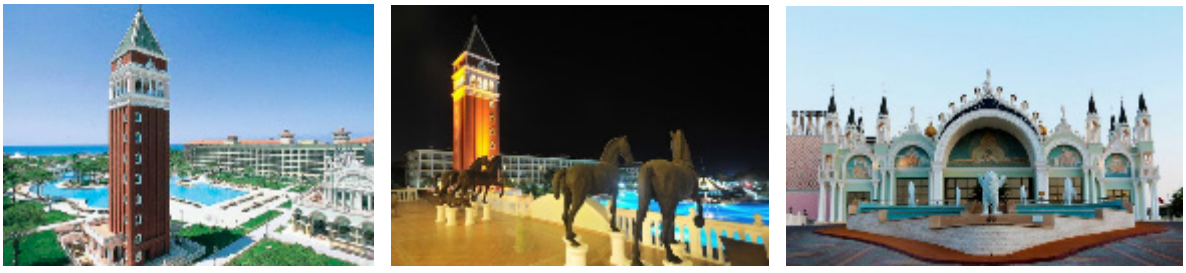

Figure 10-11-12. Venezia Palace Deluxe Resort (from authors' personal Archive)

This 37.200 m2 size touristic resort with 1300 bed capacity, by its' Venice City theme, stands among with the other two resorts on the same region designed by the same architect, Kremlin Palace and Topkapi Palace. The atmosphere of San Marco Square was created and the design of the resort belongs to Hasan Sökmen, in 2002.

Vialand Theme Park

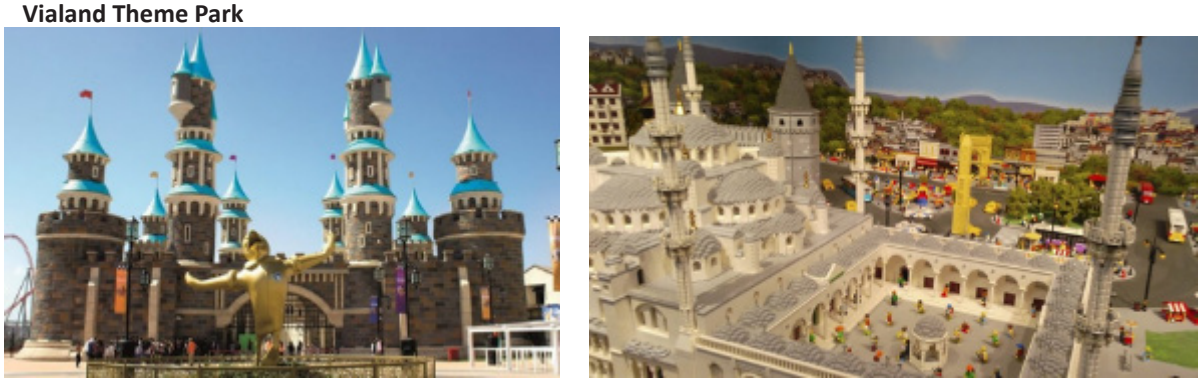

Figure 13-14. Vialand Theme Park (from authors' personal Archive)

Vialand theme Park is a 70's Las Vegas type architectural production, whereas in Las Vegas theme space creation started in the design of the luxury hotels. The project is located in Eyüp district of Istanbul, Turkey in 450.000 m2 dated to 2012. Learning From Las Vegas of Venturi, what the strip can teach us about urban planning, David Levene for the Guardian on 2015, February 9th reminds us that, "...what kind of an urban experience has resulted? To a first-time visitor (himself included), the Strip can look and feel like the concretisation of unplanned chaos – with its waves of pulsing lights and scrolling video screens; its "riot" of clashing, garish architectural styles; the wide central river of frequently gridlocked traffic; and the swarms of tourists, all dressed with aggressive casualness and milling blindly every which way. But does it make any sense at all to apply the term "urban planning" to the Strip? Or is this simply what happens when money dictates every aspect of a built environment?" He says that, "The repulsion eventually fuelled a great aesthetic controversy in 1972, when the architects Robert Venturi, Denise Scott Brown, and Steven Izenour published Learning From Las Vegas, which dared to approach the built environment of the Strip on its own terms. By their own terms, "Las Vegas is to the Strip what Rome is to the Piazza". Again he argues that (2015), "the trio declared, having a grand old time enumerating the freakish architectural mini-movements that had emerged there, from *Miami Moroccan, International Jet Set Style* to *Yamasaki Bernini cum Roman Orgiastic* to *Bauhaus Hawaiian*. But they also noted that, while the Strip originally *just grew*, they were seeing the emergence of *the usual building and zoning controls* and even a *Strip Beautification Committee.* It gets them worrying: "What will happen to the Strip when the tastemakers take over?" Here maybe it will be a common question for all of these half-utopic, half-f*airytaillish* projects while swimming in *an extravaganza ocean*, what will happen to the architecture at all, when the tastemakers take over? Does always becoming fashionable work to be an avant-garde on the praxis?

IC Hotels Tropicana Resort

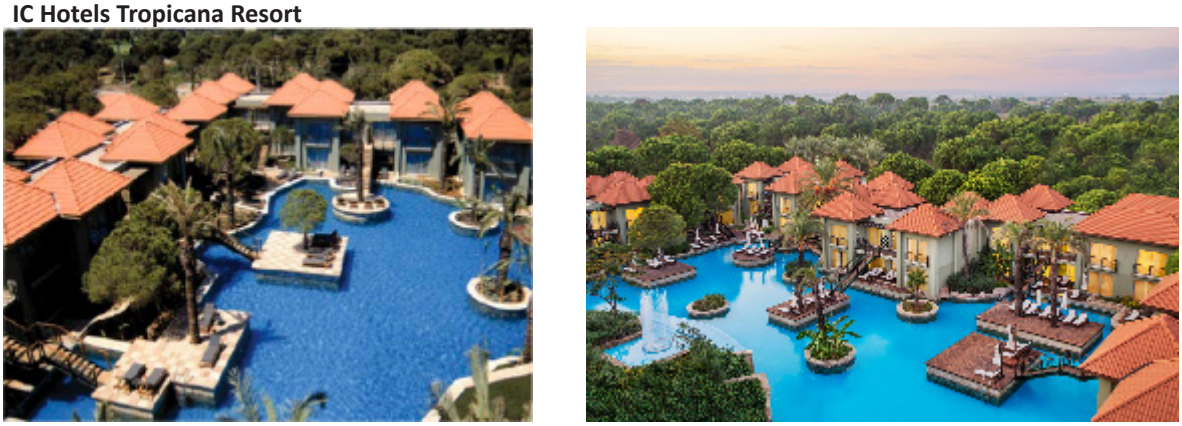

Figure 15-16. Tropicana Resort (from authors' personal Archive)

According to the statement made by Fatih Dardağan in Turizmde Bu Sabah (www.turizm.com), the architectural feature of the hotel is planned to create a theme in a more flora and fauna environment. Dardağan's description continues as follows, there is a theme designed as a tropical structure surrounded by ponds and gardens, completely decorated by "herbal cover" which is called the Balinese style. So the basicly the landscape is processed here. The main aim here is to ensure that the guests will have a more comfortable and relaxing holiday. It doesn't have an eclectic architecture within a far away point of view. Our project criterias are producing an eco-friendly easy living space, having a comfortable rooms, and inside a comfortably solved landscape. The project offers tropical way of being in a holiday to the clients while being far far away from a tropic forests.

Hapimag Hotel Complex

Figure 17-18. Hapimag Hotel Complex (from authors' personal Archive)

Hapimag Hotel Complex is located in Bodrum, Turkey, on a 87.921 m2 land facing to the Aegean Sea. Project is dated back to the year of 1992, and offers an Aegean island type holiday to the clients on the main land of Anatolia. Inside of the resort there are many small streets created full of romantic bougainvillea trees standing next to stone small Greek houses.

The Beamish Museum

Figure 19-20-21. Beamish Museum (from authors' personal Archive)

The Beamish Museum is a place it seems it is full of utopic feelings, whereas it is an old English town, in where people are living according to the 19th century life-fiction. It is an open-air museum of today where visitors can have their own personal experiences that could be dated back to 19th century.

Tianducheng City

Figure 22-23. Tianducheng, Hangzhou, China and Paris (from authors' personal Archive)

As the *city of Love*, by its' well known title, Paris has been always an attraction point. So, why could not be there more of it? In Hangzhou, China, with the title of New Paris, a city is created, Tianducheng City in 2007 on 31 km2. It is almost very hard to say if it is an utopic architectural design, or an ordinary concept creation or what else. Replica

pairs of avant-garde creations thus it can be now seen, not only on fashion, but also in architectural production, too. There is a long way in between mimesis in architecture and creating a synthesis architecture. It seems, in Ingles words, saying "yes" to all possibilities in architectural production creates mimesis instead of catching the possibilities of creating a synthesis architecture in between the past and the future.

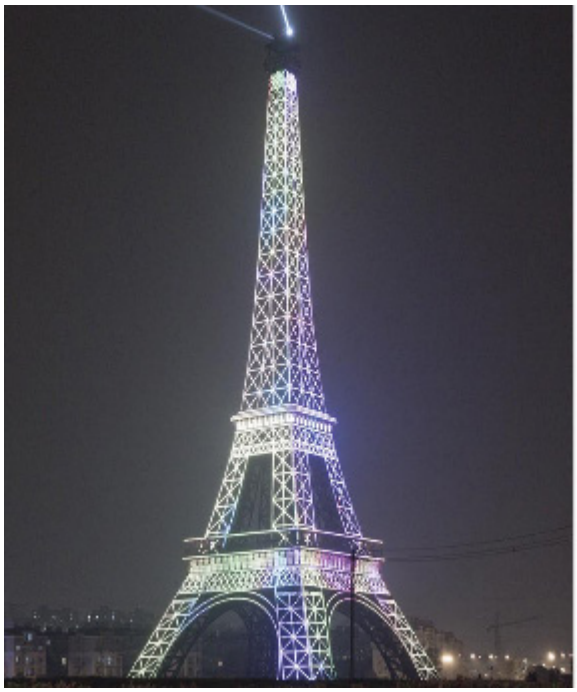
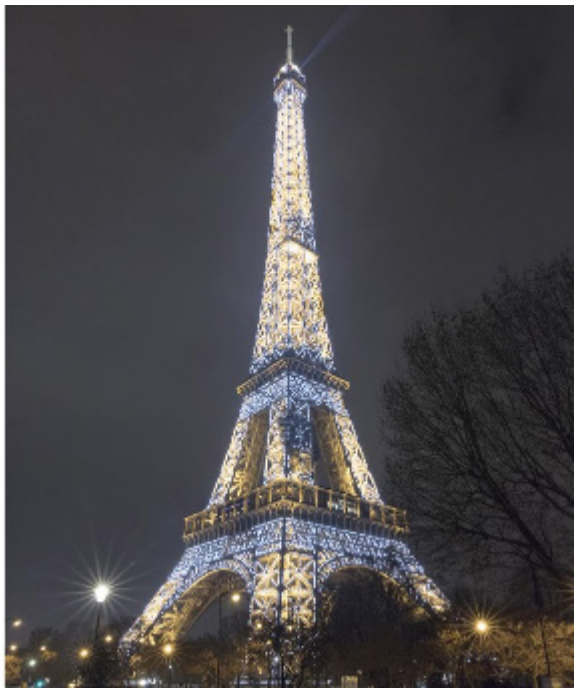

Figure 24-25. Twin of Eiffel Towers, replica one in Tianducheng, Hangzhou, China and the other in Paris (from authors' personal Archive)


Figure 26-27. Twin city squares, replica creation in Tianducheng, Hangzhou, China and the original one in Paris (from authors' personal Archive)

Zero Zira Island Project, Azerbaijan

While defending "Yes is More" in architecture, Ingles and his firm Big Architects pushed to the button of creating a concept that includes a designing an instant mountain with seven important peaks of Azerbaijan. Even though, it seems that there is an island with a mountain over with seven peaks, in reality it is almost a monolithic residence project having mix-use details inside, and seems as if it is a real mountained island in Azerbaijan. On the presentation brochure with the words of the team, the project is described as "The Seven Peaks are conceived not only as *icons*, but engineered as entire eco-systems, a model for future sustainable urban development" (http://www.ziraisland.com/downloads/Mipim_brochure.pdf).


Figure 28-29. Zero Zira Island, Azerbaijan (http://www.ziraisland.com/downloads/Mipim_brochure.pdf)

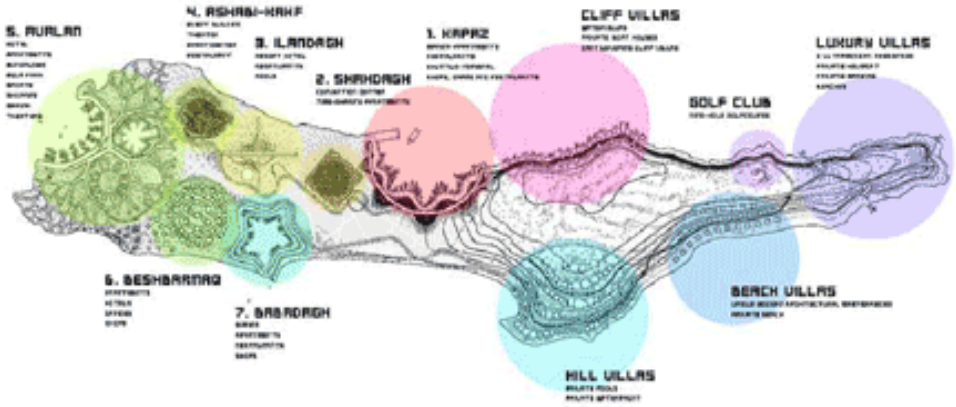

Figure 30. Masterplan Areas and Data (http://www.ziraisland.com/downloads/Mipim_brochure.pdf)

Robot Science Museum, Seoul, South Korea

Melike Altınışık Architects won the project competition of Robot Museum, which will be located in Seoul, South Korea. It is planned to be the World's first pioneer Robot Science Museum. According to the announcement of MAA on their web page (www.melikealtinisik.com) "The competition which was hosted by The Seoul Metropolitan Government called for the ideas to design Seoul Robot Science Museum (RSM) to support public education in robotics and increase the public knowledge and interests in robots". With their words the project is described as: "MAA's design for Robot Museum (RSM), which plays a catalytic role in advancing and promoting science, technology, and innovation throughout society is not only going to exhibit robots but actually from design, manufacturing to construction and services robots will be in charge. In other words RSM will start its 'first exhibition' with 'its own construction' by robots on site in early 2020 and is expected to be completed with the official opening slated for late 2022" (www.melikealtinisik.com). It seems on the near future of architectural praxis, including both the design side and the rhetoric, there will be a new jargon regenerated so soon in a totally different point of view.

Figure 31. Robot Science Museum, Seoul, South Korea**,** designed by MAA MELIKE ALTINISIK ARCHITECTS and Visualisation by Ediz Akyalçın www.melikealtinsisik.com

Conclusion

As new technologies and constructional techniques are developed, by the light of the words of Bijark Ingles, a pragmatic utopian architecture takes on the designing of socio-economically and environmentally perfect spaces, and yet every will of the humankind started to become real as a practical objective; thus, we assume that we are living on the age and land of Yes is More!

It seems rather than contextual background creation, all of the selected examples are located on *a fictional conceptual bases*, in the words of Sagdic, once indicated on her book-chapter titled, Searching of the Concept on 21st Century: A Comparison Between World Architecture Examples and Turkish Architecture Examples, in 2017. She added that, "these fictional conceptual bases are more effectively shaping the form geometry of buildings and contemporary architecture examples all over the world and as it is seen and understood from examples", the geometrical form based on production of extravaganza, "where extravaganza is more powerful on the market, not only to sell the construction, but also to have a place on architectural discourse and history; thus, it is understood that architects", by a deep impact of their feelings, "thus, it is understood that architects are forced to make/ design their creations under *the deep impact* of finding/ creating *a popular concept*" rather than giving attention to context, where neo-liberal economies make everything more easier on this point of view.

All of the above examples are for users to make a kind of "venue experience"; the places used by aristocratic or bourgeoisie which cannot be reached / reached, or places where a life is not possible, to offer thematic fictions for the purpose of making a premium with this feature and with this feature, produced. All examples are copies of a building complex in another city or another country, or even more replicas of a city, independent of where it was built. However, one of these examples, The Beamish Museum, is a region that is already existed. It has been designed as an open-air museum, to present the process since 1820 to visitors, with the improvement of existing buildings in this town-land and by the reconstruction of extinct structures.

As a result of these projects; the history of a town, the important architectural structures of an iconic city, simulating the places of a historical building and presenting it to the user are determined as common points for all examples. Simulative architectures that become part of real life after the film scenes create an artificial reality for the user. In parallel with the rapid increase observed in today's technological age of life, it is inevitable that the architecture will increase.

It seems that as once Ingles said "Yes is more", on the architectural tectonic it might be a new age for architects who would like to say "the strongest of us is gonna be the most adaptable to change" and who is going to create designs for a *robotic production base,* it seems, might be the one who will be standed as the most adaptable to change; who will write down the most appropriate architectural rhetoric. Thus it seems, it will be a proper future for pioneer architects, who might indite the architectural praxis as a formulation of manufacturing of the robotic based tectonic. It might be a future for star architects who will give architectural creations as results of a robotmanship just like to the craftsmanship of Arts & Crafts Movement, and write down a new rhetoric that supports robotic architectural production on the architectural field.

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OPPORTUNITIES FOR TRANSFORMATION THROUGH ADAPTIVE DESIGN: EMERGENT STUDENT WORK

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Abstract

The Design Research Studio, Studio Adapt! in the post-graduate architecture programme at the University of Cape Town, engaged with transformation through the adaptive redesign of existing structures. This paper will look at activities undertaken by students in the studio environment during the 2017 and 2018 academic years.

Starting with the premise that a building could be understood as standing in for abstract thought, the studio introduced the students to a range of theories. Seminars on the found object in art, significance in heritage studies, gentrification, the right to the city, conflicting rationalities, social transformation through spatial transformation and sustainability, encouraged the students to address the problem from multiple angles.

More specific concepts were identified by each individual student through field work, including mappings and conversations with the various stakeholders of their selected sites. The students were required to identify the specific characteristics, challenges and potentials of their sites of study and to allow the found potentials to guide their investigations and design moves. Students were encouraged to treat their design interventions as a means through which to instigate dialogue between various conflicting positions surrounding their sites and areas of investigation, and they were required to consider the social and material implications of interventions on a site.

Projects by students, both theoretical and practical, are used in this paper to illustrate concepts that hold potential for transformative design practices in adaptive reuse. The research reveals issues of interest embedded in the selected sites and presents possible approaches towards the transformation of the city through a series of design propositions presented by students. These include issues such as the right to the city and social justice, typological disruptions, programmatic adaptations, memory and archaeology, and the adaptation of ways of making.

In all cases, the students built on the theoretical framework offered by the studio seminars through a careful reading of the specific character of the existing building, following the narratives provided by the tension between the found form and the new demands brought about by a changed context. In every case the existing was evaluated for what it might offer. Through a series of imaginative explorations, interventions involving various combinations of preservation, erasure and addition, were tested for how they might unlock the hidden potential of these found buildings to contribute to social transformation through their spatial and material transformation.

Key words: Adaptive reuse, specificity, socio-spatial transformation, student work.

Word Count: 6073

Introduction

Studio Adapt! has been one of four Design Research Studios in the Honours and Masters architectural programmes at the University of Cape Town since 2016. The Design Research Studio model aimed to improve the depth of design investigation of Masters' dissertations in architecture. This model allowed for Honours and Masters

students to work side-by-side within a studio whose focus was narrowed and defined by two studio teachers. A seminar-based theory course was embedded within the studio that gave students the opportunity to develop ideas through staff and peer presentations and discussions, and to research and write up a focus of interest that would improve the depth of their design investigations.

In Studio Adapt! the students were challenged to design interventions for existing structures in response to change. Adaptive design relies on the potential of old structures to be reimagined for new use, the selective erasure of parts required to unlock that potential, and the insertion of new elements to complete the design.

The position of this studio has been to explore transformation through adaptive design, treating the found building as the "crystallisation of abstract thought" (Bhabha, 2007). Students were required to research through walking and mapping, to engage with the built fabric and the people who inhabit it. They were challenged to identify the specific characteristics, challenges and potentials of their building sites and to allow the found potentials to guide their design moves. They were encouraged to treat their design interventions as a means through which to instigate dialogue between the various conflicting positions surrounding their sites and areas of investigation. Writings by Vanessa Watson (2003) offer an awareness of the conflicting rationalities that exist between communities and the governing structures intended to serve them. The students were required to interpret conflicting information and to use it to generate ideas for designs that aim to transform the environment in response to needs revealed through dialogues with stakeholders. They considered the existing city as made up of "strategies", ways in which the city is controlled or governed, and how these may conflict with the needs of the people living in it (de Certeau, 1984). The students were challenged to design a "counter-strategy" (Low, 2005) that will either accommodate the needs of its users or new emerging demands on the environment or building.

The adaptation of the old buildings begins, in the studio, with an interpretation of their meanings and, through imagination, transforms them into structures that can stand for new meanings relevant to current conditions (Low, 2003). Social transformation requires spatial transformation that is more than just a material or superficial improvement of space. It implies a corresponding change in the way of seeing, understanding and representing space (Allen, 2000). The term 'transformation' refers to changes in the theoretical and practical approach within the discipline that can lead to meaningful dialogue with changing realities. These realities can be social, but they might equally refer to the global scarcity of resources, the global disparity between rich and poor, and changes effected by on-going innovation in transportation and information technologies (Tschumi and Berman 2003: 285).

The embedded seminar series, presented by studio lecturers, invited guests and students themselves, provided a wide range of approaches towards adaptive reuse as a platform on which students could then add further readings guided by their individual investigations and design explorations. Presentations included global trends in the emerging field of adaptive reuse, learning from the 'found object' in art, the 'right to the city' by social activists, concepts of 'significance' and 'authenticity' from heritage studies, issues around 'gentrification' and developer-driven interventions, and concerns around 'environmental sustainability'.

The idea of the right to the city is presented both as a theoretical framework (Lefebvre, 1995) and in its practical lived reality in the city of Cape Town through Reclaim the City, an activist movement supported by the NGO *Ndifuna Ukwazi*, that challenges the city to provide centrally located temporary public housing for citizens evicted from private properties. These properties are typically destined for large lucrative developments with tax rebates offered by the city to stimulate development, but they can have devastating implications for tenants who have lived for generations in these neighbourhoods. This activist group has identified abandoned or underutilised municipal buildings such as schools, hospitals and hostels for nursing staff, that could be adapted for housing in the city without falling prey to gentrification. Gentrification is a condition discussed in the seminars, through which value systems are emphasised as key to adaptive design.

To emphasise the importance of imagination, adaptive reuse is likened to the found object or the 'ready-made' in art, through which several principles are explored that open the scope for design possibilities. The students are challenged to identify the specific characteristics, challenges and potentials of their sites of study and to allow the building, as found object, to guide their design moves.

During the design process in the studio, several exercises are introduced to stimulate imagination for the transformation of the found. These are: working with partners to brainstorm multiple design possibilities; the physical transformation of a found object, exploring its potential to become something else; the use of a three-dimensional photogrammetry app to generate a point-cloud model of the found through which interventions can be tested; the quick production of diagrams, to test possibilities; the use of collage to explore the qualitative characteristics of spaces in the found building juxtaposed with the possible qualities of the new; design through section to establish the scale relationship of the body to the found structure and the surrounding context; and the building of material models through which the found building can be thoroughly understood and analysed.

The work of students, both theoretical and practical, has been used here to illustrate concepts that hold potential for transformative design practices in adaptive reuse. The research reveals issues of interest embedded in the selected sites and presents possible approaches towards the transformation of the city through a series of design propositions presented by students. These include issues such as the right to the city and social justice, typological disruptions, programmatic adaptations, memory and archaeology, and the adaptation of ways of making.

Figure 1. “The Found Object” project where students are required to physically transform random household projects into something new (Authors, 2018).

The Right to the City and adapting for social justice

The Right to the City, as proposed by Henry Lefebvre in his book *Le Droit à la Ville* in 1968, has found a strong resonance in contemporary South Africa, and particularly in the City of Cape Town. This city’s persisting socio-spatial marginalisation is due to many factors, including the net results of pre-democracy *Apartheid* spatial planning practices, urbanisation, population growth, poverty, unemployment, and a high inequality rate. Spatial marginalisation and displacement are restricting access to the City and its potential employment opportunities: Transport is expensive and travel times to and from Cape Town’s peripheral neighbourhoods are long. At the same time, there is underutilised and surplus building stock in the City which can be adapted from its current use to a mixed-use model with a high percentage of residential stock, specifically, social housing, affordable housing and transitional housing.

Figure 2. A section and a diagram of the adapted Helen Bowden Nurses Home showing the process of subtraction that allows for more social engagement on and across levels (Bezuidenhout 2017).

As noted by Harvey (2012: 22), there are many urban social movements in existence, but he argues that they

should focus on gaining control of the surplus in the City. While this implies financial surplus, it can also be regarded as spatial surplus. An organisation in Cape Town called *Ndifuna Ukwazi* is actively promoting the supply of transitional housing and it argues that "It is possible and cheaper to use existing public buildings for transitional housing or purchase suitable affordable office, commercial and industrial buildings that are structurally sound and do not require significant repairs." (Pillay, Russell, Sendin, Sithole, Budlender, & Knoetze, 2017: 50) It describes the disused Ahmed Kathrada House (formerly the Helen Bowden Nurses Home) in Greenpoint as an ideal opportunity for such an adaptation. This Brutalist building has been occupied by activists who are demanding that the City releases it for housing. The thesis project *Adapting to Transformation* (Bezuidenhout, 2017) explores the adaptive potential of this building, and it aims to show how adaptive design can contribute to social, economic and environmental sustainability. It proposes a mixed-use programme where commercial activities and additions to the building cross-subsidise the social housing component, which is accommodated in the former apartments' framework that has been modified to allow for social engagement and the integration of residents from different income groups.

As opposed to adapting an underutilised building, *Architectural Space in Marginalised Communities* (Zuma, 2018) explores the spatial characteristics and adaptive potential of the oversubscribed *Old Flat Hostels* in Langa, Cape Town. These buildings were originally built by the *Apartheid* government to house male African migrant labourers who predominantly came from rural areas in the Eastern Cape. The rooms were small and there was a severe lack of social space for the labourers; this condition was exacerbated due to an increase in migrant populations in the 1970s, driven by rural unemployment, to such an extent that the hostel buildings in Langa, Nyanga and Gugulethu housed an average of four people per bed in the 1980s. The *Old Flat Hostels* in Langa are currently occupied by families and single people who are sharing accommodation, with an average of 1.8 people per bed (the best ratio of all the old hostel buildings) and a staggering ratio of 31 people per toilet (Ramphele, 1993: 26).

Figure 3. The Old Flat Hostels highlighted within the wider context of Langa, showing the lack of thresholds and the undefined public space between the hostel buildings. (Google Earth image adapted by Zuma, 2018).

In her book *A Bed Called Home*, Ramphele uses the bed as the common spatial denominator in the hostels. She argues that space is multi-dimensional, and she describes these dimensions as "physical, political-economic, ideological-intellectual and psycho-social" (1993: 2). The adaptation project used this as a starting point to expand the existing building, to allow more dignified living spaces and public spaces, commercial and educational opportunities, and a healthier social environment. By combining a few former two-bed rooms, incorporating the former central passage, and expanding outwards, a series of comfortable family apartments were created to provide dignified dwelling spaces. Combined with educational facilities and commercial opportunities on ground level and a youth hostel in the top level (which consists of bedroom pods that are a tongue-in-cheek reference to *A Bed Called Home*), the adaptation allows for a variety of occupants. The expanded buildings provide a series of thresholds between the commercially active sidewalks and new semi-private internal courtyards, thereby combatting the sense of alienation and placelessness that can be seen in Figure 3. In both examples, adaptation holds the key to unlocking the potential of existing buildings to engage with the issues of social justice and the Right to the City, and through that, to allow for the possibility of social transformation.

The Modern Project and typological disruption

Güney (1992: 8) describes the theory of type in terms of modernist ideology as being focused on the production process where standardisation and typification were used as a basis for projects: "Type in the processes of mass-production required repetition, type had become prototype. The discussion on types by the various protagonists resulted in a conformation with the rules of industrial capitalism and lead [sic] to the idea of prototypes mechanically and serially produced ad infinitum." This practice is also evident in Cape Town where the foreshore precinct in the Central Business District (CBD) was designed in accordance with modernist principles and was followed by the design of numerous tall buildings based on the modernist type. These buildings are predominantly mono-functional office buildings which are in many cases partly vacant, and like the buildings in the previous section, they present an opportunity to investigate the potential of adapting them for other uses, specifically, inner-city housing for the poor. The adaptation, particularly of the tower block, is however generally less about the new programme, and more about the challenges associated with the type itself and how to imagine new ways of inhabiting it and making it climatically suitable to its environment.

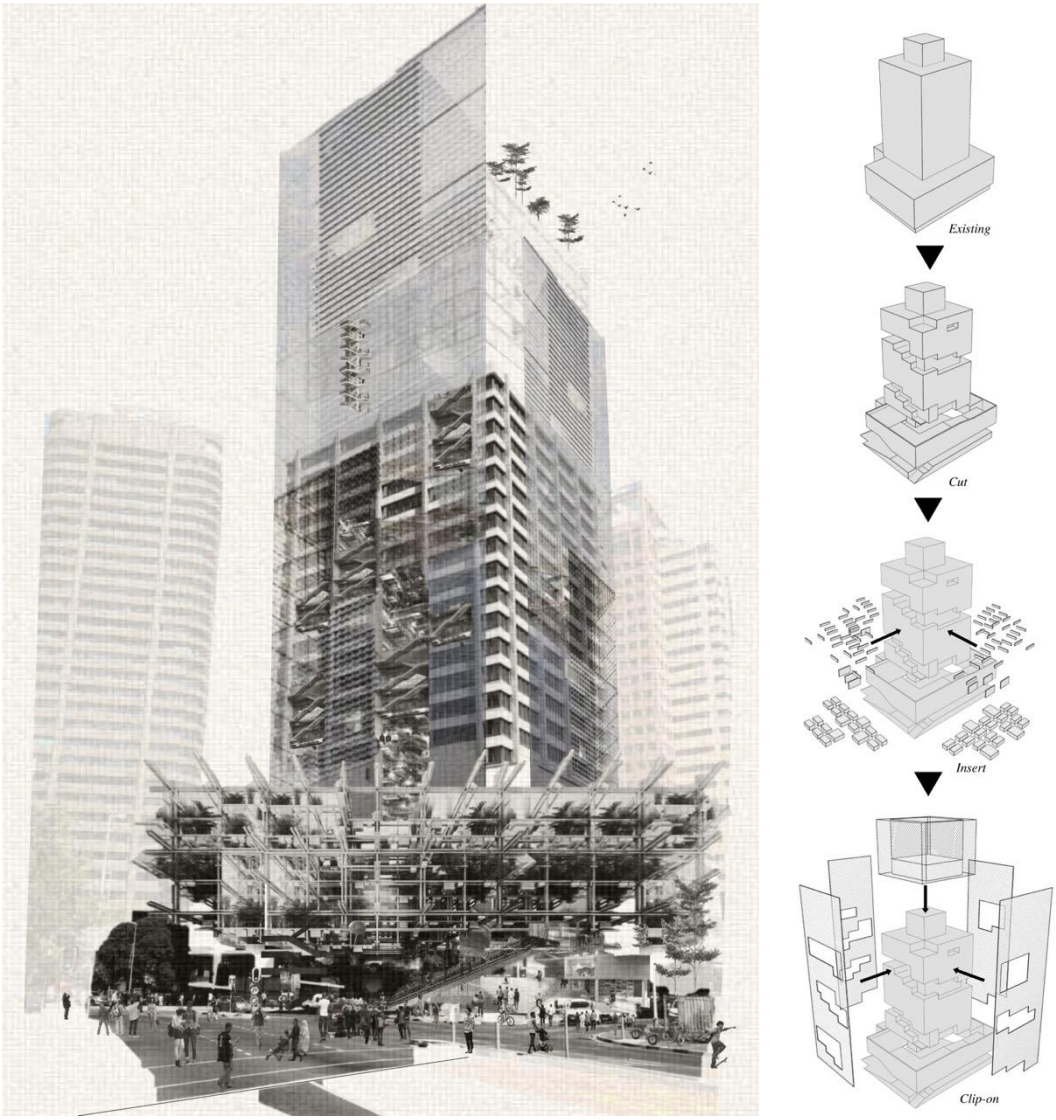

Figure 4. A collage showing the adaptation of *Mobil House*, a modernist skyscraper in Cape Town, and the key adaptation moves employed to facilitate the transformation. (Bischof, 2018).

In *(Re)Imagining an Underused Mono-Functional Office Tower in the Cape Town CBD: The Case of Mobil House,* Bischof (2018) investigated the Downtown Athletics Club in New York, designed by Starrett and Van Vleck in 1931. Rem Koolhaas describes it in his book *Delirious New York* as a "constructivist social condenser: a machine to generate and intensify desirable forms of human intercourse" (Koolhaas, 1978: 152). This building, which housed a range of sporting activities throughout its height, was criticised as being artificial and having a lack of connection across floors. By investigating Alison Smithson's "mat-building" theory, the aim was to address this criticism by improving connectivity across floors, facilitating easier access, and allowing for a mix of programmes. Candilis, Josic, Woods and Schiedhelm's *Free Berlin University* has been identified as a mat-building, and it has also been referred to as a "ground-scraper" that offered improved social connectivity on a horizontal plane. Applying the ground-scraper's

principles to a skyscraper provided a lens through which to challenge various preconceptions of the tower block type.

The value of the tower block, according to Bischof, lies in its robustness, its potential flexibility and the high embodied energy embedded within it. The adaptation of Mobil House challenges the lack of access to the City, and offers access to all levels of the tower, by providing an intricate weaving of public programme and private programme (which consists of a mix of housing types for different incomes). This programmatic weaving required the disruption of the tower's podium, basements, circulation systems, roof, and skin, amongst others. The most visible disruptions include the excavated podium, a spiralling promenade along the building's perimeter that alternates between public and private use, a new façade treatment, and the additional floors at the top of the building which house a public sports facility; the mixed-use cross-programming envisages a combination of both public and private uses along the entire height of the tower block, in what could be regarded as facilitating the general public's Right to the City's skyline.

A similarly difficult mono-functional type is the sports stadium. This building type is often constructed specifically for a mega-event, after which it can sometimes fall into disuse, or be demolished, or if it is still used regularly, it is often economically unsustainable. The Cape Town Stadium, which was built for the 2010 FIFA World Cup is a case in point, and its commercialisation is currently being investigated. The project *The Afterlife of Megastructures: In the Aftermath of Mega-Events, the Case of Cape Town Stadium* by Mwedzi (2017) tested the potential of turning the stadium-type into a multi-functional civic, educational and commercial entity which is programmatically tied to its surrounding context. In a similar way to Bischof, Mwedzi valued the robustness of the existing structure, and he used Metabolist theory as an approach to differentiate between permanent structural elements and transient programme-specific elements. The deep floor plates represented a particular challenge environmentally, as did the building's size; approaches like Rayner Banham's "Megastructures", Kenneth Frampton's "Megaform", Rem Koolhaas' "Big", and David Gissen's "Big and Green" were investigated to find ways to engage with the building's scale.

The key to disrupting type seems to be the clear identification of what the found building's inherent values are, and which adjustments need to be made to make it socially, economically, and environmentally sustainable, while being more rooted in its context. Mwedzi (2017: 59) notes that Cape Town Stadium and its surrounding urban context is alienating and inaccessible in many ways and that the Stadium's public role should be re-acknowledged. He argues that adaptation of this type can provide "the prospect of changing the legacy of the Stadium from one of underutilisation and public financial burden to one of nurturing self-sustaining talent and to public service, recreation, engagement and education."

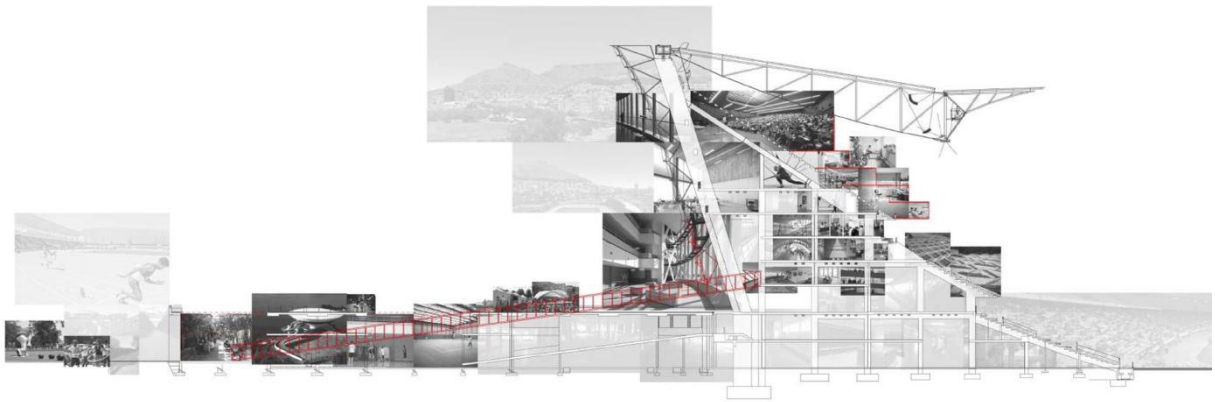

Figure 5. A sectional collage showing the stadium's existing structure overlaid with photographs of the proposed new activities and conceptual interventions in red. (Mwedzi, 2017).

Programmatic adaptations

While programmatic adaptation has some similarities to typological disruption, it usually retains the primary existing programme (sometimes in conjunction with additional new programme) and it aims to optimise the existing programme or to adjust it for changing conditions. This type of adaptation often occurs in light-industrial manufacturing areas that are situated in good locations close to the city centre: Property values in these areas are prone to increase and sprawling single-storey factories or production facilities operated by a single entity generally must make way for other commercial uses or high-end residential development. This often results in gentrification, and it can result in job losses if the production facilities have to relocate beyond the reach of their employees.

Saville (2017) investigated the potential of verticalizing a former single-storey leather factory to democratise the ground plane and to activate the building as a social condenser in a predominantly industrial area with limited public space. Using Rappaport's concept of *Industrial Urbanism* (2015) as a reference model, space was created for smaller local retailers on the now accessible ground plane, while the singular horizontal productive model was changed to a

multi-tenant model with productive linkages in an adaptable tower. The aim was that the adaptation would become an enabler for small-scale local craft industries to access global markets within a networked productive condition that is referred to as a Community Workshop Model, and that the accessible nature of the building will improve social interaction in the area without displacement of the community.

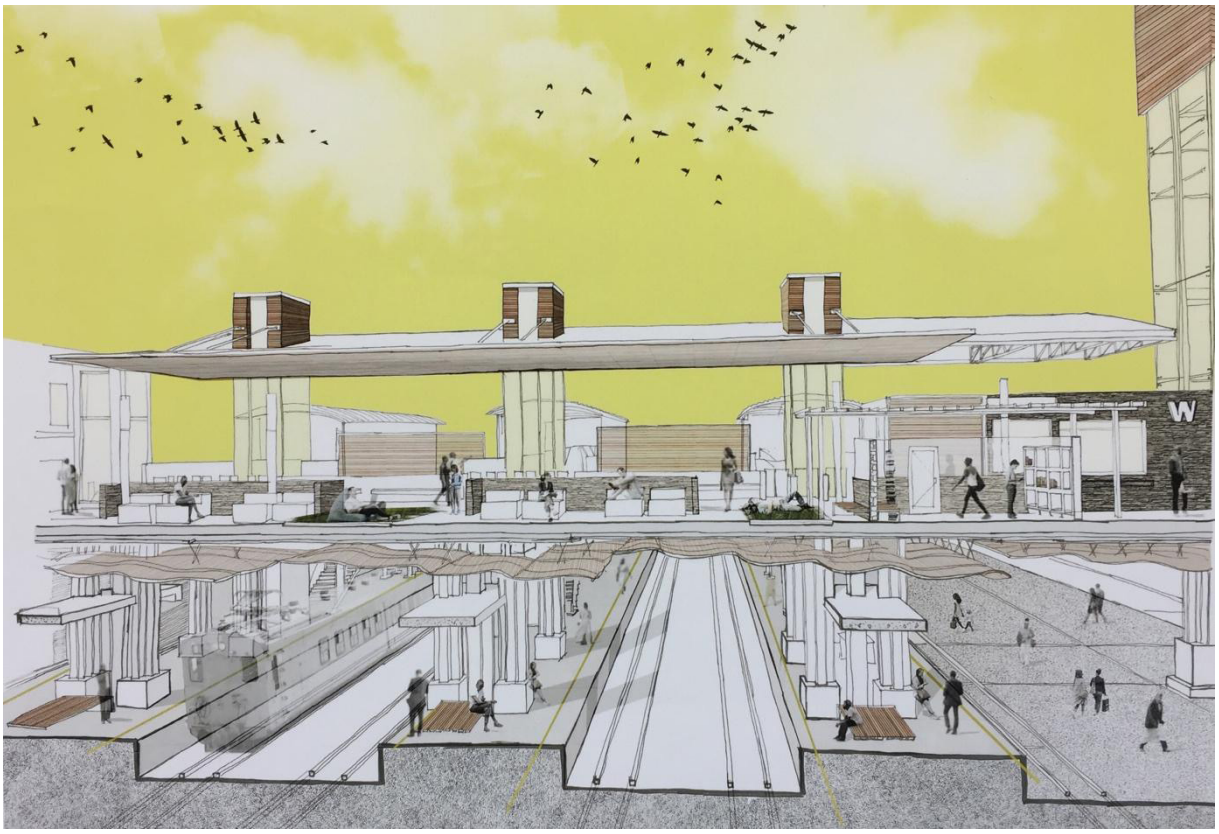

Figure 6. The new public plaza over the platforms at Woodstock Station, Cape Town. (Komane, 2018).

In *Architecture + Intimacy: A Place for Pause*, Komane (2018) programmatically adapted Woodstock station, which is an important transport interchange linking Cape Town's rail, bus and minibus transport systems. The movement flow of both rail commuters and pedestrians wishing to cross the railway tracks was combined into a raised public plaza with controlled access to the platforms. This was done to increase the efficiency of movement, to improve public safety, and to allow for commercial opportunities and homework space for learners. The aim was to counter the sense of alienation that can be experienced in areas of rapid movement by designing spaces for pause, intimacy, and refuge – both in terms of planning and programmatic terms, but also in terms of sensory experience. In both programmatic adaptation projects, a wider urban contextual analysis and a clear understanding of programme were required to be able to adapt both productive flows and social opportunities optimally. While the programmatic adaptation improved efficiencies, it was primarily aimed at improving social conditions and a person's experience in the building and its surrounding urban fabric. Speaking about a very personal experience, Komane (2018: 5) writes:

"The quick pace of my movement has been temporarily paused… This sudden change in my movement and the atmosphere begins to change my mood. The densely packed information clouding my brain begins to weigh less as I sit and contemplate this space. The now. The present. At this moment, it is in this atmosphere, this moment of pause that I am most at peace."

The lack of refuge in an often-frenetic urban environment can be detrimental to a person's physical, mental and emotional wellbeing but if an inclusive space of pause can be created through adaptation, it can transform an existing place and the wellbeing of its inhabitants without the negative effects of displacement or by replacing a sense of alienation with an alien object after demolition.

Memory and archaeology

Pierre Nora wrote extensively about sites of memory and he argues that while places can easily have embedded memory, they can also become symbolic and have deeper meaning for a specific society by becoming part of its identity. Writing about remnants of the past he notes that "We no longer inhabit that past, we only commune with it through vestiges – vestiges, moreover, which have become mysterious to us, and which [we] would do well to question, since they hold the key to our 'identity', to who we are." (Nora, 2002: 6) Wren-Sargent used this link between memory and identity to adapt Cape Town's former Non-White Main Line Concourse in his thesis

Engaging Vestiges of Negative Social Memory: From an Order of Segregation to Linkage (2017). He argues that this building was a tool of the *Apartheid* government and, like the buildings in Johannesburg's Constitution Hill, is a symbol of former oppression and segregation. His project aimed not to erase this negative social memory, but to adapt it into a site of learning where visitors can reflect on the past; the adaptation was approached so that "stigmatised historical buildings may be interacted with architecturally to benefit society." (Wren-Sargent, 2017: 8) The intentional spatial domination of the building is countered through the juxtaposition with newly inserted elements that are in dialogue with the existing. Improved spatial connectivity, visual linkages, the incisions that allow light deep into the oppressive platform spaces, and the removal of spatial hierarchies transform it into a democratic social gathering space that invites commuters to pause (similar to Komane's intervention) and interact with each other and the building.

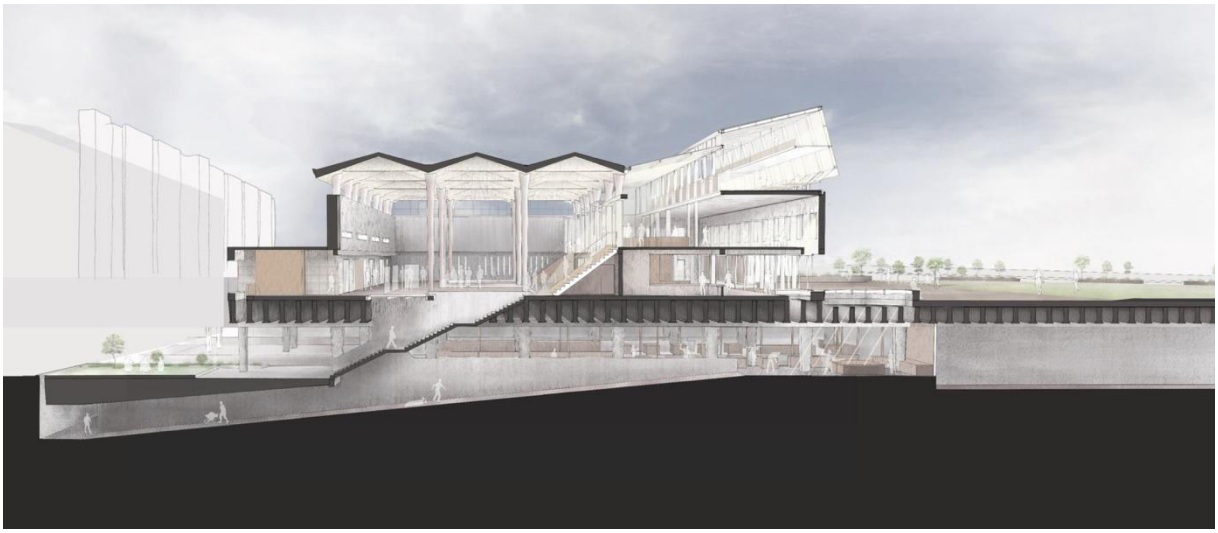

Figure 7. A section through the adapted "Non-White Main Line Concourse" showing some of the adaptation strategies, including juxtaposition, incision, spatial connectivity and the intentional atmospheric manipulation of light. (Wren-Sargent, 2017).

A strong sense of negative social memory also persists in the area known as District Six in Cape Town. The community that formerly lived in District Six was forcibly removed by the *Apartheid* government under the Group Areas Act and almost all the buildings were demolished. Lehabe, in her project *In Service, On Common Ground: Finding Commonality Between User, Architecture and Landscape through the Ritual of Dining* (2017), engages directly with the complex issues surrounding this contested space. She uses the terms of transference, translation and ambiguity to frame her investigation, and while she admits that ambiguity is often perceived as negative, she searches for multiple meanings within ambiguity to generate a stronger connection between a person and his or her environment. Her programme of a Service Dining Room that provides food for marginalised people adds further layers of complexity to the project.

"District Six is a site of ruin and decay, a ruin that not only speaks of the past but continues to breathe into the present and into the future. It is a living ruin. The ruin seen as void, becomes the absence of what was there before. What makes this absence so powerful, is that it is not a void of silence but one that speaks. It speaks, in the language of translation, thus, the spoken word remains alive. The fact that the ruin is alive, alludes to a temporal quality. The void represents perplexity and complexity, therefore becoming ambiguous in nature." (Lehabe, 2017: 27)

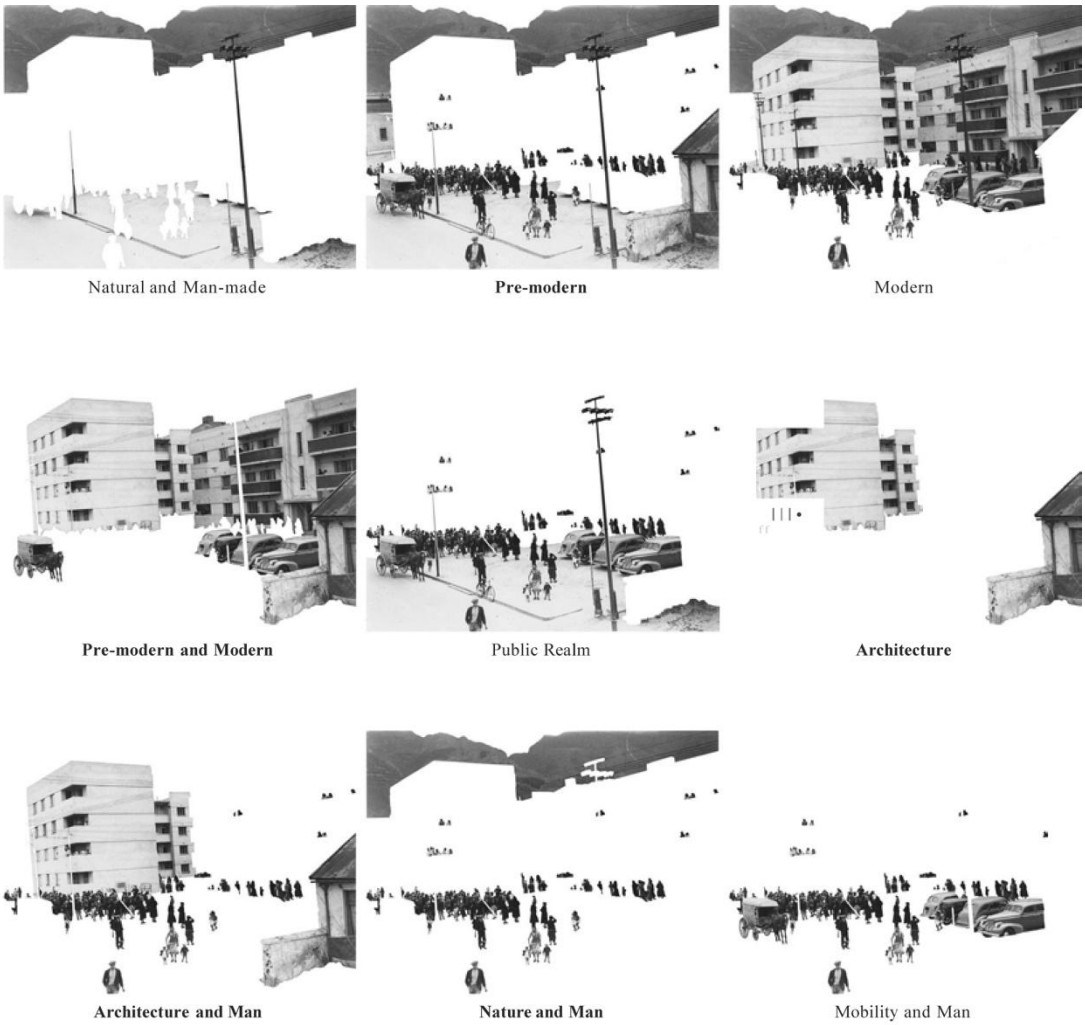

Figure 8. An analysis of the Bloemhof Flats, which were built in 1938 following slums clearance in Wells Square (which was renamed Canterbury Square), identifies multiple meanings or readings of the space to emphasise relationships between specific elements by creating a void between and around them. (Original photographer unknown, The National Library of South Africa, adapted by Lehabe, 2017).

In another project called *Biotic Machine* (Austin, 2018), beauty is found in the ruin of the former Collier's Jetty in Cape Town's harbour. Austin set out to preserve its weathered character and its economic importance to the local fishing community in the context of the rapidly gentrifying Victoria and Alfred Waterfront. It is a liminal site that separates the touristic Waterfront (which includes the new Zeitz MOCAA) and a working fishing harbour. His project explores ways of combining these two aspects to provide benefit to both, but by purposefully privileging the fishing community by inserting a range of additional commercial opportunities that build on their existing skill base. He cites Douet (2012: 8) who stated that "To advocate preservation of a redundant industrial site, basing the arguments on traditional heritage values, does not always look attractive to a community afflicted by economic collapse or high levels of unemployment."

Something that all three of these projects have in common is their thorough analysis of the found building: They all involved "excavations" or "biopsies" of the found building or space that allowed a clear identification or taxonomy to be made of its constituent parts. This was done spatially, structurally and materially to relate its physical elements to its socio-cultural meaning which is more than the sum of its parts. They aimed to retain, and in some instances, emphasise the embedded memory and symbolism, despite the fact that these memories are often painful. The commonality between Lehabe's and Austin's work, however, is that both projects engage with the ruin in such a way that it serves the vulnerable communities in a contested space by uncovering the value inherent in the ruin.

Figure 9. An initial collage that attempted to capture the industrial character of the site and a rendering of the final project that shows the inclusive nature of the final intervention. (Austin, 2018).

Adapting ways of making

The process of adapting existing buildings for social transformation can be augmented by adaptations of local construction technologies which will provide a platform for local involvement in the transformation of the existing buildings. All three projects described here touched on the idea of architecture as having agency for social and material transformation. This can take the form of adapting locally available craft skills, as was done in *Re_Skill* by Siebert (2018) by analysing boat-building methods in Hout Bay Harbour, and designing methods of adapting these for use in building construction. The process of adapting the production of the building was combined with the adaptation of the building itself and of its context to allow improved connectivity for the marginalised community of Hangberg, and by designing for potential future adaptability of the spaces and programme by using Herman Hertzberger's concept of polyvalence (1991: 146).

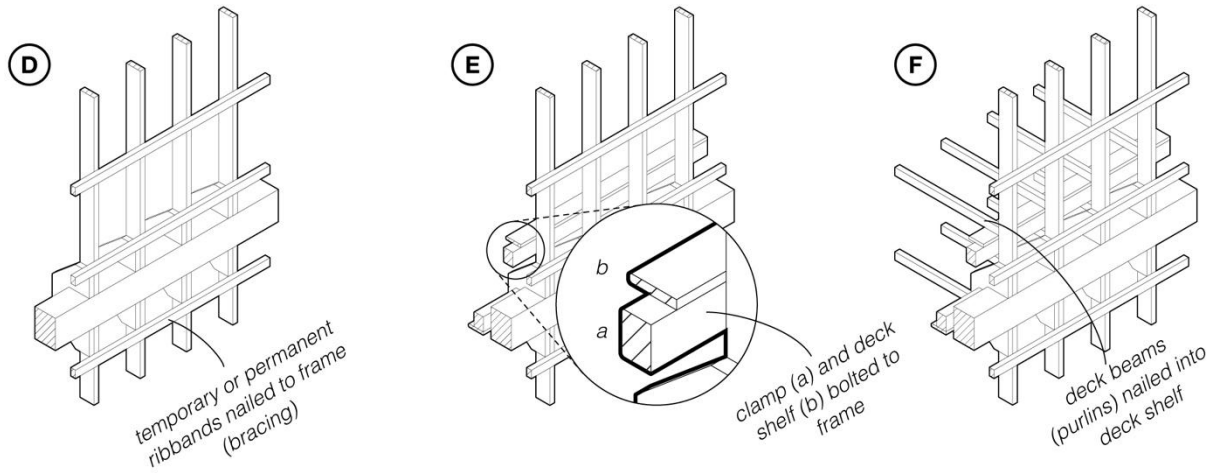

Figure 10. An extract from a building manual created by Siebert that demonstrates the processes of adapting boat building technologies for building construction. (Siebert, 2018).

Madolo (2017) investigated the material sustainability of indigenous timber and the socio-economic benefits that can be designed in by specifying locally grown and sustainably harvested timber, the use of local craft skills in its processing and the upskilling of local labourers for its use in construction. Malan (2017) on the other hand used material normally regarded as waste to construct her adaptation of an existing waste handling facility in the Western Cape town of Kleinmond. She describes the commonality between both site and material as being regarded as residual. She argues that the "relationship between waste materials, waste infrastructure, society, and the urban and natural landscape needs critical evaluation." (2017: np) The project's aim was to contribute to

the creation of a circular economy, to use waste as an employment generator, and to design the building to be a mechanism that can address the divided spatial legacy of the town. This was done through improved connectivity, access, and designing the recycling depot as a commercial and touristic drawcard, through a re-valuing of discarded materials and the re-valuing of a discarded community.

Figure 11. A perspective through a communal space demonstrates how an existing concrete frame office building can be transformed by inserting sustainably sourced timber elements (Madolo, 2017).

Conclusion

These student projects mostly grappled with multiple issues simultaneously, and despite being grouped into specific themes, they all aimed to address social transformation through adaptative design. This was done either by improving the public's experience of a building, by improving its potential for social interaction, by disrupting monolithic mono-functional structures, by addressing the very real need of access to the city and its inherent opportunities, or by preserving traditions or memories of the past.

In all cases, the students built on the theoretical framework offered by the studio seminars through a careful reading of the specific character of the existing building, following the narratives provided by the tension between the found form and the new demands brought about by a changed context. In every case the existing was evaluated for what it might offer. Through a series of imaginative explorations, interventions involving various combinations of preservation, erasure and addition, were tested for how they might unlock the hidden potential of these found buildings to contribute to social transformation through their spatial and material adaptation.

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AIRPORT TRANSFORMATION IN GREENFIELD PRODUCTION, A COMPARISON STUDY OF ATATÜRK AIRPORT

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Abstract

Cities, which are living mechanisms, are in continuous transformation and development process. They expand physically, increase their population, and undergo changes over time while consuming their existing resources. One of the areas that had to change as a result of these urbanization processes is greyfields such as shopping centers, airports, and military areas that have lost their function. Airports, which entered our lives in the 20th century, are the areas that remained amid in intense urbanization in time, unable to expand their capacities due to the intense urbanization and forced to move to the edge of the cities. The transformation processes of these remaining areas are the subject of this study. Many airports in the world have been transformed in this way. Atatürk Airport in Istanbul is also about to change as one of the failed airports. The airport has begun a transformation process that is still in the project stage. Although two years have passed since the announcement of the project, no final decision has been made, and the project has not yet started. Airport land has been used for festivals, cargo, and private flights. Therefore, the examples from around the world that have undergone a successful transformation will be examined under the headings to be descriptive for the Atatürk Airport. The example transformations, which are generally transformed as green, residential and commercial areas, will be examined according to public participation, decision mechanisms, sustainability context, and architectural competition criteria within the scope of the study and will be compared with the transformation process of the Atatürk Airport. As a result of the study, Atatürk Airport has the potential of a successful transformation to a greenfield, if the decision-makers can lead the public and creative industries to contribute to the process of sustainable transformation. With this comparison study, it is aimed to shed light on the potential transformation process of the Atatürk Airport.

Keywords: greyfield; airport transformation; Atatürk airport
Word Count: 7969

1. INTRODUCTION

The density in the cities is increasing rapidly. According to the United Nations (UN) today, 55% of the world's population lives in urban areas, which are expected to increase to 68% by 2050 (UN, 2018). This situation will increase the need for more urban land for housing and urban infrastructure. On the other hand, cities need green areas which provide many environmental and social benefits with a higher quality of life. However, urban planning

policies and population growth in cities lead to uneven distribution of urban green areas and transformation into residential areas (Kabisch & Haase, 2014). Unfortunately, cities that cannot provide enough space to thrive will begin to use existing green areas, and lead to transformations that result in a lower quality of life. To make this transformation more sustainable, it is necessary to consider the need for new green areas while protecting existing ones as much as possible. One of the successful examples applied in the world is to create more urban green areas by transforming urban lands that have been used extensively in the past and have lost their function recently within the urbanization process. Such fields are referred to as greyfields in the literature. Greyfield term usually refers to derelict shopping centers, airports, military areas, and such real estates. The name is given because of their vast area of parking lots which paved with asphalt. However, this study only covers airports as one of the greyfields.

Airports are one of the most critical areas that have lost their functions and need to be moved out of the city centers by urbanization. In the world, a large number of airports have been out of use and turned into other functions for various reasons. Some of them were transformed into green areas due to ecological concerns and urban needs.

A recent example of these airports that are intended to transform into a green area is the Atatürk Airport which has lost its function in 2019. The new project of Atatürk Airport was presented to the public as an urban green area with a fair and congress center. However, there is a lack of official announcements. Project visuals, which are generally encountered in all news sources, are not included in any governmental sources. Therefore, the new functions of Atatürk Airport have not been clarified with the official approval of the project. At this stage, this paper aims to guide possible solutions with real-life examples. Decision-making processes, urban needs that affect the decisions, public reactions, and international design competitions are at the scope of this paper. To compare these examples with the case area, Atatürk Airport, the criteria will be detailed under the titles of public participation, sustainability context and design competitions, and decision-makers.

The primary research questions are;

- How and according to which criteria are the airports transformed in the world?
- Which of these criteria were evaluated for the Atatürk Airport, and what are the possible results of the project?

2. LITERATURE REVIEW

This section will first summarize the definitions and transformation processes of greyfields. Afterward, the transformation processes of airports in the context of greyfields will be described with the examples in the world.

2.1 Greyfield Definitions

The New Urbanism Congress in 2001, with its 'Greyfields into Goldfields' report, created the term 'Greyfield', which is often the place of derelict shopping malls and commercial sites surrounded by asphalt seas, and suggested taking back these remaining areas by adding new mixed-use, mixed-income, pedestrian-focused activities (Kim 2004). In this report, Lee Sobel describes the term; greyfield, due to their grey-colored structures and their vast area of parking lots, which is associated with failed shopping malls, which locate in the inner ring of suburban areas (Sobel 2002 as cited in W. Merritt 2007). Newton defines the terms as aging, occupied residential areas that are physically, technologically, and environmentally obsolescent but economically outdated, failing, or undercapitalized real estate properties located in the suburbs (Newton, 2010).

2.2 Greyfield Transformation

There is a lack of a suitable term to clarify the situation where new functions and new uses are brought to a parcel or an area with a structure within it. There are a few terms in this issue; (re)conversion, (urban) transformation, (urban) development, reuse, redevelopment, reclamation, regeneration, and renewal. Table 1 lists the terms, and the most preferred terms are transformation and development. The transformation in urban scale is the conceptual equivalent of the changes experienced by the urban space in the physical, social, and economic context. According to Roberts and Sykes (2000), urban transformation is a comprehensive and integrated vision and action that aims to bring a continual development to the economic, physical, social and environmental conditions of an area that has undergone change and pioneers the solution of urban problems. According to McCormick et al. (2013), sustainable urban transformation refers to structural transformation processes that can effectively direct urban development towards ambitious sustainability goals. The general concept of urban transformation includes concepts such as urban renewal, urban restructuring, urban gentrification, urban regeneration, and urban redevelopment (Tolga, 2006). It is one of the main tasks of urban design and urban planning to transform the greyfields into new functions and to connect them to the urban environmental fabric, which has long and complex processes and which is parallel to the economic, ecological and social transformation of the countries (Stangel, 2011).

Table 1. Terminology in the airport literature (Elaborated by the authors).

Term	Source
(Re)Conversion	Dümpelmann & Waldheim (2014); Bagaeen (2006); Favargiotti (2018)
(Urban) Transformation	Genco (2007); Damigos, et al. (2012); Kabisch & Haase (2014); North (2012); Favargiotti (2018); Loures & Panagopoulos (2007); Hess-Lüttich (2016); Best (2014); Németh & Langhorst, (2014)
(Urban) Development	Solnes & þorgeirsson (2006); Gómez-Navarro, et al. (2009); Roskamm (2014); Lange, et al. (2010); Gyurkovich (2011)
Reuse	Damigos & Kaliampakos (2012)
Redevelopment	Bagaeen (2006); Damigos & Laliotis (2010)
Reclamation	Loures & Panagopoulos (2007); Solnes & þorgeirsson (2006)
Regeneration	Damigos & Kaliampakos (2012); Bagaeen (2006); Favargiotti (2018)
Renewal	Favargiotti (2018); Loures & Panagopoulos (2007); Hess-Lüttich (2016)

In the abundance of these terminologies, the transformation of a greyfield into another urban function can be more easily explained by the term transformation. The transformation of such urban fields is seen as an opportunity to create cities that can adapt to changing conditions. Transformation of greyfields is demanded, especially in Australia and the United States. In the matter of Australia, the transformation of greyfields is about the housing market and the housing industry. This effort can be understood by the compact and mix-used urban development strategies of the low-density cities in these countries. According to the Australian Housing and Urban Research Institute (AHURI) Final Report, greyfields have become a key target for the city development strategies by the state government planning agencies, because these areas, which appear between the vibrant inner-city housing market and recently developed greenfield suburbs, provide excellent access to employment, public transport, and services (Newton et al., 2011). Therefore, the transformation of airports which have considerable large areas also plays a crucial role in urban development. Many examples from the world can be given to the transformation of commercial and military airports into different functional areas such as an urban park, agricultural land, and solar energy production (Table 2).

Table 2. List of airports in the process of transformation (Elaborated by the authors)

Airport	Location	Situation	Method	Result
Tempelhof	Berlin	Unchanged	Referendum	Public Park
Reykjavik	Iceland	Project level	Debate/Competition	-
Riem	Munich	Completed	Municipal	Multiple Usage
Taichung	Taiwan	Completed	Competition	Multiple Usage
Stapleton	Denver	In Progress	Foundation	-
Hellenikon	Athens	Partly Reused	Competition	-
Downsview	Toronto	Completed	Competition	Public Park
Caracas	Venezuela	In Progress	Competition	Public Park
Casablanca	Morocco	Project level	Competition	-
Oldenburg	Oldenburg	Completed	Government	Photovoltaic Plants
Kai Tak	Hong Kong	Completed	Government	-
Atatürk	Istanbul	Project level	Ministry	-

3. COMPARISON STUDY OF THE AIRPORT TRANSFORMATION

In this section, the listed airports will be detailed with their brief history and transformation processes. While highlighting the prominent transformation criteria, current situations, and recommendations for Atatürk airport will be included.

The former Atatürk Airport locates in the province of Bakırköy, 24 kilometers west of the city center, Taksim square, and the land is about 11 million m^2. The first civil air transportation in Turkey was initiated in 1912 in Yeşilköy Airport. In the 1930s, experts from developed countries were introduced to develop Turkish Civil Aviation, and the first flights were launched in 1938 between Istanbul and Ankara (Hoş, 2003). After the International Civil Aviation Agreement signed in Chicago in 1944, it was decided to build an international airport in Yeşilköy, Istanbul and the first airport of Istanbul was opened on August 1, 1953, under the name of 'Yeşilköy Airport' (Papila, 2014). The

name of the airport was changed to Atatürk Airport in 1985, and the commercial flights ended with the last flight to Singapore on April 6, 2019 (Alas & Yıldız, 2019). It has been stated that Atatürk Airport has filled its capacity and that it will have to carry passengers over its capacity in 2020. It was also stated that the third runway planned for the expansion works could not be built due to insufficient capacity and intense construction around the airport area and therefore the airport should be moved out of the city (Saldıraner, 2013). It is planned that the cargo flights and general aviation activities will continue for a while and then the land will be transformed into the 'Millet Bahçesi (Nation Garden)' (Figure 1) with the transformation of the terminal building into the congress and exhibition center (Barlas, 2018).

The first presentation of the project visuals (Figure 2) was announced by President Erdoğan in a joint broadcast of Kanal D and CNN TÜRK on June 7, 2018 that Atatürk Airport will be closed to flights and social facilities will be established under the name of the Nation Garden and he also states that such a large recreation area, which is approximately 4 times larger than the size of New York Central Park, is needed for the people of Istanbul (Sarp, 2019). The project, which was also shared with the public as a general election campaign by the Ministry of Environment and Urbanization and announced to be completed in 2018, is intended to be connected with the coast of the Marmara Sea and to be a green corridor of Istanbul with gardens, tea houses, walking and cycling paths (MEU, 2018). In the case of the implementation of the project, it is claimed that the Nation Garden, which will be established on a part of the airport land, will be the 3rd largest city park in the world compared to the international big city parks. The Nation Garden project is planned not only for Atatürk Airport, but also for various districts of Istanbul and the construction is undertaken by the Housing Development Administration of Turkey (Yeni Emlak, 2018). The proposed project for Atatürk Airport remained on the agenda for a concise time, and the public was only informed with a few project visuals. On the other hand, there are statistical evaluations based on the possible results of the land. According to the Tüvimer report in the Eko Yapı Magazine (2018), if active green space is established on the entire area of Atatürk Airport's 11 thousand 700 acres, the green area per person will increase by 52 m^2 (520%) in Bakırköy and 0.76 m^2 in Istanbul. This means a 10% increase compared to 2017 data from the Ministry of Environment and Urbanization. In addition to the green area assessment, the value of housing + trade mixed-use was also analyzed. Tüvimer, with the Tapusor data, states that the value of the airport land will be 234 billion TL, based on the average square meter value of the zoned land in the area, in the case of zoning for housing, and if the 3-story limited construction permit is increased by possible zoning changes, the value of the land will increase and it will become a dense settlement area (Yılmaz 2018).

Since the project presentation in 2018, the airport continues to be used with various festivals. Teknofest was held on 17-22 September, 2019 and Etnospor Festival was held on 3-6 October, 2019. On the other hand, it is seen that there are few official initiatives for the construction of the Nation Garden. On 27 September, 2019, the General Directorate of State Airports Authority (DHMI) announced a tender for the demolition of some existing buildings in order to demolish the area and build the Nation Garden (DHMI, 2019). Therefore, it is planned that the area will be in use with various public activities until the construction of the Nation Garden project begins.

3.1 Public Participation

Since 2007, in the planning process for the reuse of Tempelhof airport, Germany has included citizens, professionals and non-governmental organizations (NGOs) through internet forums, surveys, discussions, and presentations, as well as they, apply top-down strategies, such as the 'Parkland Tempelhof' architectural competition announced in 2010 (Dannenberg & Follmann, 2015). Thanks to the invitation to the citizens to propose provisional uses for determined plots, today it is a new product field, a contemporary urban square, and the most abundant open public space in the city with more than 2,000,000 visitors a year to enjoy its wide-open spaces (Favargiotti, 2018).

Architect Ernst Sagebiel was commissioned by Hitler to design the airport in 1935 but the Nazis never actually used Tempelhof as an airport; they used it as a factory to build fighter planes and weapons during the war (Shead, 2017). Although the historical meaning of Tempelhof airport, which is considered to be of historical importance in the world, is a symbol of freedom in individuals, the history of Tempelhof Airport is somewhat different and comprehensive with the violence and terror practices of the Nazis (Copley, 2017). Perhaps this symbol of freedom has shaped Berliners' desire to preserve this vast space as a public park where they can freely use it. In 2008 the airport was closed, and in 2010 it was opened to use as a recreational and leisure area. 'Parkland Tempelhof' architectural competition was announced for the Tempelhof Airport in Berlin and the proposal of GROSS.MAX (Figure 3), which was selected from 78 projects, was accepted in 2011 (AEST, 2011).

In May 2014 Berliners decided in a referendum not to allow construction on the edge of the airfield and to keep Tempelhofer Feld mainly as it was and in June 2014 a statute governing Tempelhofer Feld's conservation came into force (Grün Berlin Gruppe, 2016). The referendum was for the new use of the Berlin's largest park, the old Tempelhof Airport (3.55 km2), 64.3% of voters chose to keep the Tempelhof as it was (as a public park), after months of hard debates and a campaign supported by most media (Fahey, 2015). This referendum process was an example of a substantial misunderstanding between political forces, the city administration, and the people, and shows the necessity of an urban transformation process that can only be successful if all parties work together and understand each other's goals (Hess-Lüttich, 2016).

After the airport was closed in 2008, the giant terminals and hangars are used as concert venues, while the community uses the large open areas for cycling, running, running, dog walking, kite flying, horticulture and more (Baskas, 2017). The atmosphere (Figure 4) at the airport after the transformation was very viable and bustled with energy (Németh & Langhorst, 2014). Due to the refugee crisis in 2015, the hangars of the Tempelhof airport began to be used as a temporary shelter, and although plans were subsequently prepared to build a larger camp area, it was not accepted because the immigrants would be isolated from society (Hess-Lüttich, 2016).

The Tempelhof example is a powerful example of public participation and the resistance against all political forces and capital owners to ensure that the airport remains a green area. In the case of Ataturk airport, public participation or public influence is not yet possible. As the fate of the project prepared by the Ministry of Environment and Urbanization is uncertain, the citizens who are the main users should have a say and define the uses according to their needs in the preparation of the project to be implemented in the future.

3.2 Design Competitions and Sustainability Context

The idea of sustainability dates back more than 40 years; it was a vital theme of the United Nations (UN) Conference on the Human Environment in Stockholm in 1972 (IUCN, 2006). According to the United States of America Environmental Protection Agency (EPA) who has responsibility to prepare its own National Environmental Policy Act (NEPA) documents for compliance; the goal of sustainability, derived from the NEPA (1969) is to, "create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations" (EPA, 2015).

Airport transformation projects propose green area options such as public parks to bring more sustainable solutions. Interdisciplinary cooperation should be developed for airports to deal with their critical environmental problems which they usually have and be productive and livable places that have a strong relationship with the environment after the transformation. Besides, airports should be planned to utilize their infrastructures throughout their lifespan (when they are built, at peak times and when their use begins to decline) so that they can be prepared for future transformations (Favargiotti, 2018).

However, greening the greyfields have many opportunities when considering environmental quality. According to Loures & Panagopoulos (2007), potential funding sources should be identified; derelict land inventory should be taken, greening opportunities, which constitute an essential opportunity for the emergence of benefits such as improving soil quality, habitat creation, improvement of recreational opportunities and economic revitalization of neighborhoods, should be evaluated. Then, a clear understanding of the benefits can be provided.

In the case of the leading examples in the world for sustainable airport transformations, the process is traced through architectural design competitions rather than top-down projects. One of the examples is the Reykjavik airport (Iceland) that transformed into urban parks through architectural competitions in 2013 (Uygur, 2018). Since 1919, the airport was the main domestic airport in Reykjavik, the capital city of Iceland. For more than 20 years, people have discussed and debated the question of whether the airport should be relocated to make room for urban development. Due to the value of the airport area, the government proposed to relocate and offered 4 different alternatives; keeping the airport in the same place, evaluating the land next to the current airport, moving to the rugged lava field in the south of Reykjavik and moving to Keflavik International Airport, about 60 km away (Solnes & þorgeirsson, 2006).

In 2002, a new detailed land-use plan for Reykjavík was approved, which called for a substantial reduction of the airport by 2016, and a full departure by 2024, to use the land for development (The Reykjavík Grapevine 2008). In 2007, the competition briefing asked for fictions about the spatial, programmatic, economic and cultural future of this city, and the winning project (From Runways to Greenways) addressed the potential of technological development while offering a self-sufficient city on energy, agriculture, and water (Figure 5). The project for Reykjavik, where urban sprawl and car ownership per person is high, proposes master plan for Reykjavik's expansion to intensify the city and to exploit the potential that nature creates for green energy, urban agriculture, and urban nature, while combining various modes of production (research, culture, education, agriculture) to produce greater environmental efficiency (White & Sheppard 2009).

The second example is the former Shueinan Airport which was built by the Japanese army in the 1930s and was decommissioned in 2004 when the Ching Chuan Kang airbase expanded (Dümpelmann & Waldheim, 2014). The Taichung Gateway Park International Competition was announced in 2011 to transform the former Taichung (Shuinan) Airport (Taiwan) and its vicinities into a modern Eco-Park that will be divided into four districts (Eco Residential District, Gateway District, Cultural Business District, and Innovation R&D District) pursuant to their features (Jarz, 2011). According to the project manager, the site was aimed to host a business park, university facilities, a convention center, an ecological park with renewable energies and a smart management system and Sou Fujimoto's future Taiwan Tower, which constitutes a new landmark in the Taichung skyline (MAA, 2016). The 67-hectare site, which was under construction for more than four years, was completed in 2018 (Ching-ya & Hsiao, 2018). The winning project converts the airport into a weather machine, tempting citizens to spend time outdoors despite the tropical climate with its heavy rainfall and unpleasant heat (Dümpelmann & Waldheim, 2014).

The former Caracas Airport was also designed through competitions. It was used for military purposes from 1946 until the opening to the public in 2005. Since then, different proposals have been made for the recreational,

urban, and cultural use of the area. In the study of Gómez-Navarro, et al. (2009) three proposed projects for the transformation of Caracas Airport were evaluated by environmental impact assessment method according to land use, population density, energy consumption, water use, and waste generation values through surveys conducted with experts. The study results show that the theme park has the least water consumption and therefore, the least environmental impact compared to the health club and residential areas. In 2012, a design competition was held to generate ideas for its conversion into a park (Dümpelmann & Waldheim, 2014). The winning idea proposes an efficient use of space with potential for social and urban integration through the implementation of five interrelated strategies that will result in new relationships and meanings for the city: environmental balance, urban dynamics, social encounter, new housing developments, management model (Lalueta, 2012).

Through a design competition, Casablanca Airport in Morocco was aimed to turn into a new cultural and business center in 2007, including a business center, office area, private residences, a new university, an aeronautical museum, and a theatre (Dümpelmann & Waldheim, 2014). Even though the design project gives the idea of a green area, the reality is still far from it (Figure 6). The current aerial photos and maps reveal that the area looks abandoned and is planned to be a financial center soon.

The former Toronto Airport was also designed with a competition which was called Downsview Park competition. It was opened as a result of the closure of the airport in Toronto in the mid-1990s, and it was the pioneer of the design competitions on the transformation of airports into new urban landscapes in the international arena (Uygur, 2018). Downsview was established as a military airbase in the 1940s, and the Canadian government decommissioned the park in 1994 to turn the site into the country's first national urban park (Dümpelmann & Waldheim, 2014). However, the results of the park differ than the design project. The initial aim was to involve the public to the whole process through design to finance. According to the North (2012), with the winning team of the international design competition held in 2000, a process-based landscape design was planned, which was flexible, naturally developing, allowing for future diversity, but instead, a traditional, static master plan was put into practice due to the changing members of the project team and political factors. In the case of Downsview, it can be concluded that the participation of communities in the transformation process is crucial in both the long and short term.

Another example from Germany, Munich-Riem Airport is an example of sustainable concerns. The new airport has become necessary because of the environmental reasons and the old airport Munich-Riem is no longer acceptable for capacity (Toepel 1990). For some time, the former airport was used for rock-concerts and dance-events under the name Kulturzentrum Riem (Culture Centrum Riem) was transformed to the Messestadt Riem (Convention City Riem) with a convention center, apartment houses, and parks (Figure 7).

Messestadt Riem, the new district of Munich, was implemented in the eastern part of the city, in the distance of seven-eleven kilometers from its center, on the grounds of the former Riem Airport after the last plane took off from here on May 17, 1992 (Gyurkovich, 2011). The 210-hectare Riemer Park (Also known under the name BUGA Park, since it was inaugurated in 2005 for the Federal Garden Show) which was built between 1997 and 2005 by landscape architect Gilles Vexlard, is the third-largest park in Munich and today attracts walkers, sunbathers, and swimmers because the 10-hectare Riemer lake is part of the recreation area (muenchen.de 2011). Because the park was opened for the BUGA Garden Show, it is criticized by the public for being unnatural and artificially designed.

This problem of artificiality is also valid for the case of Atatürk Airport. Considering other precedent parks in Istanbul which are designed as the imagination of nature, rather than leaving the natural succession process or designing with local plant species that the location and climate allow, the designs are preferred with vegetation that has aesthetic beauty, often requires high maintenance and is not long-lasting. This situation leads to both budget, time, and labor force loss. Of course, these initiatives are based on achieving political power on the voters by providing visual beauty even though it is always criticized.

In addition to these examples above, some airports have been transformed into other functions rather than green areas. One of them is the former military airfield of Oldenburg (Figure 8), operated from 1932 to 1993, was transformed into one of the largest photovoltaic plants in 2011 (Krawczyk, 2017) in the direction of the country's renewable energy targets (Uygur, 2018). Another example is the Kai Tak Airport of Hong Kong, which was an international airport operated between 1925 and 1998. The seaside airport was transformed into a cruise terminal and housing estate to provide a living environment for around 90.000 residents after the new airport started to operate (CEDD, 2013).

3.3 Decision Mechanisms

The decision-makers are the governments, ministries, local municipalities and private companies with a financial interest in the case of transformation of airports. Therefore, economic interests override ecological and social values. However, studies have shown that creating ecological value will also contribute economically. Damigos & Laliotis, (2010) conducted a survey and Fuzzy Delphi Method to evaluate two projects, culture, sports, leisure park with commercial uses and green park with light recreation areas, proposed for the Hellenikon Airport and as a result, both plans positively affect the prices of dwellings, but the second plan shows 60% more contribution than the first. Relatively, Damigos & Kaliampakos, (2012) also examine the economic value of Hellenikon Metropolitan Park in the region and indicate that even a pure green area creates economic value for the surrounding properties; if the park affects the value of the 1000 apartments in the surrounding area, sufficient earnings will be obtained

for the entire project. Hence, to develop a transparent and socially fair decision-making analysis, the definition and measurement of the benefits of non-commercial uses, i.e., green areas will provide an opportunity, even though they are hard to estimate in monetary terms (Damigos & Kaliampakos, 2012).

The Hellenikon Airport, which is located by the sea and 12 km south of Athens, was built in 1938 in Greece and operated for sixty years up until 28 March 2001. The airport could not meet future demand since the surrounding residential area prohibited any further expansion, it was decided to relocate the airport. For the 2004 Summer Olympics, some areas of the airport hosted sports activities, some were used as bus and tram depots, and for the remaining area, the Greek Ministry of Environment announced a 400-hectare park and 100-hectare office and residential area plan (Damigos & Kaliampakos, 2012). In 2005, an international team of architects won a competition that focused on redeveloping the area for designing of a metropolitan park on the site of the Hellenikon Airport (Dilouambaka, 2017). The 8 billion-euro Hellenikon Project (Figure 9) to turn Athens's former airport site into a multi-purpose complex that will include hotels, luxury apartments, amusement parks, restaurants, bars, and a casino is moving ahead (GCT, 2019).

Former Stapleton Airport, Denver Colorado, has a similar transformation (Figure 10). The Stapleton Airport was operated between 1929 and 1995, replaced by Denver International Airport and planned as a retail and residential neighborhood with the vision of New Urbanism for 25.000 residents and 30.000 jobs (Dümpelmann & Waldheim, 2014). The site was redeveloped by Forest City Enterprises for pedestrian-oriented real estate design while erasing all the physical traces of the former site (Favargiotti, 2018).

It was stated above that the project developed for Atatürk Airport was prepared by the ministry and has not yet been shared from an official state source. Therefore, information about the decision process, which is only handled by the ministries and real estate companies, analyzes, needs of the region and the possible results of the design is not available from any governmental source. In addition, there is no ongoing debate within the ministry or metropolitan municipality, such as architectural competitions for the most efficient transformation possible, economic/ecological/social analysis, and world examples that can be modeled or compared in the context of the referendum process and site-specific planning. However, a report of a round table meeting of real estate companies was disclosed to the press recently (Özer, 2019). The meeting of Urban Land Institute (ULI), 'How can Atatürk Airport be transformed?' themed meeting was arranged in Istanbul, on the 2nd of May, 2019. The outcomes were so; a pleasant land (11 million m^2), a new law needs to be passed to redevelopment, converting to the green area is costly, and no economic return and the airport is creating an economy in the region. In the meeting, the participants also suggested some new functions; cultural techno-park, aviation fairground, multiple functions, touristic projects, international trade center, entrepreneurship base, and private flight tracks. These recommendations seem to have been taken into consideration; recently, Minister of Transport and Infrastructure Cahit Turhan stated that the area will be able to carry out general aviation and cargo flight operations and non-aviation activities (Airport Hotel, conference hall, aviation fairground) and that the works initiated in these areas are continuing (Çakır, 2019).

As this study states, many reasons, especially urbanization, forced the airports to move out of the city and provided opportunities to transform their current location in the best way. European cities can be said that they are successful in benefiting from these opportunities. As in the above examples, the determination of the future of such large areas is often supported by competitions, but the results of the airport transformations also depend on the decision-makers such as governments, ministries, and municipalities. Collaboration with architectural companies, universities, and the public as the real users allows the fields to be transformed with more creative, solution-oriented, ecologic, and sustainable projects. The projects that are created are intended to use each area most efficiently. This efficiency is not only in the economic sense, but also in ecological and social efficiency, which often brings about economic efficiency, too. From this point of view, we can assume that the project which is considered for Atatürk Airport has remained only at the ministerial and government level so far. However, this study demonstrates successful airport transformation processes and collaborations to shed light on future studies and designs for Atatürk Airport. The cooperation for the project, which is not yet officially approved, can be provided by the public, universities, and creative industries.

4. CONCLUSION

As a result of rapid urbanization, areas that lose their functions and remain idle in the central regions of the cities arise due to various reasons such as capacity issues and new functions needed. One of these idle areas are called greyfields such as shopping centers, airports and military areas, which are mostly covered with asphalt and inevitably subjected to transformation processes. Due to the intensive population growth and dense construction around them, airports are filling their capacities, cannot expand their area. Therefore, they lose their current positions and leave their places to new urban functions. These areas, which are frequently seen in the world, are generally transformed into green spaces through projects aimed at the needs of the citizens. Against the problems such as global warming, rapid consumption of natural resources and intensive urbanization, the tendency of green area production has increased. With growing cities and shrinking environmental resources, green areas must act as a vibrant infrastructure, not only for recreation but also to support future urban concentration, and provide optimal and varied performance (North, 2012). Therefore, green area production should be emphasized here and should be an indispensable condition for the areas that are waiting to be transformed, such as Atatürk Airport.

This research was commenced to reveal such successful transformation processes of these failed airports in the world. For that purpose, first, the terms were explained in the literature review section. Then, the world examples were detailed according to the criteria of public participation, decision mechanisms, design competitions, and sustainability context. Consequently, it appears that the most successful implemented projects were designed with the collaboration of design competitions and public participants. The competitions and projects presented create a collaborationist environment for spatial and social solutions, which are crucial in the case of being consistent and sustainable, responding to economic, ecological and social needs, reaching all segments of the society and to providing useful and appropriate solutions for the planning site. Since the old airports are mostly located in the middle of the cities, they should be able to meet the daily needs of the people. For this reason, the above-mentioned competition processes have been mentioned in order to direct the future of Atatürk Airport. There is still a chance to improve it since the project has not been officially announced and there is an ongoing debate by public and real estate companies. On the other hand, news of Atatürk Airport, which is constantly occupying the agenda, also shows the importance of the area. These include various activities such as festivals and fairs, new decisions from various public institutions on the fate of the site, and new steps to implement the Nation Garden project. Here, it is the duty of the academy and the transformation experts to have a say in these steps to direct the decision makers; the project in the field should be finalized, only after the proper research and development processes, as in the above examples.

In short, this comparison study reflects global tendencies in airport transformation processes. The airports have an important place, history and value in the city. When they are ineffective for various reasons, their new functions should be designed according to the needs of the city and its citizens, in cooperation with them, to add ecological, social and thus economic value to the city. With these examples, it is aimed to contribute to Atatürk Airport transformation process and to direct as much as possible.

The issues that need to be discussed and kept on the agenda are not only the general design concept, the number of trees and the economic value. At the same time, the needs, integrated uses according to these needs, its relationship with the rest of the city and its importance in the future of the city should be discussed.

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VAASTUSHASTRA CASE STUDIES ON COMFORT RESIDENCES IN DUBAI

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Abstract

This paper examines the comfort levels achieved in homes that are designed on the principles of *Vaastushastra,* specifically in terms of temperatures recorded inside homes in Dubai.

Vaastushastra is a vernacular architectural practice that comes from the Indian subcontinent. It is a theory that existed thousands of years ago and was used by artists, artisans and architects in order to understand the basics principles of design and its execution. The core philosophy of *Vaastushastra* deals with proportions, scale, orientation, placement of various internal functions, use of materials and the construction techniques that were used for architecture, sculpture and furniture design. The primary concern was that everything made by man should be in harmony with nature. The buildings that were constructed, used prescribed proportions, scale, indigenous materials and adequate construction techniques to blend into the environment.

The core aspects of *Vaastushastra* are, *Panch Maha Bhutas* (5 elements) and *Vaastu Purush Mandala* (Cosmic Grid). The *Panch Maha Bhutas* are earth, fire, water, wind and space, which represent the elements of nature. These elements are placed together on a grid known as *Vaastu Purush Mandala*. The functional use of the spaces is laid out on the plan based on the locations of the elements. The activities that are supported by the element are placed in the appropriate zone. Each element is a force of nature and therefore thought of as a source of energy.

Vaastushastra is commonly associated with good luck, prosperity and good heath when followed successfully but when the rules are not followed occupants of the house can experience the bad luck, misfortune and death. Thousands of years ago, many people would follow the rules of the *Vedas* possibly because the rules were accepted by the masses and the fear of ill fate was too engrained for anyone to take a risk of going against them.

In this paper key principles of *Vaastushastra* will be identified and five case study homes that are designed on these principles will be used to map the comfort levels of the houses. Principles of *Vaastushastra* are based on the five senses and the way to understand if this connection is to test the impact these spaces have on the senses. Sound is usually very controlled or stable within an average residential space and similarly smell is usually very pleasant unless there is a problematic area close by. Light differs within a space based on season and time of day but varies within a predetermined range of values. Temperature and humidity can vary drastically within indoor spaces based on the design principles applied to the house. In this paper the main focus will be to understand comfort through temperature and humidity.

The original texts of *Vaastushastra* state the principles of how homes should be designed but doesn't provide any explanations on why these principles should be followed. These rules were written before science, as it is commonly known today was understood, and therefore the rules of *Vaastushastra* aren't explained in this context. One possible explanation for following the rules of *Vaastushastra* is that the internal spaces stay close to comfortable temperature regardless of external temperatures.

Word Count: 7432

Principles of *Vaastushastra*

The core aspects of this theory are, *Panch Maha Bhutas* (5 elements), *Vaastu Purush Mandala* (Cosmic Grid), *Shad Varga* formulate and use of materials. Each of these aspects is interlinked and should not be examined in isolation. All of these topics are discussed in all the ancient manuscripts, each manuscript goes into different levels of details. The manuscripts simply list the rules that the architect should follow and do not provide any explanations.

The *Panch Maha Bhutas* (5 elements) are *aakasha* or space, *vayu* or wind, *agni* or fire, *jal* or water and *printhvi* or

earth. The explanations provided are based on traditional Indian scriptures such as the *Veda*s and aren't supported by western scientific foundation but forms the fundaments of understanding the theory.

Aakasha or space – this element incorporates all the cosmic energies such as gravitational forces, heat & light waves and magnetic fields. Its main characteristic is known as *shabd* which could be translated as 'sound'.

Vayu or wind – this element is the atmosphere around us, what causes movement and what transmits *prana*-universal breath. Its main characteristic is *sparsh* - touch.

Agni or fire – this element represents the heat and light of the fires, lighting and volcanoes, as well as the heat of fevers, energy, passion and vigor. Its main characteristic *drishti* is sight.

Jala or water- this element represents everything liquid, rain, rivers, the sea, as well as steam and clouds. It also represents all living plant material and its main characteristic is *ras* - taste.

Prithvi or earth- this element represents all solid matter, as well as everything we stand on – the Earth itself. It is also the element of *gandh* - smell. (Craze, 2001)

Element	Sense	Architectural feature
Ether (Space)	Sound	Auditory
Air	Touch	Tactile
Fire	Sight	Visual
Earth	Smell	Atmospheric (partially)
Water	Taste	

Table 1. Elements of Vastu, the Senses of human body and link to architecture

According to Hinduism the human body and the Universe are made of these 5 elements (K.Juyal, 2010). Therefore, it is suggested that the subconscious mind connects to the balance or imbalance of these 5 elements in the built space (Vir Singh, 2005). Each of these elements connects with one of the 5 senses – ether connects with sound, air connects with touch, fire connects with sight, water connects with taste and earth connects with smell (Pegrum, 2000). Table 1 above lists the possible connections between the elements, sensory organs and architectural features and shows that taste as the only sense that doesn't directly connect with any architectural feature.

The above mentioned five elements *Panch Maha Bhutas* are placed onto a grid of 9x9 squares which is an example of the *Vastu Prush Mandala* (Bubbar, 2005).This grid constitutes of three components, *Vastu*, *Purusha*, and *Mandala* that mirror the threefold nature of existence in terms of mind, body and spirit (Chakrabarti, 1998). There are 32 types of *Mandalas* ranging from a single site/plot to a combination of 100 sites/plots on a grid. For the purpose of this paper the (9x9) *Mandala* is the only one that will be discussed. This is a simplified grid that shows the locations of the elements on the grid. The elaborate 81 grid shows each square representing divine forces, demonic forces, animals, plants and other qualities/ adjectives (Dagens, 2000). ""The names of the forces or the processes involved in the evolution of the spatio-temporal cosmos are the *Devas* or *Devtas* (wrongly translated as gods because they are not personified)"" (Bhatt, 1979). The principles behind all the grids mentioned are the same; there is a specific corner of the grid allocated to each element. Fig.1 below shows how the *Mandala* represents the five elements of nature, which can be used to create positive spaces. The element mentioned in each corner is supposed to represent the allocation of the functions in the house.

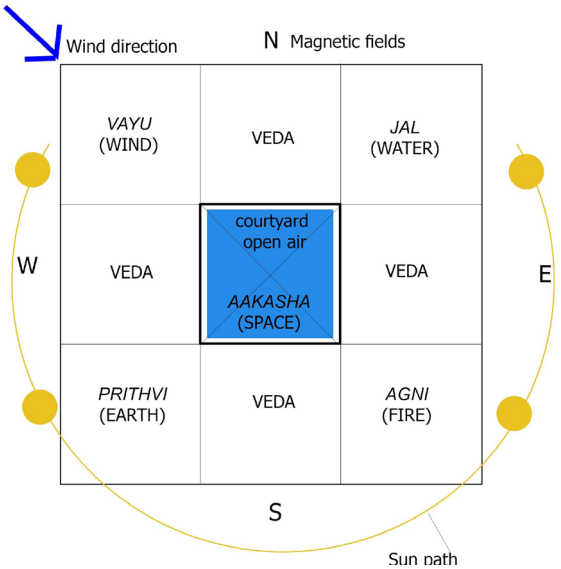

Figure 1. *Mandala* Grid with elements and influences of natural elements

Northeast corner is associated with water; therefore, the water features of the house should be placed in this corner. The possible explanation could be that water features placed in this corner would be outdoors and mainly exposed to the early morning sun when UV rays are the least. This doesn't mean that water can't be placed in other corners such as the southwest or other northwest, the optimal direction for placing water is the Northeast. Due to the combination of water and early morning sun, the northeast space is suggested for prayers (usually happen at sunrise) or any activity that happens in the morning.

Southeast is the fire corner this is possibly because it is exposed to maximum heat gain. It can be argued that the south side (both southeast and southwest) are equally exposed heat gain so why is the south east associated with fire? This thesis will test if there is a noticeable difference in the temperatures recorded in these rooms. Since it is the fire corner it is said to be the best place to locate the kitchen as it is the warmest location of the house.

Southwest is associated with the earth element. It is difficult to establish a link between the element and the direction in this case. Traditionally this corner is supposed to have minimal or no windows and is associated with heavy weight. The reason for the weight association could be because it is linked with the earth element which is a heavy material. Since the southwest direction is exposed to the setting sun it can make the internal space significantly warmer, which is the possible reason for minimal or no windows on the walls.

Northwest is the wind corner because it is the predominant wind direction in many parts of India. This is an example of the element reflecting the physical environmental condition of wind direction. The house should be designed so that this side should allow for wind circulation by either placing adequate windows or by creating low height-built structure.

The central space is associated with the element ether or space. The thought behind placing the element of space in the middle of the house is so that the center is kept empty. In an average size and larger house, the empty space means that this central location should be a courtyard. Based on the proportion of the site and the way in which the architect wants to include the courtyard, it's specific location can be altered. In a small house and can't allow for a courtyard it means that the central space should be free of any structural wall/ column.

After understanding the *Vastu Purusha Mandala* and the elements that link with it there is a possible reasoning behind the allocation of spaces based on the association with the elements. Table 2 shows the connection between the intermediate direction, element and the suggested function of the space.

Direction	Element	Function
North east	Water	Meditation
South east	Fire	Kitchen
South west	Earth	Master bedroom
North west	Wind	Bathroom
Centre	Space	Courtyard/ empty

Table 2. Elements of Vastu, the link to direction and function

The word *Shadvarga* translates to six-fold division and refer to a group of six proportions or six formulae which are used at the design stage when the volume of the house is created. The most important factor is perimeter of the building, i.e., the length and the breadth of the site must be in harmony with each other. The *Shadvarga* formulae are a series of simple calculations that use the length, width or perimeter of the plot to calculate whether the site is auspicious or inauspicious. When these rules were written, most people would comply with the rules without questioning them.

Based on the location of the site, the formulae are modified to accommodate the variations in climate conditions. Similar to the *Shadvarga* formulae is the *ayadi/ aya* formulae, which have different equations which are used to calculate different aspects of the site. The names of the six formulae each describe which aspect of the site it will calculate. The description of each formula is provided in brackets in English after the Sanskrit name which are as follows *Aya* (gains), *Vyaya* (losses), *Nakshatra* (asterisms) *Yoni* (matrices), *Vara* (solar days) and *Tithi* (lunar days). The results of these calculations should be within a specified range of numbers otherwise the measurements of the site are considered inauspicious. If the measurements don't give the desired outcomes by using the formulae, the perimeter size is adjusted so that desired outcomes would be achieved. There is no scientific explanation behind following these formulae, not to explain the aspects of gains, losses and so on that the formulae are titled. These formulae are used to calculate the ideal site proportions which in the authors opinion connect with the five core elements. My understanding is that these calculations were stipulated in the rules because they create guidelines for the proportions of the site. These guidelines underpin the proportions recommended as site proportions without having to list every specific combination.

User's Comfort factors

Comfort in any built environment can be assessed through many different criteria; some of these aspects are measurable through quantitative methods, some are qualitative and are expressed through feelings and others are ineffable such as the users' personal choices. Users' comfort in residential space is a vast topic, for this paper it will only be considered in homes that are designed based on the principles of *Vaastushastra* to be able to examine if there is a noticeable connection. This paper will consider the first two aspects of the users' comfort by measuring the quantitative aspects such as, temperature and humidity levels because these fluctuate the most during the day. Additionally, sound, smell and noise will be measured qualitatively through questionnaires in which the users' will be asked how they feel in the space. The quantitative and qualitative aspects of a space can possibly summarize the major comfort factors that the users identify with in built spaces.

This study was limited to understanding the touch or 'feel' of the houses which was achieved by recording the temperature and relative humidity. Since private homes were the main part of the study the sight, sound and smell were not measured because homes are very personal spaces and individuals who live there can usually control aspects of sight, sound and smell. The details of the sensory aspects are as follows-

• Sight is measured by the ability to be able to clearly see in a space by means of natural or artificial light. Light levels of a house can easily be modified to suit the occupant and the preferences they have based on the activity that is carried out. For example, some people like to sleep during the afternoon with the use of black out curtains and others prefer to read at night with artificial light.

• Sound doesn't typically vary too much within a home as the activities that create noise within a house are usually caused by its residents. Any noise that comes from the outside is filtered by the time they can be heard by the occupants and therefore shouldn't be too high. The sound level cannot be and should not be zero as constant silence is not always very pleasant. Some sound is needed but this sound should be minimal and nonintrusive. Reality is that sound is generated by the appliances in the house – heating or cooling systems or refrigerators or washing machines etc. and in Dubai due to the temperature outside the biggest problem of noise at home comes from constant use of air-conditioning.

• Smell is the level of pleasant or unpleasant odour that the user can detect. To an extent the odours of the house are also largely controlled by the occupants since the activities in the house determine the odours. At the same time there are some odourless gasses that are also harmful for the people. These smells and gasses are typically constant in houses and the variation is usually minimal depending on the air circulation of the house. The exceptions to this would be when the house is maintained with materials that contain VOC's, if natural ventilation is not provided in the kitchen then cooking gasses and odours can be troublesome to the occupants. In the case of the latter air fresheners (which don't contain VOC's) in the house can maintain pleasant odours.

• Touch is the aspect of the study that reflects how the user feels in the space. There are many factors that govern touch, from surface temperatures of the finishes used, to the clothing worn by the inhabitants of the space and to an extent by the way in which the space is built. This paper focuses primarily on the last aspect, which is the way in which the built space influences how the users' feel in the space. There are many aspects about the design and construction of the built space that have an impact on the temperature and humidity level and the comfort of the users.

Common principles of *Vaastushastra* and user's comfort

The common principles identified are as follows –

1. Orientation of the house – is a significant aspect in *Vaastushastra* because it one of the foundation principles and all other rules applied are based on the orientation of the house. Orientation have an influence on the internal temperatures that are achieved in the different corners of the house base on the direction. The assumption is that Northeast and Northwest are naturally cooler than the Southwest and Southeast side.

2. Placement and size of windows – *Vaastushastra* mentions the ideal locations for windows in the house which is predominantly on the North side for arid climates. Windows influence the amount of heat gained by the building therefore placing them in the appropriate direction with an appropriate size would mean less heat gain in the building. The North and East side are thought to favour windows and the South and West side are the unfavourable sides, especially in Dubai as the buildings are designed to avoid gain heat.

3. Proportion of the house – *Vaastushastra* stipulates that proportions of the site and the building through *Shad Varga* formula and one of the benefits of following this is the comfort of the users because of the internal temperatures. Overall the geometry and proportion of the house is thought to have an influence on the internal temperatures. Basic geometric shapes such as square and rectangle which have the required proportions should be able to help the indoor space stay at a temperature that is close to human comfort.

4. Proportions of the rooms in the house -the *Shad Varga* proportion system from *Vaastushastra* lays the rules for the proportions of the rooms as well as the site. Proportions of the rooms have an impact on the temperature recorded within the space. The preferred shape of the room should be square or rectangular and the rectangular shape is based on the specific proportions.

5. Use of courtyard in the house- *Vaastushastra* mentions that homes of a specific size and larger should have a courtyard. Mid-size homes and above can benefit from having a courtyard located in the centre of the house, as

this helps to achieve users' comfort in the house overall. The courtyard is also dependant on proportions itself and to the whole house.

6. Adding windows to the South or West side is possible if there are appropriate shading devices introduced. With the addition of shading devices, the heat from the sun could reduce solar heat gain.

Methodology

Two methodologies that were used for this paper are case studies and questionnaires. The case studies were used to understand the impact of applying principles of *Vaastushastra* to homes in Dubai. These principles were written in an abstract manner and might appear rigid at first, but architects who study these understand that there is an amount of flexibility suggested in them. Various devices can record physical attributes of a space, but this doesn't always equate to end users feeling comfortable. Questionnaires were used to identify how the residents experienced the spaces. The questionnaires were given to all the residents of the house to understand how each one of them felt in the space at different times of the year.

First methodology used is to understand the comfort level of touch in a space, which is associated with temperature and humidity and the feel of the space in terms of furniture and finishes used. The latter is constant in a space as the feel of the furniture and finishes remains the same till it is replaced. Individuals try to maintain the temperature at levels that suit themselves and since there are few people in residential spaces this is easier to achieve. Since UAE has two major seasons, internal measurements using data loggers were taken twice in each of the five case study homes. The quantitative data would show the temperature differences between internal and external temperatures during summer and winter months. External temperatures are very high in Dubai during the summer months; therefore, the occupants were allowed to use air-conditioning on occasion and maintained a log for this. The data below has been interpreted based on this factor. The winter months however are cooler, and the readings are taken without the use of air-conditioning. Case study homes are all different and comply with different principles of *Vaastushastra*, the data collected will help determine the impact these rules have on the internal comfort level of temperature and humidity.

Second methodology is to ask the occupants of the tested houses to fill in questionnaires about how they feel in the space. Temperature and humidity vary the most in a space and represents the sense of touch which was captured by placing data loggers. The other sensory connections of smell, sight and sound should be reasonably constant within residential spaces therefore loggers were not placed to measure these. However, it is important to know how the occupants feel about these sensations and were asked about them through the questionnaires. Meeting temperature requirements of a space doesn't always mean that it is comfortable for the users. The occupants were also asked how they felt about the temperature of the space in the questionnaires and the collected data will help to understand the comfort of the users in the space. This will help in understanding the impact the principles of *Vaastushastra* have on the five case studies.

Case Study Homes in Dubai

Dubai is a dessert and is predominantly a hot and humid climate, even though the humidity does not climb above the highest average level of 65% it is considered humid because the RH level does not fall below 55% throughout the year (ClimaTemps.com, 2009). The average highest temperature of Dubai is in the summer and is 41°C and low of 30°C while in the winter it is average high of 23°C and low of 14°C. These aspects of the environment have a strong impact on the research conducted and the data gathered for this thesis. For the purposes of this thesis mid-sized dwelling spaces which are three- or four-bedroom independent homes built on the principles of *Vaastushastra* in Dubai will be considered. The reason for the selection is based on size of the house, its adherence to the principles of *Vaastushastra* and the similarity of the users' profiles. The average size of these houses is kept between 250m^2 to 500m^2 which should be sizeable enough to record differences in comfort factors in different parts/spaces of the house. If small houses were selected the space would possibly have similar recorded measurements on all sides and parts as the limited dimensions would create similar conditions in all corners of the house. Larger homes are very limited in Dubai out of which very few are designed on the principles of *Vaastushastra* and therefore have been eliminated. The users' profiles for the different houses will be kept similar in terms of their requirement to live in a house that is designed based on the principles of *Vaastushastra.* This connects the users' in terms of accepting the requirements of vernacular design. The homes are located in residential neighborhoods in Dubai, namely Al Mankool, Al Jafliya and Jumeriah 1

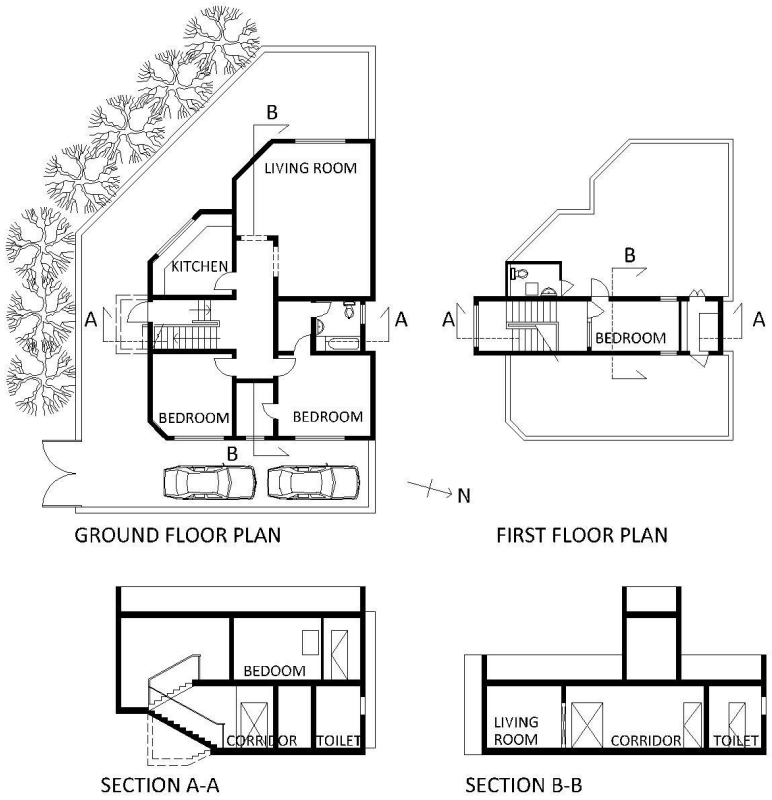

Figure 2. Plans and sections of Case study 1

Case study 1

The house selected for the first case study was a mid-size family home which was approximately 250m^2; it was built on two levels with an internal staircase and a back-garden space. The cooling system used in the house is individual air-conditioning units. In addition to this the house has a ceiling fan in the living space and floor fans around the house and these are used in suitable weather conditions. There are openable windows on both levels of the house, of which there is a sliding glass door that opens into the garden area and is also used as a window.

The house is not thoroughly aligned with all the rules of *Vaastushastra* but does follow some of the crucial ones which are the following –

• This building is oriented around the North/ South axis, but it is aligned with the short axis of the building. It is important that the main axis of the building (short or long) aligns with the North/ South axis and isn't aligned at an angle higher than 15°.Therefore this house complies with the principle of orientation.

• Most of the windows of the house are placed correctly on the North and East side. But there are a few windows on the South and West side which is not in line with the principles of *Vaastushastra*. The windows on the South and West side will help determine of the impact these have on the users' comfort levels in the space.

• The proportions of the house itself comply with the proportions that are established by *Vaastushastra* as the house is rectangle as an overall shape.

• The rooms within the house also follow similar proportions as each room is rectangular and based on similar proportions as the whole built space. The concern is that some rooms are cut off at corners, this helps examine if the pure geometry has an impact on the comfort levels of the users.

• This house doesn't have an existing courtyard and therefore doesn't comply with this specific requirement.

• The house has windows on the South and West side, but these windows do not have any window overhangs or shading devices. This will help determine if there is heat gain from these sides of the building and if it has an impact on the users' comfort factors.

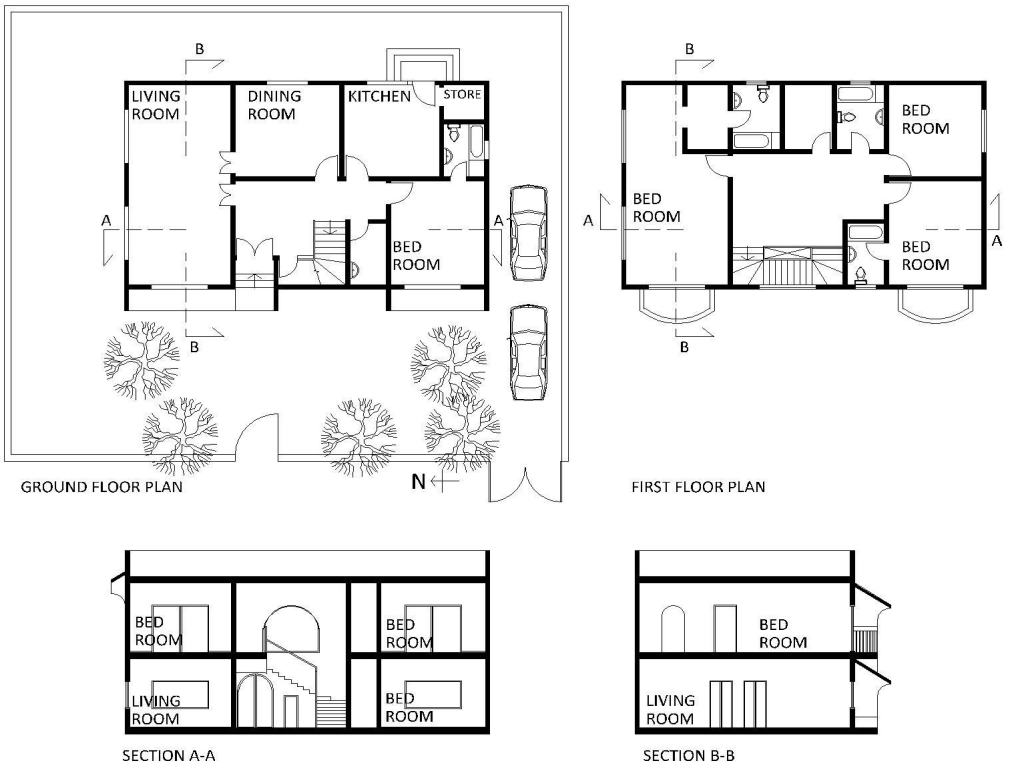

Figure 3. Plans and sections of Case study 2

Case Study 2

The second case study selected was similar to the first case study in terms of size as it was 260m^2 with two levels, an internal staircase and open garden space. Each of the rooms that are occupied have individually controlled air-conditioning units and the corridor spaces do not have any operable cooling systems. No other cooling systems are used in the house. There are openable windows on both floors and balconies on the upper floor with openable glass doors which are utilized as windows allowing ventilation in the cooler months.

The house is compliant with the rules of Vaastushastra in the following ways –

The orientation of the house aligns with the cardinal directions and the length of the house lines up with the North/ South axis which is a core principle of *Vaastushastra*.

The windows in the house are on most sides which includes the sides that are thought to be positive North, East and the side that are thought to be negative West.

• The proportions of the whole house are based on the proportions of *Vaastushastra*; the house is rectangular in proportion which is one of the recommended ratios and shape.

• The rooms within the house are rectangular and square and match the overall proportions of the house.

• This house doesn't have an existing courtyard and therefore doesn't comply with this specific requirement.

• In this house there aren't too many windows on the South side of the house, just one small window on the South-east façade and this doesn't have an overhang. The West side of the house has many large windows, but these are set back into the house and have an overhang to possibly prevent heat gain.

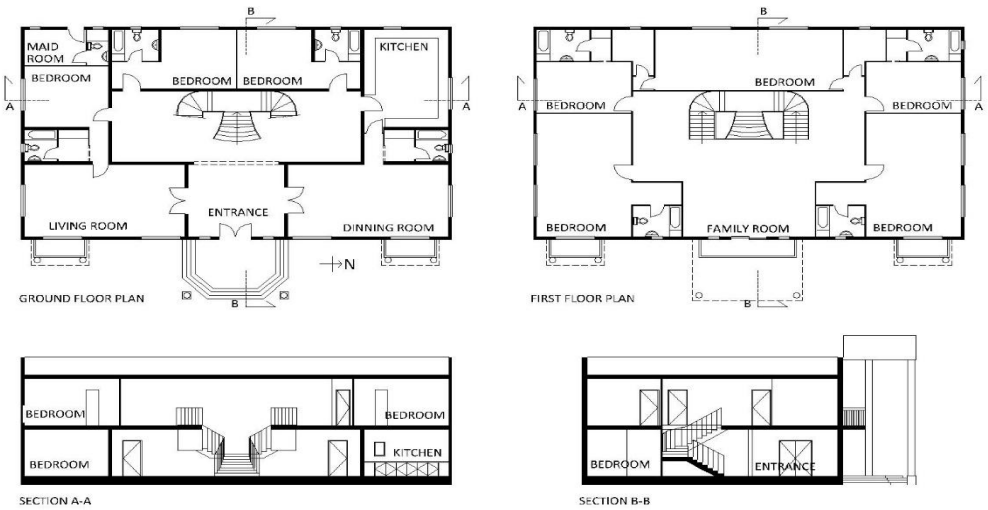

Figure 4. Plans and sections of Case study 3

Case Study 3

The next house is larger than the first two and is 350m^2 in built up space. This house is also a two-storey house with an internal staircase and an elevator, but the outdoor space is not utilized as a garden or green space. The compound space in this house is used primarily for parking the remaining space is paved and used as an outdoor seating space. The house has central air conditioning units with individual controls for each room. There are no other cooling systems used in the house. There are openable windows that can be used for cross ventilation when the weather gets better.

The house is compliant with the rules of *Vaastushastra* in the following ways –

• The orientation of the house aligns with the cardinal directions and the length of the house lines up with the North/ South axis which is a core principle of *Vaastushastra*.

• The windows in the house are on all sides. Windows on all sides help to determine if these windows have the expected impact on the interior space and on the comfort levels of the users.

• The proportions of the whole house are based on the proportions of *Vaastushastra*; the house is rectangular in proportion which is one of the recommended ratios and shape.

• The rooms within the house are rectangular and square and match the overall proportions of the house.

• This house doesn't have an existing open courtyard but there is an existing central space which has a roof. Without an open courtyard the house doesn't comply with this specific requirement.

• The house has windows on the South and West side, but these windows do not have any window overhangs or shading devices.

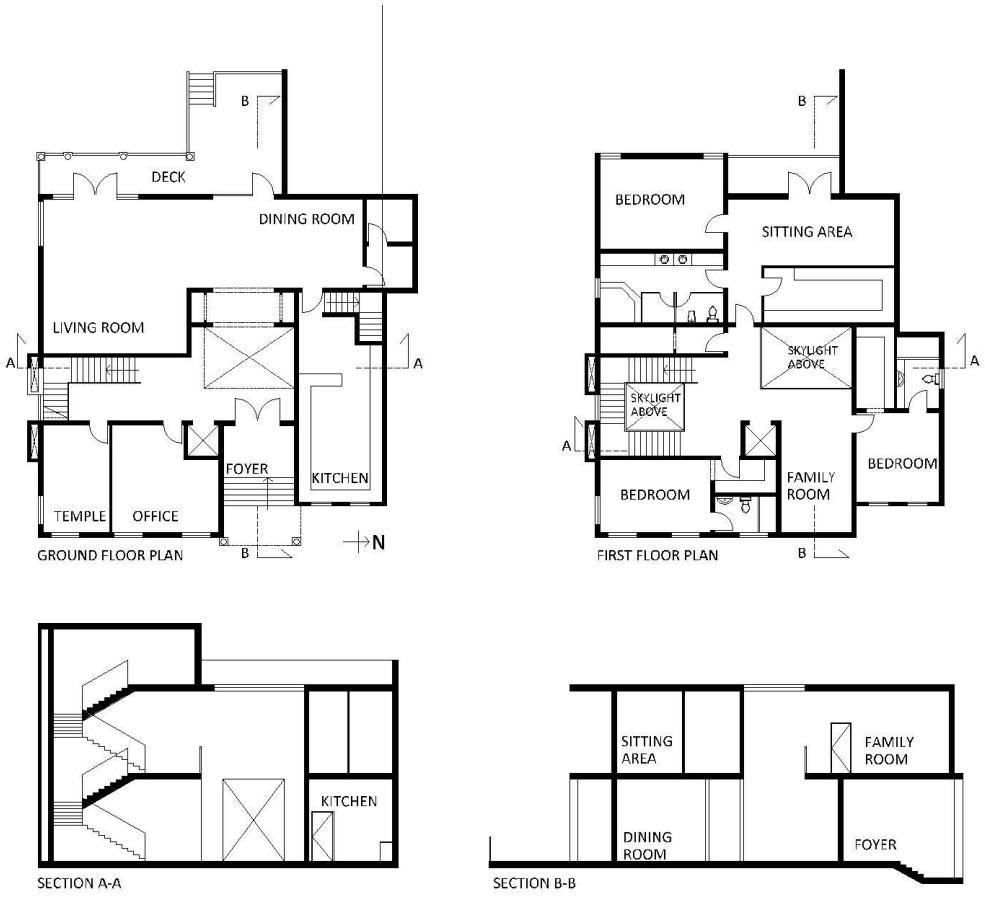

Figure 5. Plans and sections of Case study 4

Case study 4

The fourth house is also larger and has a built up of 500m² built up space. This is a two-storey house which has two sets of internal staircases and one elevator. This house is part of a compound of three villas and therefore sharing its compound space with the other houses. The shared compound space is primarily used as car parking space and each house has its own deck space which is used for outdoor private sitting in the cooler months. The outdoor space is completely hardscaped only without any trees, plants, shrubs or lawn. The geometry of the house isn't an exact square, but the overall proportions and shape match those stipulated in *Vaastushastra*. Main source of cooling in the house is the central air- conditioning and each space has a control of its own. No other cooling systems are used in the house. The house does have openable windows that can be used for cross ventilation when the weather gets better.

The house is compliant with the rules of Vaastushastra in the following ways –

• The orientation of the house aligns with the cardinal directions and the length of the house lines up with the North/ South axis which is a core principle of *Vaastushastra*. Since the house is close to the proportions of a square, either dimensions of the house are similar and therefore can be considered as the length of the house. The house is aligned with the true North and is therefore highly recommended in terms of alignment with the cardinal directions.

• The house doesn't have too many windows and is used to study the impact this condition has on the internal conditions and users' comforts. There are maximum windows on the East side, with a couple of windows on the South side and openable glass doors on West side. The room in the Northwest corner is the only one that doesn't have any window. By measuring temperature and humidity on all sides it is easy to compare the recorded temperature and understand the impact that the design of the house has on the internal space.

• The overall shape of the house is rectangular and therefore follows the principles of *Vaastushastra*.

• The proportions of most of the rooms are either rectangular or square which follow the rules of *Vaastushastra*, except for the one room on the ground floor which is very long in comparison to its width.

• This house doesn't have an existing courtyard and therefore doesn't comply with this specific requirement.

• The house has windows on the South and West side, but these windows do not have any window overhangs or shading devices. This will help determine if there is heat gain from these sides of the building and if it has an impact on the users' comfort factors.

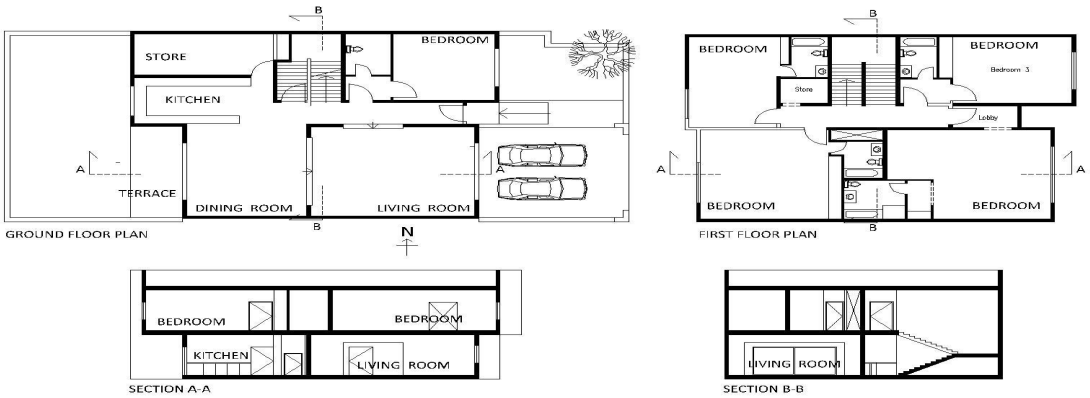

Figure 6. Plans and sections of Case study 5

Case study 5

The last house selected as a case study has a built-up area of 500m^2. This is another two-storied house which has an internal staircase and outdoor green space. The house is independent and doesn't share the compound with any others. The compound space is used for parking and has a front garden and a patio at the back with an outhouse. There are portable fans to support the air-conditioning system. There are openable windows on both levels of the house, of which there is a sliding glass door that opens into the garden area and is used as a window.

The house is compliant with the rules of Vaastushastra in the following ways –

• The orientation of the house aligns with the cardinal directions and the length of the house lines up with the East/ West axis which is accepted in *Vaastushastra*. The house is aligned with the East and is therefore studied to understand how the variation will impact the space.

• The house doesn't have too many windows and is used to study the impact this condition has on the internal conditions and users' comforts. There are maximum windows on the East side, with a couple of windows on the West side. By measuring temperature and humidity on all sides it is easy to compare the recorded temperature and understand the impact that the design of the house has on the internal space.

• The proportions of the whole house are based on the proportions of *Vaastushastra*; the house is rectangular in proportion which is one of the recommended ratios and shape.

• The proportions of most of the rooms are either rectangular or square which follow the rules of *Vaastushastra*. Use of rectangular and square geometries as the shape of the rooms and the house will help determine the impact these have on the comfort levels of the users.

• This house doesn't have an existing courtyard and therefore doesn't comply with this specific requirement.

• The house has windows on the East and West side, but these windows do not have any window overhangs or shading devices. This will help determine if there is heat gain from these sides of the building and if it has an impact on the users' comfort factors.

Case Study findings

Summer temperatures can be very high in Dubai ranging higher than 40°C and not dropping below 30°C. These temperatures make it very difficult for people to go outdoors for extended amounts of time, or to stay indoors without the use of air-conditioning, which made it difficult to record temperatures of the house in the summer. One option was to place the data loggers in the case study houses when the occupants were on holiday, but since there were different families they would go away from the house at different times in summer. To understand the impact that the design of the house had on the internal temperature of the house the external temperature had to be a constant factor and therefore it was important to conduct these tests on the same dates. Occupants of the house were asked to maintain a log of the time that the air-conditioning was switched on and off in the house and was considered during the analysis of the temperature and humidity data collected.

Data loggers were placed in four intermediate directions of the house during both summer and winter. Each time the loggers were placed at the same location in the house and were kept there for the same duration of 10 days. The temperature and humidity readings where recorded at intervals of 10 minutes to be able to understand the times at which changes occurred. The data was collected from all the houses and the below bar charts show the outcome.

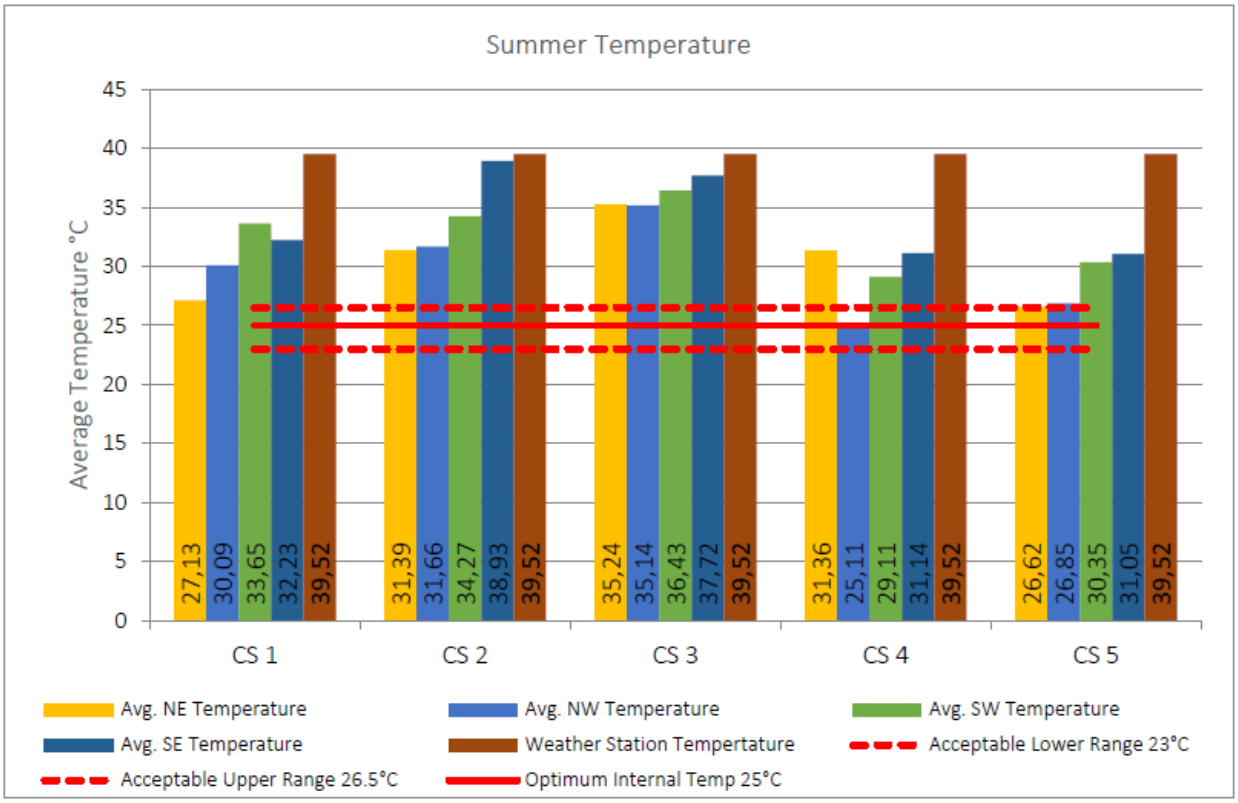

Figure 2- Comparison of Average Internal Temperature of Case Studies (CS) in Summer

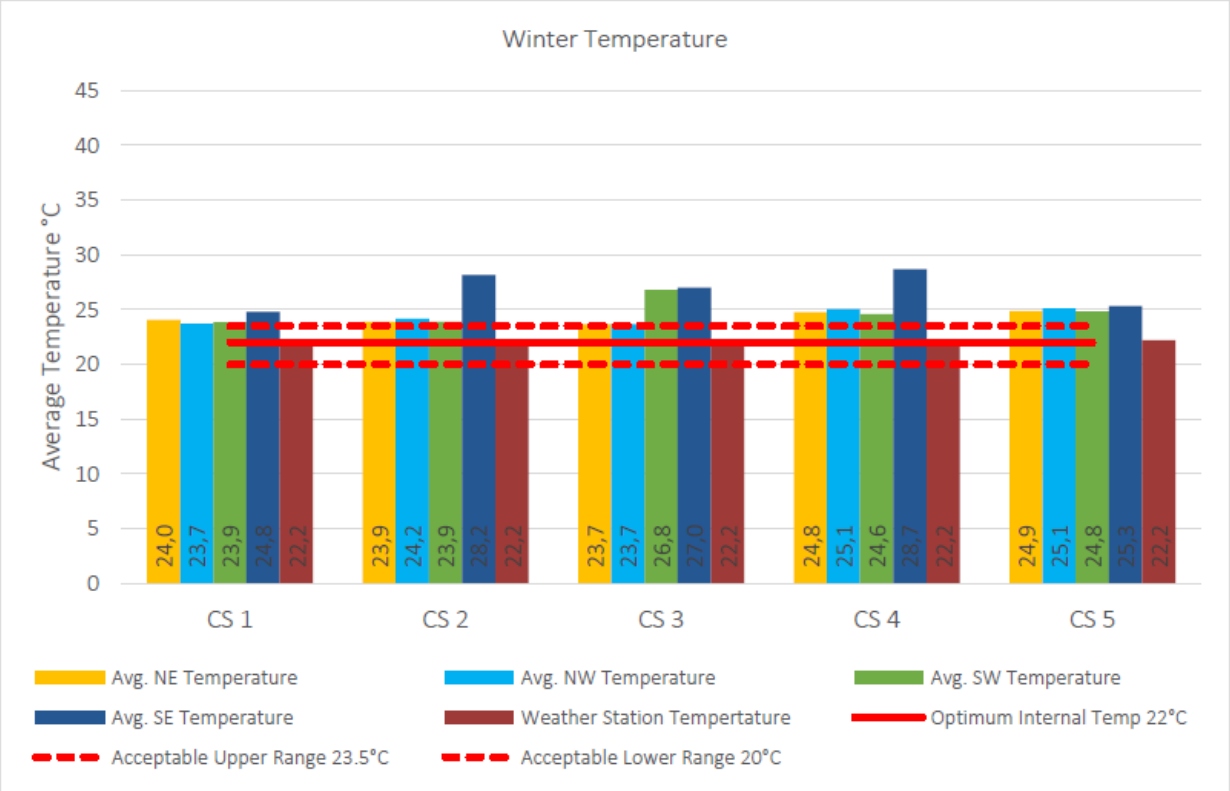

Figure 3- Comparison of Average Internal Temperature of Case Studies (CS) in Winter

The following observations can be made from the data collected -

• In comparison to the outside temperature the warmest corner is the Southeast corner, followed by Southwest, Northwest and Northeast, with a couple of exceptions. In case study 1 the Southwest corner is the warmer than Southeast and in case study 4 the Northeast temperature is as warm as the Southeast during the summer months only.

• A possible cause for these exceptions could be the proportions of the rooms in case study 1. The Southwest

room in this house has a cut and doesn't follow the proportions of *Vaastushastra* which is the reason for the variation in temperature.

• The exception seen in case study 4 is that the Southwest room is much cooler than the Southeast room, which is because the Southwest room has no windows and therefore there is no heat gain or heat loss. This also verifies that if the rooms on the South side do not have any windows it will be a cooler space.

Findings from users' questionnaires

To understand whether the principles of *Vaastushastra* had an impact on the comfort levels of users they were asked to fill in questionnaires. Even though user's experience of a space is subject to their age and gender as these factors have an impact on the way people experience spaces; the data on age and gender of the user was not collected as this would create too many variations in understanding the different levels of comfort that were experienced in the house. The questionnaires were used to understand the levels of comfort that the users' felt regardless of their age and gender. The findings of the questionnaires are summarized into the main ideas for this paper.

All the houses selected for the case studies follow the basic principles of *Vaastushastra,* some of the houses are more adherent while some are less. Findings from the questionnaires support that the houses which align more with the principles of *Vaastushastra* are more comfortable for the users. Most of the occupants didn't complain about noise levels from outside because the houses were in residential areas. Only case study 5 had an issue with sound when they left the windows open because the window opens to a noisy street. Some of the occupants had problems with amounts of natural light received in the house, which could relate to the orientation and number of the windows. All the occupants were comfortable with the smell around the house since there was nothing around that caused any bad odors. Touch links to the temperature and humidity of the house. The occupants' answers in the questionnaires were similar to the findings from the data loggers mentioned above. The residents of case study 3 mentioned that they relied most on air-conditioning during summer and winter months equally, which ties into the fact that the house has windows on all sides and therefore is warmest of all the case studies.

Conclusions

Case study 1 follows most of the principles of *Vaastushastra*, except that the southwest room is not rectangular, there is a cut in one corner of the room. Since this room doesn't follow the principles of proportions and geometry it is warmer than the southeast corner of the house in the summer months. The temperatures of the house during the winter months are within acceptable comfort levels even without the use of air-conditioning. The house has acceptable internal temperatures in the winter months with the exception of the southeast side which is completely glazed and therefore increased heat gain is observed. In this case study the window extends over both the floors as it is a window and this causes heat gain.

Case study 2 is the warmest in the Southeast side during summer (higher levels than case study 5) because there is a southeast window which causes heat gain, whereas the southwest side isn't as warm because there is no glazing on the south side. The window on the southwest side is covered by an overhang and therefore helps to maintain lower temperature. The west windows allow for cross ventilation of the air and the shaded structure helps to prevent excessive heat gain. During the winter months the house is comfortable except for the southeast corner which is naturally warmer by 5°C due to exposed glazing on the south side.

Case study 3 remains the warmest of all the houses in the summer, which is due to the fact that there are windows on all sides of the house and that the central space is covered with a roof. The windows on the south and west side should have shading structures to prevent any heat gain. If the central space had been used as an open courtyard the overall heat might have been reduced. The courtyard allows for cross ventilation and gives an opportunity to shade some of the openings on the south and west sides. During the winter months the north side of the house is within comfort levels and the south side still stays warm without the use of air-conditioning.

Case study 4 the northwest room is the coolest and the northeast room is warmer than the southeast room during the summer. This is because the northeast room of this house is not of ideal proportions, it is too long and narrow which is the reason for the heat gain in summer. Due to glazing on the south wall the southeast room remains warm during the summer and the winter. The southwest room has a temperature which is lower than expected because there are not windows on either walls of this space which helps maintain a comfortable space which doesn't receive any direct natural light. This space is open to the room in northwest which allows for indirect light to filter through.

Case study 5 is the coolest house from all the studies because of several factors. The house is oriented around the North to South axis which in this case is aligned on the short axis rather than the length. This explains why the principles of *Vaastushastra* are written in an interpretive manner to suite the site. Even when the length of the plot is on the East to West axis the house confirms with the rules. Placement of windows plays a key role because there are windows on the East and West façade and the windows on the latter have an overhang above them which prevents heat gain. The summer and winter temperatures of the house stay within the comfort zone except for the South side during the summer which sees a significant gain in temperature.

From the studies of the five houses during summer and winter some common principles are suggested –

• Houses that are designed based on the principles of *Vaastushastra* create spaces in the house that are relatively more comfortable than the other parts of the house.

• The use of the internal spaces should be decided based on the orientation of the house, so that the spaces that are most comfortable are used by the residents. For example, the Southeast space is the warmest in the house, therefore the living room or family room should not be placed here because it might be uncomfortable for the users.

• The variations in temperature gain or loss could be due to placement of windows, size of windows in proportion to room size or the orientation of the plan in relation to the North South axis.

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A PASSIVE SOLAR HEATING EXPERIMENT UTILIZING PLASTIC WATER BOTTLES AS THERMAL MASS

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Abstract

It is a critical concern for architectural educators to increase the awareness of their students about the importance of sustainability in the design of the built environment. This trend is a significant tool that can help the humankind to face many environmental challenges. The passive solar heating design is one of those powerful tools; it relies on specific materials to work as thermal mass or heat sink. Thermal mass can store the solar energy during the day and radiates it to indoor spaces at night in cold seasons, while the reverse process occurs in hot seasons. Due to its high heat storage performance, water is one of the most effective materials for this purpose. This paper aims to introduce a simple and easy process to prepare an experiment that can enhance the understanding and awareness of architectural students to the potential capabilities of water as a thermal mass. The authors asked the students to assign four spaces to carry on the experiment - two identical closed spaces, one semi-closed space, and one open space -; then, the authors directed them to reuse plastic water bottles to build the thermal mass and to constitute small groups that are responsible for monitoring and recording the air temperature within 24 hours. The authors advised the students to use the recorded air temperatures of each space as input data to a web-based thermal comfort tool and to compare the results. A quick survey to measure the students' satisfaction showed that the experiment participated in increasing the awareness of more than 93 % of the students about the positive effect of using water for thermal mass in elevating the indoor space temperature in cold seasons.

Word Count: 4306

Introduction

Many researchers believe that the Greeks were the first who adopted the concept of passive solar heating -heating the indoor spaces without relying on mechanical or electrical systems. They designed and oriented their buildings to collect and store the solar energy during the day, but they could not retain it at night due to the unglazed window openings. The Romans developed the Greek's idea by providing glazed windows. The glass participated in forming a heat trap similar to what we now call the greenhouse effect (Butti, 1980 pp.1-21). The idea vanished with the fall of the Roman Empire, but Walter Gropius adopted it again in the 1920s. Then it took its way across the Atlantic to the Americas and the rest of the world (Grondzik, 2015 pp. 295-296). In passive solar heating design, the main building elements such as floors, walls, and windows do not be only satisfying the architectural and structural requirements but also the energy ones. Glazed windows trap the solar energy in the indoor spaces during the daytime, while the walls, roof, and floor slabs store and radiate the heat at colder times - nighttime and the early morning. Thus, any passive solar heating system consists mainly of three elements:

- Aperture: South-facing glazing - in the northern hemisphere - with no more than 30° of rotation to the east or to the west from the true south.
- Absorber: A hard, darkened and unglazed surface of the storage element.
- Energy Storage Element: Thermal mass such as rock, brick, reinforced concrete or water.

In addition, the designer might incorporate the following elements as well:

- Heat Distribution: Small fans, ducts or blowers in case of the applied system is not strictly passive and relies

only on natural heat transfer by conduction, convection or by radiation.

- Control: Overhangs or trees to shade the windows in hot seasons (DOE/EE-0342, 2010).

The relationship between these elements leads to three design systems: Direct Gain, Indirect Gain (Trombe Wall) and Isolated Gain (Solarium / Sun-space). Figures 1-a, 1-b, and 1-c clearly illustrate the major differences between the three systems (Neha Gupta, 2015 pp.305-335).

When compared to different building materials, water is light and has a higher Heat Storage Performance (HSP), which is a function of its thermal capacity and its conductivity (Table 1). Another important issue is that most of the building materials are usually isolated from the indoor environment by floor/wall finishes, suspended ceilings, furnishing... etc. Hence, leads to a significant reduction in the convective and radiant heat transfer between the thermal storage material and the indoor environment. For all these reasons, we can depend on water as one of the favorable materials that we can use as thermal mass when we design passive solar heating or cooling systems for our indoor spaces (Milan Ostry, 2013 pp.837 – 843).

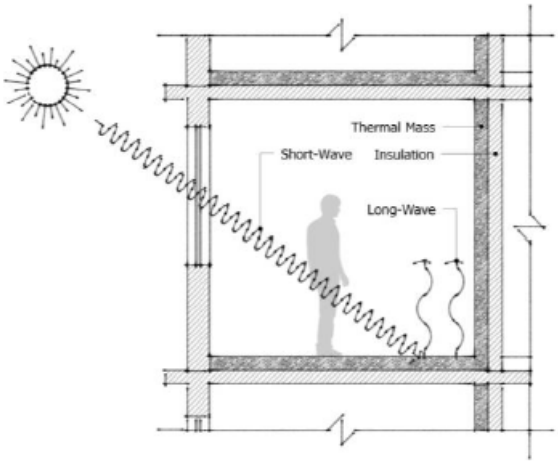

Figure 1-a. Direct gain

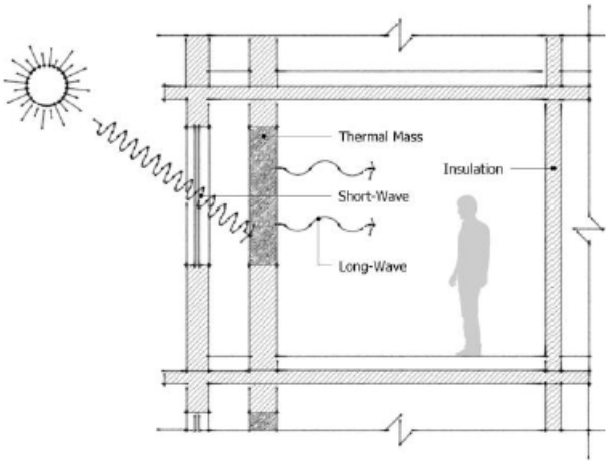

Figure 1-b. Indirect gain (Trombe wall)

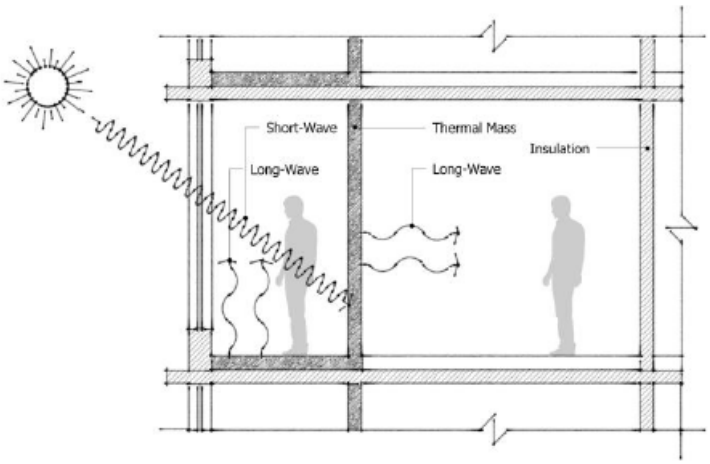

Figure 1-c. Isolated gain (Solarium / Sun-space)

For any thermal mass to be effective, the following conditions should be considered:

- The exposure of thermal mass to the direct solar radiation; therefore, floors are the first favorable choice.
- The combination of directly and indirectly exposed thermal masses when it is difficult to depend only on the directly exposed one. Thus, walls usually become the second favorable choice.
- The isolation of thermal mass from the outdoor environment.
- The surface area of the thermal mass, which is much more important than its thickness.
- The color of thermal mass surface, which should be dark to ensure a high absorption, while the surfaces of non-mass materials should be very light in color to reflect the solar radiation to the darker mass materials.
- The surface area of thermal mass, which is estimated as a percentage of the south glazing area (Table 2). However, this condition really matters, especially in both of the direct and indirect gain systems, while in the isolated gain system; the solarium is designed as a separate space (Lechner, 2015 pp.173-179).
- The relationship between the glazing area and the climate of design location (Table 3). In addition, the rules for estimating the glazing size (Bainbridge, 2011 pp.167).

Material	Water	Steel	RC	Granit	PC	Solid brick	Wood	Gypsum board
Density (kg/m³)	998	7850	2500	2500	2100	1800	400	750
Specific heat (J/kg K)	4182	440	1020	950	1020	900	2510	1060
Thermal capacity (10^6 J/m³ K)	4.17	3.45	2.55	2.38	2.14	1.62	1.00	0.80

Table 1. Characteristics of selected construction materials applicable for heat storage

Thermal mass	Exposure to solar radiation	Thickness & surface area ratio (to glazing area)					
		Direct gain		Indirect gain		Sunspace	
		Thickness	Surface area ratio	Thickness	Surface area ratio	Thickness	Surface area ratio
Concrete or Masonry	Direct	10-15 cm	3 times	25-40 cm	same	20-30 cm	same
	Indirect	5-10 cm		6 times		Not applicable	
Water	Direct	15-30 cm	Half	> 20 cm	same	12 cm	Half

Table 2. Rules for estimating the required thickness and surface area of thermal mass

Climate	Very cold	Cold	Temperate	Tropical	
				Dry	Humid
Thermal load	Heating only	Heating only	Balanced heating & cooling	Cooling & Small heating	Cooling only
Area of glazing as a percentage of flooring area	10-20 %	10-25 %	9-15 %	6-11 %	0 %

Table 3. Rules of estimating the optimum area of south-facing glazing for direct gain and Trombe wall

From the literature survey, the authors noticed that most of the researchers focused on the design guidelines and the field application techniques while less attention was given to the experimental and verification side during the undergraduate studies. Hence, the need for this experiment emerged, posing the major questions for this paper as follows:

- How to introduce a simple and easy experiment that may help architectural students to understand the potential capabilities of using water as a thermal mass in a better way?
- Could we conduct this experiment by utilizing a mobile thermal mass that is made of plastic water bottles without the need to make any changes in the interior design of the campus?
- Is utilizing plastic water bottles will be effective for this purpose?

Choosing the appropriate approach

To answer the first question of this research it was important to make a comprehensive comparison between the three passive solar heating systems to determine the advantages and drawbacks of each. This comparison was necessary to guide the authors in choosing the most appropriate system to conduct the experiment. From the comparison, we could find that:

- The direct gain system will put some restrictions regarding the location of the thermal mass and the way of its direct/indirect exposure to solar radiation, which must be either a floor or walls. In addition, it requires the thermal mass to be an integrated part of the building and this requires for structural modifications.
- Isolated gain system requires the presence of additional space, which is not applicable in the CIC campus.
- The indirect gain is the most appropriate system, as it gives an opportunity to use a movable thermal mass to function as a Trombe wall, where the students can use it only during carrying out the experiment.

To answer the second and third question, the experiment was divided into three main stages:

1. The Preparation Stage: comparing and assigning the suitable spaces to conduct the experiment. In addition, they will prepare the thermal mass and calibrate the measuring tools, which in this case are analog thermometers.
2. The Experiment Stage: During this stage, the students will monitor, periodically record and tabulate the weather data and the Dry Bulb Temperatures (DBTs) for the assigned spaces.
3. The Verification Stage: Studying and analyzing the effect of using water as a thermal mass on elevating the indoor space temperature in cold seasons.

Preparation Stage

It was important to study three main issues during the preparation process; these issues are the basic elements to conduct the experiment, and the way of choosing and/or preparing them has a significant effect on the expected

results, these elements are:

• The Indoor Spaces: The students were asked to assign two indoor spaces in the CIC campus to conduct the experiment in a way that the chosen spaces satisfy the following criteria: They should be oriented - or nearly - to the true south and in the same floor level. In addition, the chosen spaces should be identical in the floor area, height, finishing materials, finishes colors, in addition to glazing dimensions and type. The students proposed two rooms B212 & B213 (Figure 2). The two rooms are on the first floor of the school of engineering, facing the true south with a rotation angle of 28° to the east direction (Figure 3). Both of the rooms have a floor area of 11 m² and a height of 2.8 m to the false ceiling level; the walls are painted in ivory white color and the floors are finished with light beige porcelain tiles. Each room has one window opening with the width of 2 m, height of 1.2 m and net glazing area of 2.04 m² of brown tinted glass, which satisfies the required glazing ratio - more than 10 %. In addition to the selected spaces, another two spaces were included during the measuring process in order to enrich the comparison. One of the spaces is a semi-closed one, which is the corridor between classes and staff rooms, while the other one is an outdoor space, which is the campus courtyard.

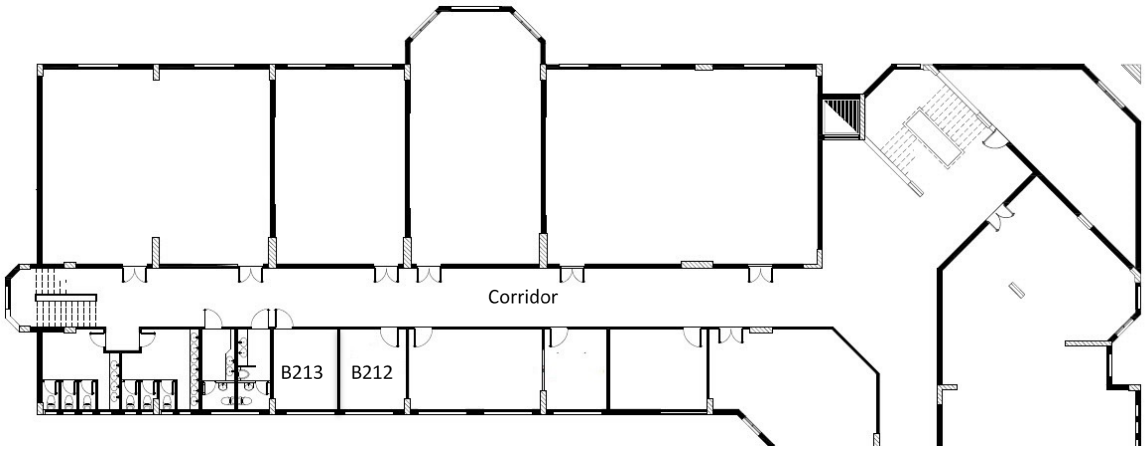

Figure 2. Typical floor plan for the School of Engineering, illustrating the proposed spaces to carry on the experiment, which are B212, B213, Corridor and Campus Courtyard

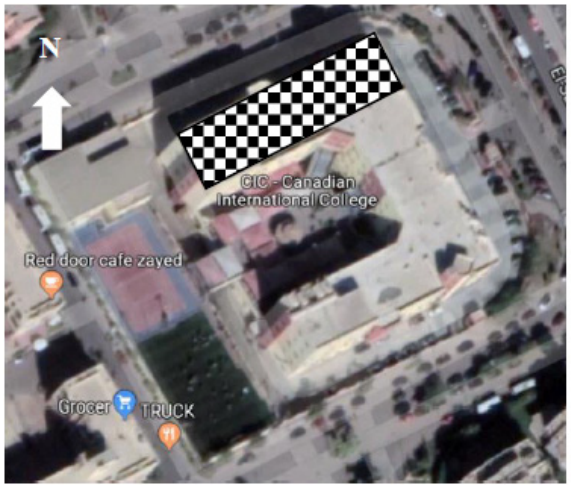

Figure 3. School of Engineering wing, CIC campus

Figure 4. The students preparing the thermal mass

The Thermal Mass (Water Bottles): Regardless the already mentioned advantages of using water as thermal mass, it has some drawbacks such as the extra-added loads on the structure and the need for containers, which may leak or require maintenance. Therefore, it was important to prepare the needed thermal mass - water containers - and use it to conduct the experiment inside the CIC campus without any permanent modifications in the indoor spaces design or the finishing materials. As students use many plastic water bottles during their scholar day, they can present an appropriate alternative in such a case. Another issue was how can these bottles could be used to construct the thermal mass; therefore, authors proposed that students could fix these bottles - after they refill them again with water - on mobile metal stands that they usually use for their architectural project presentations by cable plastic zippers. Since the indirect gain approach necessitates that the exposed surface of the thermal mass to be equivalent to the glazing area, the water bottles were not supported on all over the height of the metal stands but only on the upper part that matches with the windowsill height. To achieve the minimum thickness of the thermal mass, which is 20 cm, double layers of water bottles were supported - back-to-back - on the metal stands

in a staggered way to increase the exposed surface area (Figure 4). To prepare the required thermal mass, three hundred and twenty eight bottles were used; each one has a height of 30 cm, a diameter of 10 cm and contains 1.5 liters of water, with a total volume of 492 liters of water.

The Measuring Tools (Thermometers): four spirit thermometers were installed - one Alcohol thermometer for each space - and fixed to measuring sheets with clear caution signs to record the DBTs. periodically. A calibration process was performed on the used thermometers to ensure that each of them would give an accurate measurement before carrying out the experiment. After the calibration process, each of the measuring sheets was supported in a suitable location in each space to make it easy for any involved student to observe and record the periodical measurements.

The Experiment Stage

To track the effect of using water as a thermal mass on the indoor environment, the experiment period was set to extend for 24 hours over two cold days - the 16th and 17th of December. The students were asked to constitute groups out of two members per group. Each group was responsible for monitoring and recording the DBTs in one of the four mentioned spaces for two hours period - one reading per hour, In addition to recording the official corresponding weather characteristics for the same time of the day. These characteristics such as relative humidity, air pressure, wind speed and the DBTs. are obtained regularly from the nearest certified weather station, which is Cairo International Airport (TWC, 2014). Thus, obtaining 100 records by the end of the experiment.

- The experiment took place on a weekend - from 8:00 am Saturday until 8:00 am Sunday - to eliminate any other thermal effects such as radiation from human bodies, working appliances, lighting fixtures…etc.
- In the morning of the experiment's day - 30 minutes before starting the experiment - the prepared thermal masses were moved to one of the two identical rooms (B213). They placed the metal stands with the fixed on water bottles into their final positions, facing the window directly and 10 cm away from the glazing surface. At the same time, another group of students was responsible for installing the recording sheets with their fixed on thermometers into suitable locations in the four assigned spaces (Appendix A).
- On 8:00 am, the started the monitoring and recording task in two phases:
  - Phase 1: extended from 08:00 am until 03:00 pm, the windows on both rooms - B212 and B213 - were left without thermal insulation to maximize the heat gain.
  - Phase 2: started after 03:00 pm, the students were asked to install polystyrene thermal isolation boards and strips to isolate the windows in both of the indoor spaces. This process was critical when the windows are not exposed to the direct sun to eliminate the heat loss as much as possible.
- By the end of the experiment procedures, the students were asked to tabulate the collected data in a comprehensive way (Appendix B) and to illustrate it in the form of a line chart diagram to demonstrate the temperature changes during the 24 hours in the four spaces compared to the reference weather readings (Figure 5).

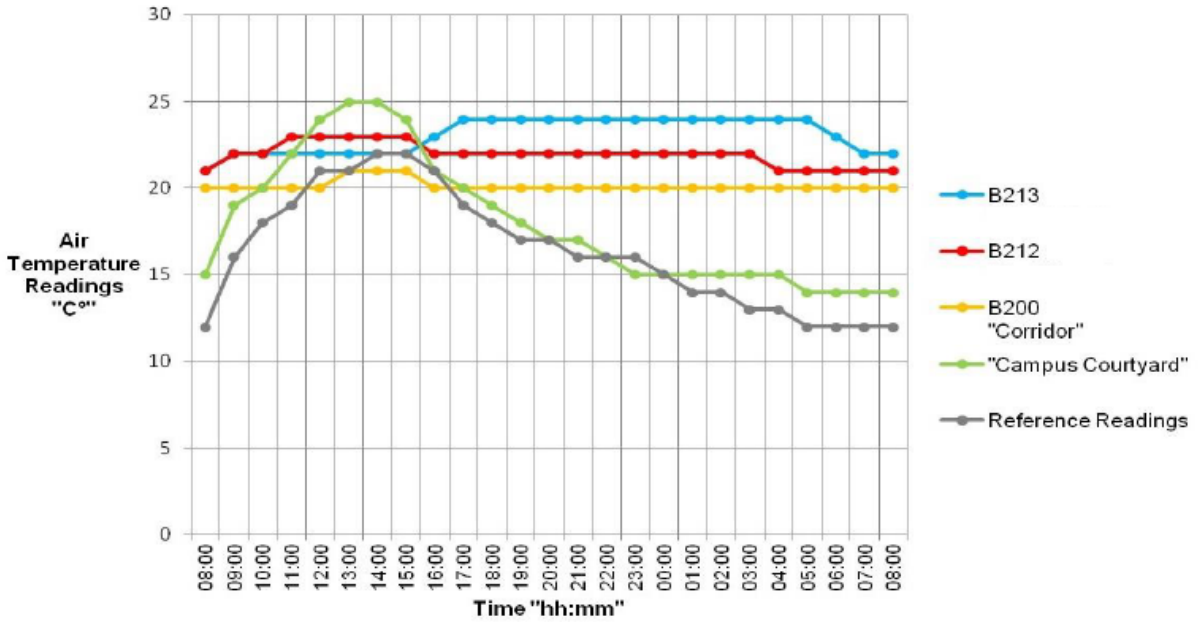

Figure 5. The recorded (DBTs.) of the four spaces compared to the reference (DBTs.) of the same day

Verification Process

To verify the effect of using thermal mass - water bottles - on the feeling of comfort inside the B 213 room, the students were advised to use their recorded air temperatures as input data for a web interface thermal comfort tool

developed by the Center for the Built Environment (CBE), University of California Berkeley (Schiavon Stefano, 2014 pp.321-334). After that, the students repeated the same process for the other three spaces and made a comparison between the four spaces.

- The CBE thermal comfort tool enables the user to choose between two methods: the Mean Predictive Vote (MPV) method or the Adaptive method. In addition, either it enables the user to apply the European Standard (EN-15251) or the American Standard for Heating, Refrigerating and Air-conditioning Engineers (ASHRAE-55) to the selected method (CBE, 2017).
- The Adaptive method was the most appropriate choice in our case as it is based on a hypothesis that the outdoor climate influences indoor comfort. Both of ASHRAE-55 and EN-15251 standards apply for the Adaptive method; however, the latter fits more in our case (Figure 6). The ASHRAE standard is only applicable to buildings without any mechanical cooling or heating systems installed, while the EN15251 standard is applicable to mixed-mode buildings, which have mechanical systems but they are not running, as in the case with the CIC campus. In addition, the EN-15251 standard considers the metabolic rates ranging from 1.0 to 1.3 met and the occupants can freely adapt their clothing insulation (CEN, 2007 pp.14).
- Supposing that the measured DBT equals the Mean Radiant Temperature (MRT), and the Airspeed is less than 0.2m/s; then, the Operative Temperature will have the same value of the DBT (ANSI/ASHRAE 2014, pp.16).
- However, it is not the case in the open courtyard; therefore, airspeed was set to 0 m/s for all the spaces, to eliminate the effect of the wind speed on the limits of the comfort zone.
- The last needed input data to the CBE thermal comfort tool is the outdoor running mean temperature. The students referred to the website of the World Meteorological Organization to get this value for the month of December in Cairo - Egypt, which was around 16 C° (WMO, 2017).

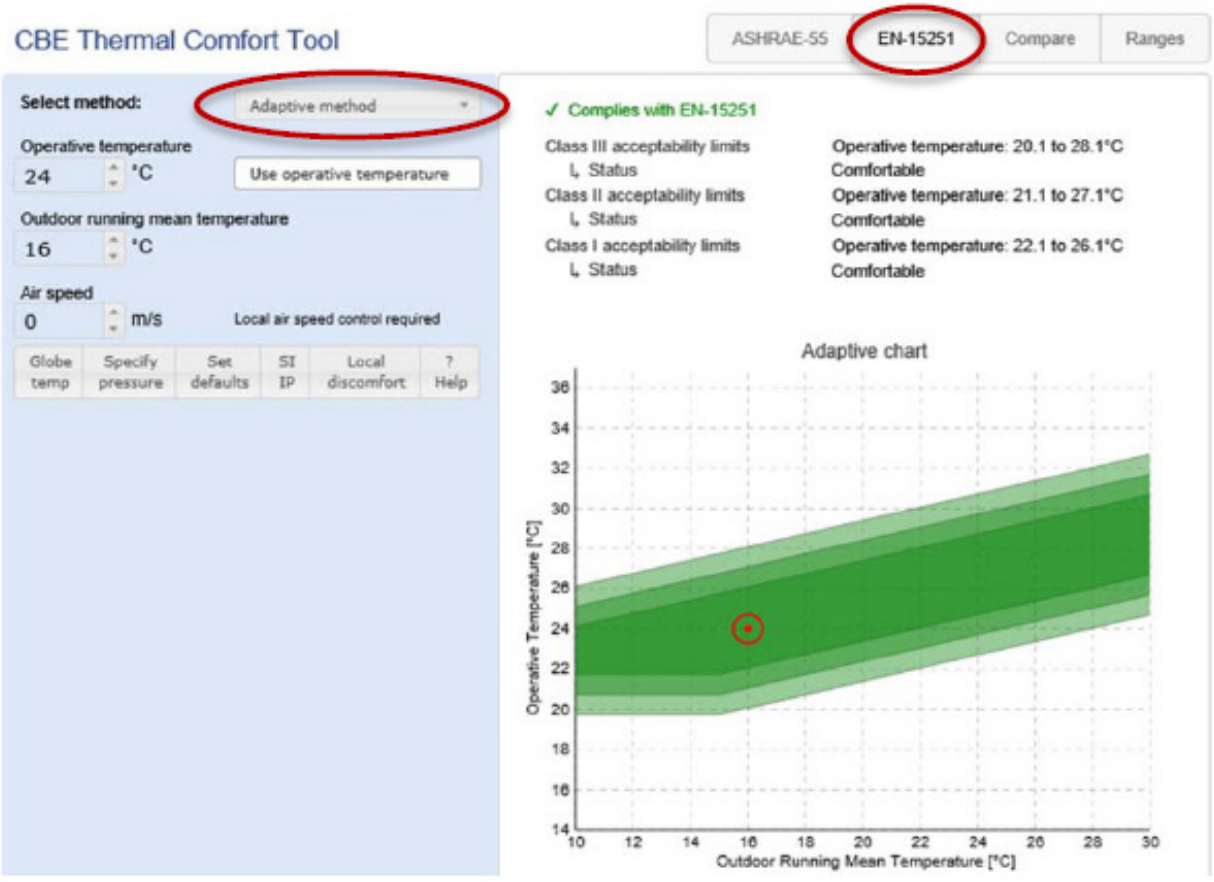

Figure 6. The CBE comfort tool interface (adaptive method) according to the EN-15251 standard

The results

According to the predetermined Outdoor Running Mean Temperature, which is 16 C°, the Adaptive method in the European Standard (EN-15251) classifies the comfort zone into three main categories as follows:

- Class I (the Operative Temperature acceptability limits of comfort is between 22.1 and 26.1 C°).
- Class II (the Operative Temperature acceptability limits of comfort is between 21.1 and 27.1 C°).
- Class III (the Operative Temperature acceptability limits of comfort is between 20.1 and 28.1 C°).

For any of the three classes, the CBM comfort tool considers any adaptive temperature higher than the maximum limit to be very warm and anyone lower than the minimum limit to be very cool. When the students entered the

recorded data to the CBE thermal comfort tool the results were as follows:

- The corridor recorded the least number of hours that satisfy the thermal comfort and only within Class III, which is too cool for the other two classes and it was as follows:
  - Three hours (12:00 am - 03:00 pm) → (Class III)

  While the rest of the experiment period - 21 Hrs. - were located outside all the comfort zones.
- The courtyard had a longer period that satisfies the thermal comfort as follows:
  - Four hours (12:00 am - 03:00 pm) → (Class I)
  - One hour (11:00 am - 12:00 pm) → (Class II)
  - One Hour (04:00 pm - 05:00 pm) → (Class III)

  While the rest of the experiment period - 18 Hrs. - were located outside all the comfort zones.
- Room B212 (Closed Space without Thermal Mass) was located within the limits of comfort zone during the entire experiment period as follows:
  - Five hours (11:00 pm - 04:00 pm) → (Class I)
  - 14 hours (09:00 am - 11:00 am on day one and 04:00 pm - 04:00 am on day two) → (Class II)
  - Five hours (08:00 am - 09:00 am and 04:00 am - 08:00 am) → (Class III)
- Room B213 (Closed Space with Thermal Mass) was located within the limits of comfort zone during the entire experiment period as follows:
  - 15 hours (04:00 pm - 12:00 am on day one and 12:00 am - 07:00 am on day two) → (Class I)
  - Three Hours (09:00 am - 04:00 pm on day one and 07:00 am - 08:00 am on day two) → (Class II)
  - One hour (08:00 am - 09:00 am) → (Class III)

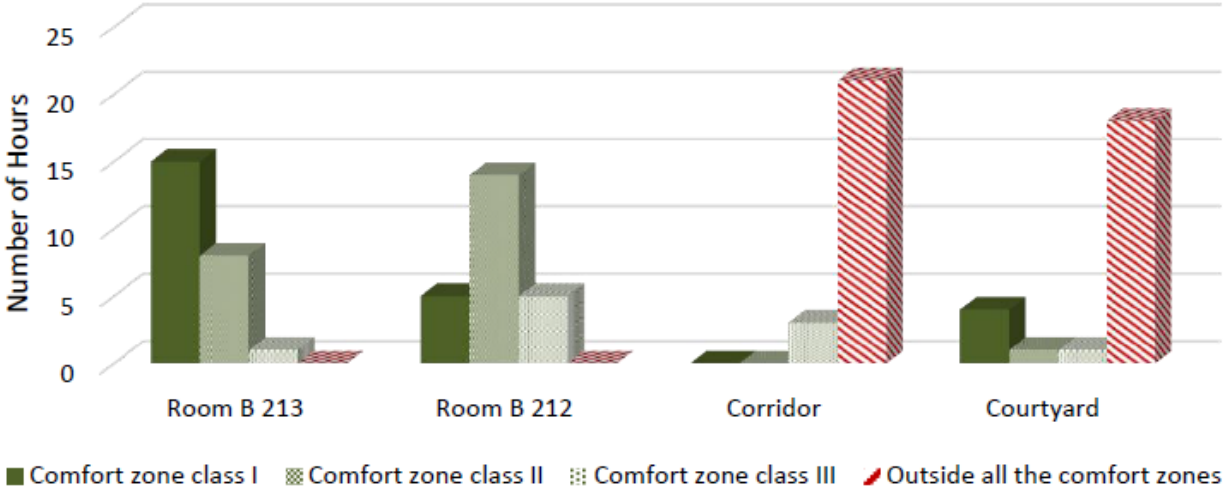

Figure 7 illustrates the summary of the above results in a bar-chart form, while Figure 8 is an example of comparing the state of comfort in the four spaces at 4:00 am (the second day).

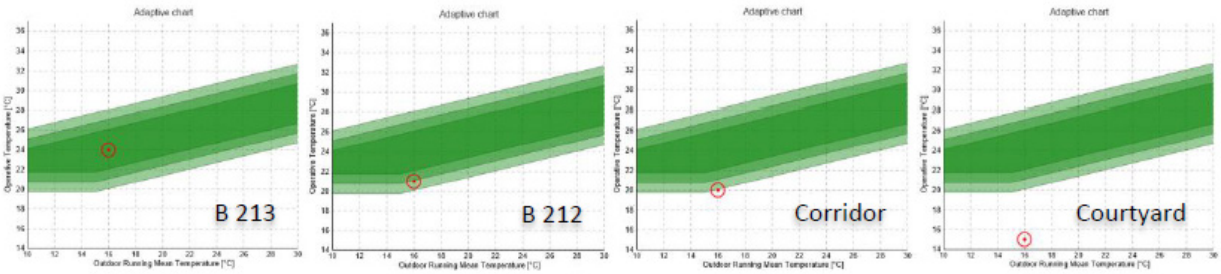

Figure 8. Example of the comparison between the comfort statuses in the four spaces at 4:00 am shows that: B 213 in class I, B 212 in class II, while both of the corridor and courtyard are outside all the comfort zones

Discussion

- Due to the effect of the CIC campus building – U shape – and the context, the recorded DBTs. in the courtyard are higher than the DBTs, collected from the reference station in most of the experiment's time.
- In the morning of the first day, both B212 and B213 had the same DBTs; yet, starting from 10:00 am until 3:00 pm, room B213 had lower DBTs as the thermal mass absorbed more energy. On the other hand, after 3:00 pm, the sun was away from the windows; yet the DBTs in B213 were higher than the DBTs. in B212.

- The effect of the thermal mass was obvious although it was the worst case. As the water was very clear - without adding any dark colors - and the use of individual bottles eliminates the effect of the convection.
- It was important to measure how the experiment could enhance the awareness of the participants in understanding the positive effect of using water as a thermal mass in passive heating systems. The authors' forwarded a quick questionnaire to the students for this purpose and the statistics of the answers showed that more than 93% gave positive feedback.

Conclusion

This paper discussed the applicable systems of passive solar heating design. A quick comparison between the different systems showed that the indirect gain (Trombe wall) is the most appropriate system to depend on when conducting a passive solar heating experiment inside the campus. The authors introduced a simple technique to build a temporary thermal mass by re-using plastic water bottles, which are re-filled with water and fixed on mobile metal stands. This experiment is applicable for execution in many of the academic institutions, as it only requires for two identical South-facing spaces and does not necessitate any temporary or permanent modifications in the interior design. Monitoring, recording and comparing the DBTs in the different spaces assured that utilizing plastic water bottles as a thermal mass is reliable to illustrate the effect of passive heating techniques in elevating the indoor space's temperature in cold seasons. The students play a major role in this experiment during the preparation, recording the air temperatures in the different spaces and while verifying the results. After the validation process, a quick survey showed that more than 93% of the participants were satisfied with the experiment's methodology and results.

Acknowledgment

The authors would like to give special thanks to our diligent students - 46 students who are registered in the Environmental Control, Cohort 2015 - who participated in the different stages of this experiment (Google drive, 2019). In addition, we would like to thank all of CIC academic and administrative members who presented all the possible help to carry on this experiment in such a successful way.

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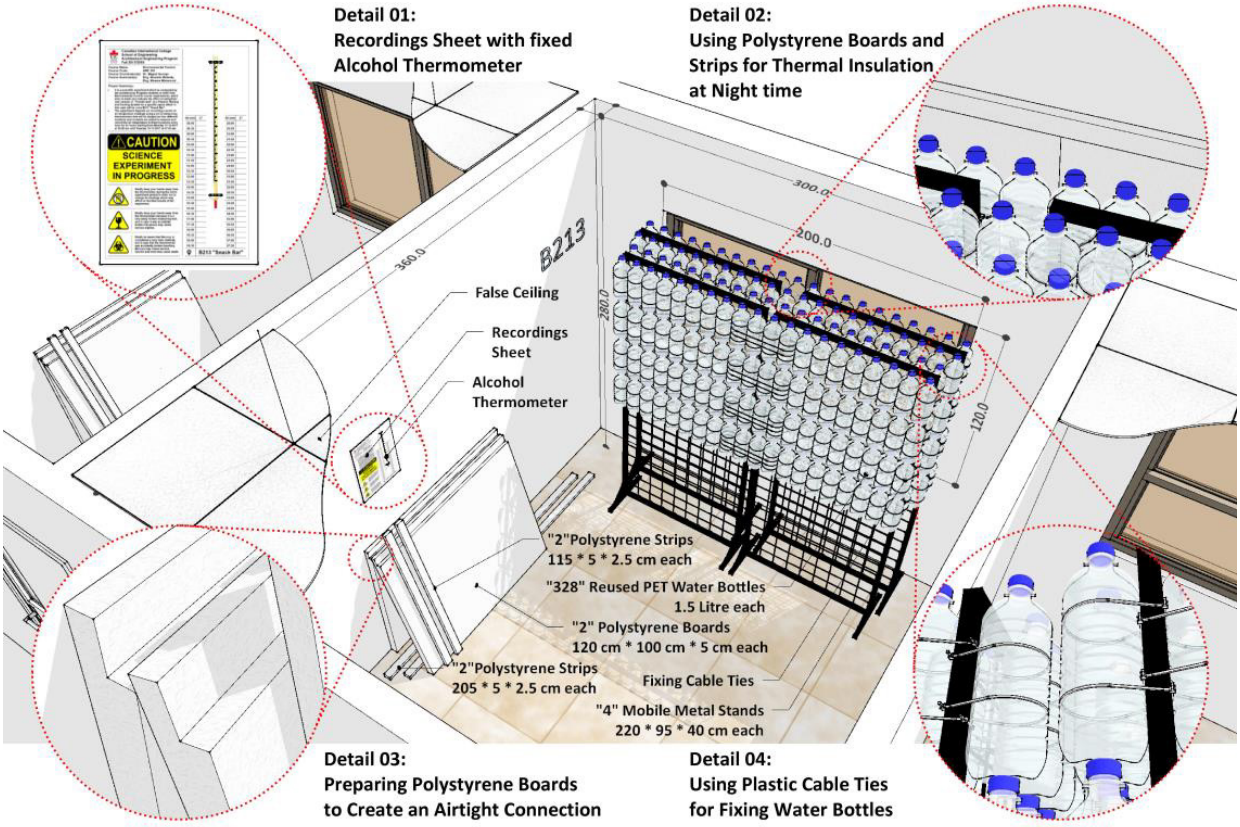
Appendix (A)
Details of the selected spaces and thermal mass



Appendix (B)
Tabulation of the recorded weather data during the experiment period

Day	Time "hh:mm"	Reference Readings				Air Temperature Readings "C°"			
		Relative Humidity "%"	Wind Speed "m/s"	Air Pressure "Pascal"	Air Temperature "C°"	B213 "Snack Bar"	B212 "Staff Room"	B200 "Corridor"	"Campus Courtyard"
Day 01 16-12-17	08:00	85	0.83	101930.00	12	21	21	20	15
	09:00	73	2.22	102240.00	16	22	22	20	19
	10:00	67	3.06	102240.00	18	22	22	20	20
	11:00	57	3.89	102200.00	19	22	23	20	22
	12:00	52	3.61	102130.00	21	22	23	20	24
	13:00	47	3.06	102030.00	21	22	23	21	25
	14:00	44	2.50	102000.00	22	22	23	21	25
	15:00	45	3.61	101930.00	22	22	23	21	24
	16:00	46	3.61	101960.00	21	23	22	20	21
	17:00	50	3.61	102060.00	19	24	22	20	20
	18:00	57	3.06	102000.00	18	24	22	20	19
	19:00	60	2.78	102030.00	17	24	22	20	18
	20:00	62	2.22	102070.00	17	24	22	20	17
	21:00	68	2.22	102000.00	16	24	22	20	17
	22:00	71	2.78	102100.00	16	24	22	20	16
	23:00	71	2.78	102200.00	16	24	22	20	15
	00:00	78	2.78	102030.00	15	24	22	20	15
Day 01 17-12-17	01:00	78	2.22	102000.00	14	24	22	20	15
	02:00	84	1.39	101960.00	14	24	22	20	15
	03:00	88	1.39	101930.00	13	24	22	20	15
	04:00	86	1.67	101930.00	13	24	21	20	15
	05:00	90	0.83	101900.00	12	24	21	20	14
	06:00	92	0.56	101900.00	12	23	21	20	14
	07:00	86	0.56	101930.00	12	22	21	20	14
	08:00	85	0.83	101930.00	12	22	21	20	14

NEW PERSPECTIVES TOWARDS SOCIAL ACCEPTABILITY OF EARTH-CONSTRUCTED BUILDINGS

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ABSTRACT

Efforts in the preservation of earth built heritage and the promotion of contemporary earth construction by members of the UNESCO-Chair in *Architectures de Terre cultures Constructives et Développement durable*, have overcome many challenges associated with the appropriateness of earth as a building material the last two decades. However, negative perceptions remain one of the biggest challenges to date. The Earth Unit has established itself within a South African tertiary institution to address all aspects of earth architecture through teaching, training, and research. A technical and design based approach is driven by many institutions in the promotion of earth construction as a discipline. Although this is one of the best ways to deal with misconceptions and reservations, a direct approach from a social scientific and philosophical stance is equally essential to understand and address negative attitudes associated with raw earth as a building material in contemporary built environments. The latter approach can help to develop a planning strategy for new projects in settlements and cities. This article will identify "Orphic" ideas, attitudes and phenomena, synonymous with "ecologically-sensitive" approaches. Orphic attitudes will be opposed to "Promethean" attitudes that spread via the historical domination of Christianity, science, technology, capitalism, whose attitudinal underpinnings have provided an ideological impetus for ecologically problematic actions. The dominance of the Promethean has resulted in steadily growing ecological crises. Furthermore, upward social mobility and migration patterns, which arguably have arisen from the global spread of Promethean systems, influence the values of city dwellers. These values affect their attitudes and behaviour towards the natural landscape and the built environment. The key impacts of these considerations help to reveal the bigger picture often blurred while strategizing promotion efforts in favour of private and public contemporary earth-constructed buildings.

Keywords: earth construction, behaviour, Promethean, Orphic, ACID
Word count: 5855

1. BACKGROUND

The work and activities of the Earth Unit at the Department of Architecture at the University of the Free State in South Africa, during the past 23 years, involved training students in architecture as well as small groups of builders, and students in quantity surveying and construction management (Figure 1 & 2). This challenge to formalised building practice started in 1996 with an introduction and integration of earth building techniques into the curriculum presented by the Earth Unit. The Earth Unit aims to promote the use of contemporary earth construction while adding to the heritage of traditional and vernacular architecture in the central parts of South Africa. Small-scale buildings (Figures 3 & 4) are used to experiment and demonstrate the contemporary application of earth in a developing country. It became clear that issues around raw earth as a building material were not limited to the technical performance of the material, but also the perceptions, attitudes, and values of the public. Accordingly, there will not be a large focus in this article on the technical performance aspects of raw earth, such as its durability or compressive strength, as a building material, but rather on some attitudinal factors relevant when thinking about earth constructed buildings and their design.

Figures 1 & 2 Student activities for the construction of an experimental house for a single mother as part of the B. Arch. – degree curriculum)

Over time, members of the Earth Unit realised the increasing need for research on the cultural values of earth construction (Guillaud, 2010: 17). Since little was known about the acceptability of traditional earth construction in South Africa, the Earth Unit looked for funding to do a major research project on this topic. This article aims to highlight the insights from a social scientific stance, combined with a philosophical perspective on the global phenomenon of rejecting traditional building techniques and materials. Note that despite the recent references to South and Southern Africa, the research conducted for this article revealed general themes and issues (arising from a broad interdisciplinary context) that we, the authors, contend are important to consider as part of the global phenomenon just mentioned. What is taken into consideration throughout this article is applicable in the South African context, but not limited to it, and we deliberately take a more generalised thematic approach to identify hitherto missing contextual information about values and attitudes. The following section will highlight the limited contribution of past studies in the acceptability of traditional earth construction in southern Africa.

Figures 3 & 4. On-site stabilised earth block production of a demonstration building project constructed in a residential area of Bloemfontein, South Africa (2016)

2. RESEARCH IN THE ACCEPTABILITY OF TRADITIONAL EARTH CONSTRUCTION

2.1 Limitation of past studies on attitudes and building materiality

The low acceptability of earth-constructed walls are well known, but few answers to the factors and questions that influence these attitudes are known (Bosman, 2015). Some clear principles and models that illustrate aspects from a social science viewpoint should be mentioned to have a better understanding of these factors. Architecture students are seldom exposed to scientific research methods during their training. Architects seldom use qualitative and quantitative research in architecture as comparative methodologies to establish end-users' attitudes of the acceptability of building materials. Architecture students should be exposed to a curriculum promoting contemporary earth construction. This will instil a better understanding of the viewpoints towards traditional earth construction. In this curriculum, the Earth Unit focuses on the importance of addressing issues of acceptability through a promotional approach to contemporary earth–constructed building.

2.2 Recent research project in South Africa on attitudes and building materiality

From 2006-2009 the Earth Unit conducted the first significant traditional earth-constructed housing research funded by SANPAD (South Africa-Netherlands Research Programme on Alternatives in Development) through a household survey (n=1790) regarding the perceptions and attitudes toward earth construction. Multiple qualitative

and quantitative responses both for and against the use of adobe were recorded (Bosman, 2015: 81). For this study, correlation and regression analyses were used to test for the characteristics (significant variables) that influence the acceptability of earth-constructed houses.

The findings showed that respondents regard traditional earth building materials as inferior (Bosman, 2015: 105-135). Negative attitudes to the structural performance of unbaked earth materials regarding stability in wet conditions were linked. Maintenance was indicated as a factor to be considered. Additional limited studies confirmed the low acceptability of traditional earth constructed walls. Regression analysis could not confirm that personal and household characteristics are associated with the housing, context and acceptability characteristics. Correlation analyses confirmed that specific housing characteristics (essential services such as water-born toilets connected to sewerage systems, running water and electricity) influence the acceptability of traditional earth constructed houses. Correlation analyses confirmed that context characteristics (location and area types) influence the acceptability of traditional earth constructed houses. Furthermore, the data and literature confirmed that the building culture (available material and building skills) and upward social mobility together with state-funded houses (with essential services) influence the acceptability of traditional earth constructed housing.

The current literature on the factors that influence societal views on building material is still limited (Stevenson, 2006). Factors associated with the acceptability of traditional earth construction (Ngowi, 1997a; Hadjri, Osman, Baiche & Chifunda, 2007) are not only limited to context characteristics but also are influenced by building culture and upward social mobility in combination with the presence of state-funded houses. The following sections provide the background to insights on social issues that are considered drivers in the global phenomenon of the low acceptability of earth-constructed buildings in developing countries, followed by a broadly philosophical, ecological, and historical perspective on some relevant aspects of western civilisation.

3. SOCIOLOGICAL INSIGHTS CONNECTED TO THE ACCEPTABILITY OF BUILDING MATERIAL IN DEVELOPING COUNTRIES

Rapoport (1977: 40) stated that the normative value filters people use to look at life influence all thinking. People's world-views are influenced by their parents, their upbringing and their culture, all of which work to influence these filters. Through globalisation, western civilisation has increasingly influenced how the developing world sees the rest of the world. These filters used to look at life and the world holds differences in culture, background and values. Furthermore, these values are fluid and change over time (McCarthy, 2017: 40).

3.1 Values, class and social mobility in developing countries

It is essential to consider contemporary representations of health, status, social ethics and mobility when interpreting social change (Carocci, 2011: 370). Furthermore, if the negative perceptions of traditional building material are investigated the influence of upward social mobility should be considered. The phenomenon of upward social mobility influences the status of acceptable house building material. The status associated with more expensive building material, such as fibre cement roof tiles, in combination with face-brick walls, can be perceived as the building material choice of homeowners that show financial progress or success in life. Inequality should be considered during this process. Inequality, which accompanies social differentiation, is a growing global field of research (Krige, 2015: 104). This research holds the continued debate around the conceptions of class (Crankshaw, 2005; Schlemmer, 2005; Alexander, Ceruti, Motseke, Phadi, & Wale, 2013; Melber, 2013) that are contrasted by neo-Marxist and neo-Weberian class stances. The Marxian approach based on production, results in ownership and different classes, while the Weberian approach is based on consumption and class (Nijman, 2006: 759). These approaches have shaped research on how middle-class members legitimise newfound wealth and social mobility (Seekings, 2009; Southall, 2004) in developing countries. Social mobility patterns, driven by the overall structure of the economy (Lannelli & Paterson, 2006: 540) and consumer behaviour (Hamdi, 1985), influence personal and community perceptions.

3.2 Migration, social capital and attitudes of low-income households

Phenomena such as migration, between rural and urban areas in developing countries when investigating social mobility, should also be considered. Migration, as a "total social fact" (Rotariu & Mezei, 1999: 5; Sandu, 2010: 35), changes and shapes rural communities and the social mobility trajectories (Alexandru, 2012) of communities. Parson (1949: 435) refers to these communities as "rurban" villages, where living standards and lifestyles have changed so much that these previous rural socio-geographic spaces resemble those in urban areas.

These changes are possible through the accumulation of wealth, exposure to Western ideas, ideals and lifestyles (Alexandru, 2012: 141). These changes build new mind-sets and influence personal and social issues within different cultural contexts. Furthermore, global issues on the natural and human-made landscapes should be considered. The building industry is one of the most energy-consuming role players influencing the environment. Furthermore, environmental sociology has become more diverse and fragmented, while innovative theoretical works tend to have a limited audience and quantitative research tends to be confined to problems that lend themselves to large data sets and statistical precision (Buttel, 1987: 484). The research of Hinds and Sparks (2008), however, shows that attitudes are linked to behaviour, where the behaviour of people interacting with land and landscape, reflects direct

engagement in land management and indirect usage through recreation. Attitudes and behaviour are relevant because the world-view of people (values) affects the natural landscape (ecology).

4. ECOLOGY AND WESTERN CIVILIZATION

In a well-known essay titled "The Historical Roots of our Ecological Crisis" (1967), Lyn White (1967) made an observation that links to the one made by Hinds and Sparks (2008), who mentioned that attitudes are linked to behaviour. Forty years earlier White pointed out that what "people do about their ecology depends on what they think about themselves" concerning with the things around them (White, 1967: 11). In his essay, White focuses on some of the ideological influences that science, technology, and Christianity have had historically. He identified those "shapers of discourse" as instrumental in steering collective human action toward ecologically problematic ends. White did not suggest that science, technology, and Christianity must, by default, promote and propel ecologically problematic attitudes and behaviours. He saw that St Francis of Assisi, for example, stood out as an excellent advocate of ecologically sensitive ideas and actions: "Francis tried to depose man from his monarchy over creation and set up a democracy of all God's creatures". Similarly, it is what people do with science and technology that determines whether the outcomes are ecologically beneficial, neutral, or deleterious.

St Francis is, however, an exception to the rule in Christianity as it "unfolded" historically and spread to the point where it would influence what would become a globally-influential culture that, through globalisation, has effected the development of many people's "filters" mentioned in section 3 (above). White points out that Christianity "is the most anthropocentric religion the world has seen", and as this religion expanded globally since the reign of Constantine, it promoted "the idea of man's limitless rule of creation" (1967: 17). This idea - that "man" has a divine mandate over the natural world – is a component of a prevailing attitude that has demonstrably pervaded human activity for most of Western history. This notion drove the dominant pragmatic and utilitarian sciences and technologies that have empowered "advanced" competitive consumer-capitalist industrial democratic dominion, or ACID for short (acronym adapted from Kvaloy, see Hoyer & Naess, 2012: 48). The argument is that ACID, in this extreme form, is "Promethean" in a sense delineated by Hadot in The Veil of Isis (2008): "the Promethean attitude is inspired by audacity, boundless curiosity, the will to power, and the search for utility" and it "penetrates the secrets of nature… through violence" (2008: 91-98). Capitalism is perhaps the most unpardonable of the Promethean shapers of discourse, driven by an inherent "grow-or-die" mechanism. Joel Kovel (2002: 41) explains:

"[C]apital is quantitative in its core, and imposes the regime of quantity upon the world: this is a 'necessity' for capital. But capital is equivalently intolerant of necessity; it constantly seeks to go beyond the limits that it … has imposed, and so can neither rest nor find equilibrium: it is irredeemably self-contradictory. Every quantitative increase becomes a new boundary, which is immediately transformed into a new barrier. The boundary/barrier ensemble then becomes the site of new value and the potential for new capital formation, which then becomes another boundary/barrier, and so forth and on into infinity… Small wonder that the society formed based on producing for the sake of capital before all else is restlessly dynamic, that it introduces new forms of wealth, and continually makes the past forms obsolete, that it is obsessed with change and acquisition – and that it is a disaster for ecologies".

Christianity, science, technology and capitalism are among the most influential shapers of discourse in recorded history (Pittaway, 2017), and nobody in the "globalised world" can escape their impact. It is in this context that one can conceptualise resistance to building with earthen materials and living in earthen structures. Earthen materials and structures are, from an extreme Promethean perspective, substances and buildings that pre-Christian, pre-technological, pre-scientific, and pre-capitalist human beings lived in. These are not the buildings associated with "civilised" humankind. Civilised humankind lives in large brick houses boasting truckloads of cement, steel, plastic, and other products of the techno-scientific capitalist industry that has shaped the world physically and ideologically. The irony is that "civilised", Promethean humankind has succeeded in underwriting the ecological stability necessary for its survival, a consequence that hardly seems fitting for a so-called civilised global society.

In the following sections, changing attitudes, salient beliefs and behaviour are discussed. It will be followed by a section that explains the phenomenon of the resistance to change from a philosophical viewpoint, before the discussion and conclusion sections.

5. CHANGING ATTITUDES, SALIENT BELIEFS AND BEHAVIOUR

It is necessary to know the relative importance of the attitudinal (individual) and normative (social) factors as determinants of intentions. Figure 5 shows the factors that influence behaviour, according to Ajzen and Fishbein (1980: 6). For some intentions, attitude (individual considerations) may be more important than the normative (social) considerations, while for other intentions, normative considerations may predominate. Often, both factors are critical determinants of intentions. Besides, the relative weights of the attitudinal and normative factors may vary from one person to another (Ajzen & Fishbein, 1980: 6).

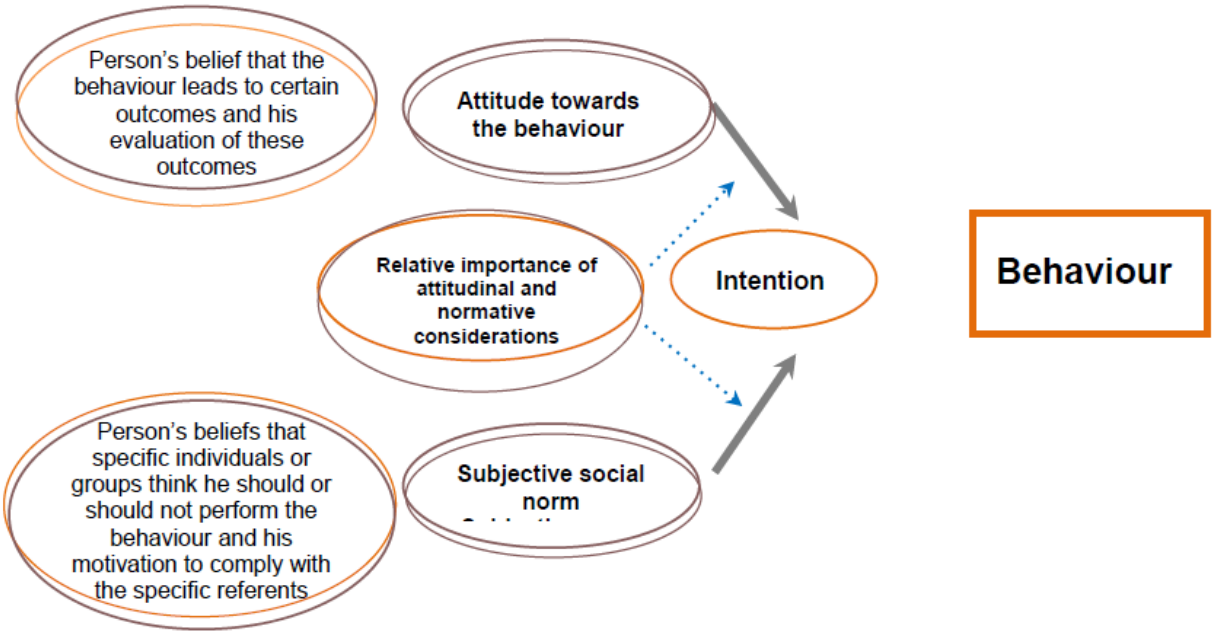

Figure 5 Factors determining a person's behaviour (Ajzen & Fishbein, 1980: 5)

According to Ajzen and Fishbein (1980: 62-64), beliefs underlying and constituting a person's attitudes and subjective norms are viewed to help ~~to~~ determine intentions and behaviour (Figure 5). Its association with various qualities, characteristics and attributes form beliefs about an object. Although a person may hold a large number of beliefs about any given object, it appears he or she can attend only to a small part of beliefs at any given time. Salient beliefs (uppermost in people's minds) may change, be weakened, strengthened or replaced by new beliefs. These changed beliefs can result in changed behaviour in a capitalistic society.

The negative side of social capital is the negative impact on values, class and upward social mobility (as discussed in section 3.1), which is also a component of a westernised capitalistic society. Both the contact person (who helped to secure the new job) and the new entrant, experience a slower improvement in living standards over time (Mitra, 2008: 261-262). Architects should consider the "life-worlds" (Schütz, Van Breda & Natanson, 1982) of migrants, and investigate the way people understand and live in the social world (Alexandru, 2012; Schüts & Luckman, 1989) if they want to address social or low-income housing. The built environment paves the way for political change since migration patterns influence cities. From the extensive history, urbanisation led to political change (Steÿn & Viviers, 2000: 271) and the scope of the work of architects is furthermore influenced by migration and urbanisation, linking to economic growth.

In southern Africa, Hadjri et al. (2007: 147) reported that urban residents in Zambia associate earth constructed buildings with poverty and low socio-cultural status. Poor developing countries have governments that cannot afford to house their people (Turner, 1988). The building of community settlements should be encouraged despite the performance of the state. Ngowi (1997a; 1997b; 1997c; 2001) conducted essential studies on efforts to upgrade the use of traditional earth construction techniques in rural areas of Botswana. However, the decline in vernacular building practices is not new.

According to Oliver (2003: 236), the desire to participate in a global economy – which, it must be added, developed in the Promethean context identified in Section 4 (above) – often leads to some people in developing countries feeling embarrassed about their vernacular traditions. Smaller communities, for example, the Masai and San in Africa, and peoples from Oceania and Indonesia, cash in on tourists' needs to stay in a simulated dwelling (Oliver, 2003: 241), which helps to overcome local embarrassment. These needs contribute to an anthropological and cultural way to support and conserve the identities of smaller groups in bigger communities (Wessels & Bosman, 2014). The conserved identities of vernacular settlements can be targeted to address salient beliefs to create positive attitudes that affect positive behaviour towards traditional earth-constructed buildings. This would constitute something of a counter-strike to the Promethean characteristic touched upon earlier.

6 PHILOSOPHICAL INSIGHT IN THE RESISTANCE TO CHANGE: PROMETHEAN AND ORPHIC ATTITUDES OF HUMANITY

Is it possible to suggest that the dominant shapers of the discourse identified earlier, have for several centuries, directed many salient beliefs of many people? Democracy has ostensibly played its part in allowing the voices of 'the people" to be heard. However, contemporary political structures are reminiscent of the "Great" Christian chain of being in the sense that a formidable hierarchical structure still separates the vast majority of humankind from affecting real change in their own lives. Unsurprisingly, bureaucratic constraints exist to prevent people from

exercising autonomy in a manner that does not conform to the Promethean status quo – consider the increasingly rare desire to build with earthen materials and the paralysing paperwork process that one must go through to have plans passed for ”alternative structures” (Bosman, 2015).

The contemporary philosophers Alain Badiou and Slavoj Žižek have used the phrases “humanity as it has been historically constituted” and “the established model of humanity”. Concerning these phrases, it is worth noting, first, that humanity as it has been historically constituted, and the established model of humanity, are Promethean, and that ACID is the contemporary manifestation of historically constituted humanity. Second, that historically constituted humanity and the established model thereof, is not the realm of philosophy:

“Each time that philosophy confines itself to humanity as it has been historically constituted and defined, it diminishes itself, and in the end, suppresses itself. It suppresses itself because its only use becomes that of conserving, spreading and consolidating the established model of humanity” (Badiou & Žižek, 2009: 11).

Instead, they identify the role of philosophy as, partly, the thinking of the transformation of life. Philosophical transformation is also a key theme explored by Pierre Hadot (1995: 257) in his well-known text, “Philosophy as a way of life”. He depicts the transformation in a manner that is away from the historical constraints of the Promethean, and toward a platform of a different kind.

One might perhaps call the other platform an Orphic platform. Hadot (2008: 91-98) says the following: “Orpheus… penetrates the secrets of nature not through violence but … melody, rhythm, and harmony”; and “the Orphic attitude… is inspired by respect in the face of mystery and disinterestedness”. One tends to have to go quite far out of her or his way to find manifestations of Orphic attitudes, but they do exist (Pittaway, 2017). Life in a “modern” built environment does little to promote the Orphic attitude because the structure came into being based partly on the assumption that nature is a standing reserve of endless resources to be harnessed by “advanced” human beings as they see fit (Heidegger 1977: 19-20). Earth-constructed buildings, however, are symbols for an awareness of interconnection with nature – for example, the members of older cultures (i.e. our more distant ancestors) built with earthen materials, and, as Hartmann (1998: 154) points out, they saw themselves as “part of the world”, and believed that it was their “destiny to cooperate with the rest of creation”. Setreng (2012:105) provides an example of how older cultures’ worldviews further translate into physical action with the natural environment. He asks one to consider “a Sherpa house in Nepalese Himalaya”:

“It always appears ‘unfinished’, a creation that never reached its ‘destined geometrical perfection’. But, from the traditional Sherpa point of view, the beauty and, intimately connected with that, the utility of the house may only be discovered if you settle down for a couple of generations, build such a house yourself, take responsibility for its daily care, live with the house instead of being its architect, repair it when (the frequent) need arises, add to it or subtract from it...”

Record a hundred years of the development of the house at a frame a day and play it back at “normal cinematic speed” (Ibid):

“What will be revealed to you, is not a house in the Western sense, but an organic structure, its wall stones and roof materials will be moving about and changing, …the animal and human life around it will expand and contract, speed up and slow down, shift in kind and variety... This is a house that is decaying every day, a fact which is accepted by the people that are part of this ‘house-hold’”.

This is a glimpse of the kind of attitude that the spread of ACID has negated, and in its place has laid the cemented foundations of capitalism and consumerism. Considering the social and ecological plight humanity now finds itself in, it seems as if it could learn something from our more distant ancestors.

6. DISCUSSION

Ngowi (1997a: 289) reminds us of the traditional European societies where the master mason or master carpenter headed the construction team as architect and contractor. Limited access to the status of the master resulted in modes of exclusion and closure – another ingredient in the Promethean recipe that influences “a vast range of behaviours, along with values and manners, [...] assimilated from childhood from one’s milieu” (Carocci, 2011: 389). According to Ngowi (1997a: 289), this contrasts with the approach of non-Western societies, where construction was an activity for all members of the community group. One generation passed down building skills to the next in a manner not characterised by the dominion imperatives and hierarchical structures associated with Promethean shapers of discourse. Contemporary societies evolved the construction industry not only in the direction of specialist industrial building materials, but also in the direction of specialised roles – architect, engineer, builder, supplier, inspector, broker, buyer, and insurer and, sometimes, tenant – often in isolation from one another. In developing countries, the spread of specialised materials and roles (professions) has changed the image of traditional architecture within specific cultural contexts.

The attitudes that people have to the current homes in which they live, or aspire to live, cannot be considered in isolation from the contexts that gave rise to these attitudes. Dominion-focused Christianity, exclusively pragmatic and utilitarian science and technology, and capitalism’s focus myopic focus on endless growth, all contributed to an ideological platform from which the inhabitants of ACID think about the world and what they should do in the world. The places and spaces of ACID often imprint clear messages: grow, consume, compete, acquire, dominate and control. These Promethean priorities are not fit for a species that has grown beyond its planet’s carrying capacity

and places and spaces that promote Orphic awareness are now necessary for every urban space hitherto void of architectural symbols of sustainability and interconnection. Earthen structures designed and built in a genuinely Orphic spirit, and design projects taking into account earthen building techniques, may play a remedial role in this regard. Design approaches such as these, as well as the end products of these approaches – i.e. earthen structures – are by no means the only solutions in the process towards a more Orphic context, a context that arguably is necessary if human beings are to actualise a more sustainable dispensation. However, considering the alarming scale of the ecological crisis, a crisis arguably caused by human activity driven by Promethean attitudes, Orphic responses from every sector of society are necessary. Architects, designers, and builders can play important roles here, because they participate in the design and building of spaces in which people spend so much of their time. This is relevant everywhere – South Africa included.

7. CONCLUSION

The Earth Unit will continue to investigate new insights - all possible explanations - to understand more about the attitudes, values and behaviour surrounding traditional earth construction. The implications are that this insight can address misconceptions and the status of traditional materials to promote contemporary, well-executed earth building techniques, appropriate to the requirements of different contexts. These conditions imply a strategy that takes into consideration not only criteria or guidelines to be used to improve the acceptability of earth construction in general, but also the attitudinal contexts relevant to design and building endeavours. Firstly, this strategy can be useful to homeowners, trainers and self-help builders, who want to improve the qualities of earth constructed wall elements and construct better earth buildings. Secondly, architects, structural engineers, soil engineers, building contractors and professionals in the building industry can improve their knowledge by understanding ~~the~~ attitudes to influence the acceptability of earth-constructed buildings. Finally, dedicated national and regional policymakers will find this strategy useful when considering alternative approaches dedicated to innovative, environmentally friendly solutions. New insight into the behaviour of the communities living in traditional earth-constructed buildings is useful to formulate guidelines to overcome the acceptability challenges of the users of contemporary earth-constructed buildings, and the Promethean-Orphic dichotomy identified in this article can be helpful in this regard.

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RELATIONSHIP BETWEEN THE LANDSCAPE PROPERTIES AND USER SATISFACTION IN THE MOSQUE GARDENS: A CASE STUDY FROM ISTANBUL

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Abstract

Gardens are of physical as well as symbolic importance for Muslim people. Gardens being quiet places are conductive to concentration, a prerequisite for genuine prayer. Consequently became one of the most favorable sites for locating mosques. When reading sources about gardens of mosques, little detail is provided about the activities which occurred during these events. This study provides details that focus predominantly on the landscape design description of the visited religious buildings, such as mosques and religious schools. For this purpose, selected samples of mosques gardens in the city of Istanbul, the base elements, the containment elements, reinforcement elements, and open green spaces were explored in terms of landscape design principles in accordance with suitability and determined deficiencies. In this study, the method of scoring was used for the evaluation of mosques gardens. Gardens of mosques classified in terms of its location, closeness to the environment, accessibility, activity areas, microclimatic conditions, water elements, plants materials and vista, whether or not the garden, landscape design, safety situation, comfort and facility. The gardens of mosques are compared to each other according to the scores they have received, and thus the positive and negative aspects of each mosques' gardens have been revealed in this research.

Keywords: Istanbul, mosque, garden, landscape design
Word Count: 3183

AIMS AND BACKGROUND

Mosques are one of the institutions in the Islamic community that is central to the social, political and cultural services for believers and plays an important role in the cultural development of the Islamic community (Karaca, 2014).

Mosques are depended on foundations, and they are at the head of religious works as architectural structures. Mosques are sacred places in the Muslim geography, both religious and artistic. Mosques were used not only as places of worship but also they were used as a religious education place for Muslims. Mosques are versatile spaces that reflect the period we live in. Mosques, which also have functions that unite and integrate our society, are of great importance for Muslims. The landscape design of the courtyards and the gardens of the mosques are as important as the architectural designs of mosques. For this reason, it is necessary to identify and develop the deficiencies in the current situation in the gardens that are as important as the buildings of the mosques.

EXPERIMENTAL

In this research, structural and vegetal landscape features of Beşiktaş Sinanpaşa Mosque, Ortaköy Büyük Mecidiye Mosque and Ortaköy Küçük Mecidiye Mosque gardens have examined and the satisfaction level of the users from these gardens has been investigated.

The mosques have been analyzed in terms of natural, perceptual and socio-cultural factors and the total

percentage of success for each garden has been calculated using the scoring method (scoring from 0 to 3) (Düzenli ve diğ., 2017). According to success percentages, mosque gardens are compared to each other.

Data Analysis. In the history of Islamic civilization, mosques have been the vital elements and assets in the planning and development of a township. Mosques serve as a worshiping place and a place for the Muslims to conduct other activities. Mosques do not only serve as a worshiping place, but also a center for social and economic activities for the Muslims (Yaacob ve diğ., 2017).

The open spaces at mosques are crucial in creating a quality surrounding of a mosque as a centre of worshipping. The opened spaces are focal points where the community can conduct their daily activities. The creation of open spaces is crucial for the community as a place to communicate formally and informally.

A public open space needs to consider the various classes and status of the needs of the community and also fulfils the various needs of the various level of the community from the rich to the poor and from the young until the old (Utaberta ve diğ., 2015). The mosque gardens have been examined from the natural factors in terms of the topographic state of the area, the existing plant species in the area and climatic factors. The mosque gardens have been examined from the perceptual factors such as noise, important visual fields (vista points), dominant view and perceptual factors.

The mosque gardens have been examined from cultural factors such as border elements, entrance points, pedestrian circulation within the area, parking lots and existing structural units (fountain, pool, lighting, ladder), traffic in the vicinity, current use of the area (activities) and user characteristics (age, sex, socio-economic characteristics).

As a result of the analysis made in terms of natural factors, cultural and perceptual factors; mosque gardens compared to each other according to the scores they received and each mosque garden has been positively and negatively characterized from the physical point of view. A survey has been conducted with 180 visitors in order to be able to show whether they are satisfied with the mosque garden. The importance given to the design of the mosque's buildings should also be given to the design of the exterior spaces. The examination of the mosque gardens both in terms of structural landscaping and herbal landscaping is very important for determining the suitable conditions for outdoor spaces and for determining the problems and deficiencies. For this reason, the outdoors of the mosques have been examined by taking into consideration the landscape design principles and used as an evaluation method. All of the mentioned landscape design criteria has been evaluated taking into consideration observations made in the mosque garden and interviews with mosque visitors and staff. Scores ranging from 0 to 3 were given as a result of on-site analyzes and interviews for each landscape criterion in the scoring chart. The characteristics of the natural, cultural and perceptual factors in the scoring chart are filled out with '0' if there is not in a garden of mosque, '1' if it is a few , '2' if medium, and '3' if there are too many.

The total percentage of success for each mosque garden was determined and the mosque gardens were compared to each other according to the percentage of success. For a total of 33 design criteria, the maximum points to be taken on the current positive score (33x3 = 99) were calculated in proportion to the sum of the scores for each mosque garden.

In the second phase of the research, a survey has been conducted to reveal the views of mosque personnel and visitors about the mosque gardens. A questionnaire was applied to a total of 180 users, 60 each. In the questionnaire they were asked how satisfied they were with the mosque garden (5=very, 1=never). Thus, it is aimed to determine whether the satisfaction levels of the mosque gardens with different landscape features in terms of hard and soft landscapes are different.

The percentages according to the scoring methodology used in the evaluation of the mosque gardens are given in Tables 1, 2, 3. % 0-30 partially successful, % 30-60 successful, % 60-100 very successful were evaluated.

Table 1. Analysis of Mosque Gardens in Terms of Cultural Factors (land use, land boundaries, entry point, area pedestrian circulation, parking lots, structural units, current use of the area).

	Beşiktaş Sinanpaşa Mosque	Ortaköy Büyük Mecidiye Mosque	Ortaköy Küçük Mecidiye Mosque
Closeness to city and visibility	2	3	3
Located in the city center	3	2	2
Accessible location	2	2	2
Closeness to major road	2	2	1
Accessibility with transportation	2	3	3
Fresence of a garden	1	2	3
Garden accessibility for pedestrians	1	2	3
Number of garden entrences	3	1	1
Pedestrian mobility in garden	1	1	3
Security unit	0	3	0
Security guard	2	3	0
Borders structure in the garden (walls, fences etc.)	1	3	3
Seating areas	1	3	3
Sitting group (pergola, arbor etc)	0	0	3
Sculpture	0	0	1
Direction boards	1	2	3
Water element	1	1	3
Total (100 % Achievement: 51 point)	23	33	37

Table 2. Analysis of Mosque Gardens in Terms of Perceptual Factors (Noise zone, dominant Landscape)

	Beşiktaş Sinanpaşa Mosque	Ortaköy Büyük Mecidiye Mosque	Ortaköy Küçük Mecidiye Mosque
Garden direction to a significant view	1	3	3
Noise	2	3	1
Total (100 % Achievement: 6 point)	3	6	4

Table 3. Analysis of Mosque Gardens in Terms of Natural Factors (topography, climate, existing vegetation)

	Beşiktaş Sinanpaşa Mosque	Ortaköy Büyük Mecidiye Mosque	Ortaköy Küçük Mecidiye Mosque
Slopped garden terrain	2	2	1
Stairs and ramps	2	2	1
Anthropometrically suitable stairs and ramps	2	2	3
Suitable activities for seasonal conditions	1	1	2
Slippery surfaces in winter conditions	2	3	1
Grass areas	0	0	3
Big trees	0	1	3
Plant species suitable for historic texture	0	1	3
Flowerbeds	0	1	3
Maintenance of the plants	0	1	3
Plants used with natural	0	1	3
Plant diversity	0	1	1
Flowered or fruited plants	0	0	1
Plants that border the garden	0	0	1
Total (100% Achievement: 42 point)	9	16	29

Survey Findings: Demographic structure

A total of 180 people, 60 in each mosque garden, were surveyed. A total of 180 people, 74 of whom were women, participated in the survey. 60 people from the survey are from outside Istanbul and 120 people are from Istanbul. The majority of the respondents (18-29) are 73 in the age group and 46 in the (40-59) age group (Table 4).

Table 4. Demographic Features of Visitors

Demographic features	Beşiktaş Sinanpaşa Mosque	Ortaköy Büyük Mecidiye Mosque	Ortaköy Küçük Mecidiye Mosque	Total
Female	9	33	32	74
Male	51	27	28	106
AGE (0-17) Age Group	-	9	4	13
(18-29) Age Group	8	33	32	73
(30-39) Age Group	4	12	12	28
(40-59) Age Group	28	6	12	46
60 age and over	20	-	-	20
Visitors from outside Istanbul	-	48	12	60
Visitors from Istanbul	60	12	48	120

Findings about the satisfaction question. Visitors' satisfaction levels were shown at table 5. The highest satisfaction rate has emerged in the Küçük Mecidiye Mosque. The evaluation of mosque gardens in the values of score card is correspond to the values of the survey results of the mosque gardens.

Küçük Mecidiye Mosque garden has the highest percentage in the terms of all criterias (location, security, equipments, green areas, water, transportation). Küçük Mecidiye Mosque garden has the highest average in terms of user satisfaction. Beşiktaş Sinanpaşa mosque garden has the lowest average in terms of user satisfaction.

Open Spaces of the Mosques. Open spaces of the mosques have been examined according to the last congregation place, portico, harim (outer courtyard), harem (inner courtyard), fountain, portal, musallam move

and Hazire (Cemetery) in the research.

Last Congregation Place. It is the portico adjacent to the Mosque in the big Mosques. One side (courtyard side) of this place is open. This place, which can be called the place of the congregation of the courtyard, is a high platform. The flooring is marble and the rugs, wood and wicker are used as cover.

Table 5. Satisfaction Rates of Mosque Gardens

Degree of Satisfaction	Beşiktaş Sinanpaşa Mosque	Ortaköy Büyük Mecidiye Mosque	Ortaköy Küçük Mecidiye Mosque
Not Pleased	%30	-	-
Little Pleased	%20	%40	-
Medium Pleased	%15	%35	%35
Very Pleased	%35	%25	%65

Portico. Portico is a semi-enclosed space, which is supported by roofed carriers, located along the outside of a building or on the courtyard (Fig. 1). In the portico system, which is confronted with every period and geography during the history of architecture, the top covered dome, vault or sloped or flat roof cover; The supporting elements are in the form of pillars or wooden pillars (Aksoy ve diğ., 2017).

Fig. 1. Portico of Beşiktaş Sinanpaşa Mosque

Harim (Outer Courtyard). “Harim” is the area in the garden wall, which is surrounded by the walls separating the Ottoman mosques from the surrounding houses and from the street and also called “outer court” or “muhavvata”. These courtyards have been opened to various places in order to provide entrance (Aksoy, et al., 2017). In the outer courtyards of the mosques, landscape design has been made with hard landscape elements (surface materials) and soft landscape elements (plant elements) (Fig. 2).

Fig. 2. Harim of Büyük Mecidiye Mosque

Harem (Inner Courtyard). Harem is called inner courtyard. It is an inner courtyard that has ablution taps and a water fountain in the middle of the Ottoman mosques (Fig. 3).

Fig. 3. Harem of Sinanpaşa Mosque

Fountain. It is a tap that generally made of tents or abacus in the shape of a dome that is built to take ablution in the courtyard. The fountains also have open tops or closed tops built into the interior courts of the mosques. There are sometimes single rows of fountains (Fig.4).

Fig. 4. Fountain of Küçük Mecidiye Mosque

Portal. It is called the Portal that the monumental entrance, richly decorated at the main entrance of a large building. The portal is a monumental gates giving entrance and exit that decorating or adorning of usually a mosque, church, madrasah, inn, bath, etc.

Musallam Move. Musallam move is located to the right of the mosque in the Ottoman Mosques. The funeral is put on the Musallam Move. It takes place in the outer court (Fig. 5).

Fig. 5. Musallam Move of Büyük Mecidiye Mosque

Hazire (Cemetery). Hazire is called the small cemetery in the garden of the public buildings such as the mosque, madrasa, surrounded by the walls and fingers. The hazire is located on the side of the qibla wall (Fig.6).

Fig. 6. Hazire of Beşiktaş Sinanpaşa Mosque

RESULTS AND DISCUSSION

Mosques in a region are important cultural heritages which carry valuable clues about the history of regions in question and their surroundings and exhibit scenes related to social life as well as environmental conditions of the past (Yilmaza ve diğ., 2014).

The old mosque gardens must be preserved in their original form, starting from the samples of the mosque gardens examined. Functional and aesthetic principles should be put forward and landscape design principles to be observed in mosque gardens should be taken into consideration While designing new projects for new mosques. Originally suitable marble materials must be used where walkways in mosque gardens, asphalt, concrete, purified from artificial stones.

In the mosque gardens, resting areas should be built in architectural quality that will not contradict the spirit of the mosque. A children's playground can be designed for mosque gardens that are suitable for a large area. Professional teams should be selected for maintenance work of mosque gardens. Mosques are the mirror of history and cultural monuments. For this reason, the mosque gardens must be arranged taking into account the history and culture of the mosques. Soft and hard landscape elements must be well assessed and organized to make mosque gardens livable and sustainable. Urban green space plays an irreplaceable role in the improvement of environment quality, mitigation of urban heat island effects, maintenance of biodiversity and provision of entertainment venues; it is also significant for the structure and function of urban landscapes and their changes (Zukin, 1991).

Mosque gardens and surroundings are only used when they are able to communicate with the user. Mosques and gardens must be preserved and developed with the establishment of social consciousness, and in this regard, the mosques should be preferred. Mosques and gardens; which can create social environments, should be designed as pieces of history that increase imagination.

Mosques are one of the most important examples of our cultural heritage, that preserving the mosques together with the gardens and leaving them to future generations is important in terms of ensuring both social and cultural sustainability.

CONCLUSIONS

As a result of the survey, the mosque garden is not suitable for the use of user groups, incompatibility of the selected equipment with the historical structure, lack of grass areas, lack of seating areas, lighting element, water element and lack of plant elements. It is difficult to transfer the culture and lifestyle to future generations due to reasons, and it has become clear that the user is not fully satisfied. The deficiencies of mosque gardens need to be done. The most important result in the research is that the structural and herbal landscape characteristics of the mosque gardens have affected the user satisfaction. The correct and appropriate use of structural and herbal landscape elements also positively affects the level of satisfaction in the users of mosque gardens. This research as a whole enable the respondents to evaluate the importance of opened spaces at mosques and give the exposure to them of the functions of the opened spaces at mosques in attracting the people to come to the mosques.

The other attractions that could vary the functions of the opened spaces at mosques are by providing recreational facilities, recreational areas or light sports such as courts. This facilities indirectly can attract the interest of the

various generation, especially the teenagers to come to the mosques (Rasdi, 2010).

The facilities can cater for the needs of all the Muslim generation spiritually, physically and mentally (Aldrin, 2007). This is indirect can help in increasing the number of the congregation or people coming to the mosques. For this reason, the elements that were applied in the opened spaces at mosques needs to be stressed on and given proper thoughts and planning.

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TO ENERGY-EFFICIENT BUILDINGS USING PASSIVE DESIGN -CASE OF ALGERIA-

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Abstract

With the growing interest in sustainable development and the fight against climate change, it is becoming urgent to reduce energy expenditure in buildings in order to meet the requirements for reducing GHG emissions. Accommodation buildings in particular hotel establishments present a real threat to the environment through their high-energy consumption, Moreover, during the last decade, we are witnessing in Algeria a multiple implementation of hotel infrastructure projects, which are not subject to an environmental, and the energy regulatory requirement, which leads to energy-intensive buildings. This can be explained by the lack of scientific knowledge by the architects in the field of bio-climatic design and the control of the energy performance of the building. This research aims to study the impact of passive strategies on energy performance of the building using energy simulation by varing design parameters.Finally,recommendations and design solutions for energy-efficient hotels have been suggested which may play a fundamental role in the choice of the right strategies that can lead to successful projects.

Keywords Energy performance, passive strategies, hotels, bioclimatic design, energy saving.
Word Count: 2511

Introduction

-In a context of reduced energy resources and targets for reducing greenhouse gas emissions, the building sector represents not only an important area of energy saving, but also an opportunity to protect the environment by reducing the impacts of these emissions. Today, tourism is one of the main drivers of employment and development and contributes significantly to local economic growth and social well-being. “Tourism is also responsible for 5 to 10% of global CO2 emissions, of which 2-7% is attributable to hotels” [1] ,In Algeria, this sector is one of the main service activities “Algeria is the 4th tourist destination in Africa in 2013, with 2.7 million foreign tourists in 2013”[2] and despite its undeniable economic role, the sector has a negative ecological footprint (CO2 projects emissions, water and energy consumption, waste generation, etc.), particularly through its hotels.) It seems that during the last decade, we are witnessing in Algeria a multiple and intense realization of hotel infrastructure. which are not subject to an environmental and energy regulatory requirement The principles of design are functional and architectural and the environmental and energy dimension of the project is not always expressive, which leads to energy-intensive buildings, In a building energy consumption is influenced by several parameters such as:the shape of the building, its orientation, its building materials, etc. A good influence of these parameters ensures the energy performance of the building. Bioclimatic architecture is one of the solutions that uses passive processes and does not require special techniques . Thus the amount of energy consumed can be reduced by the integration of passive energy efficiency strategies in buildings such as hot strategy, cold strategy, lighting strategy.

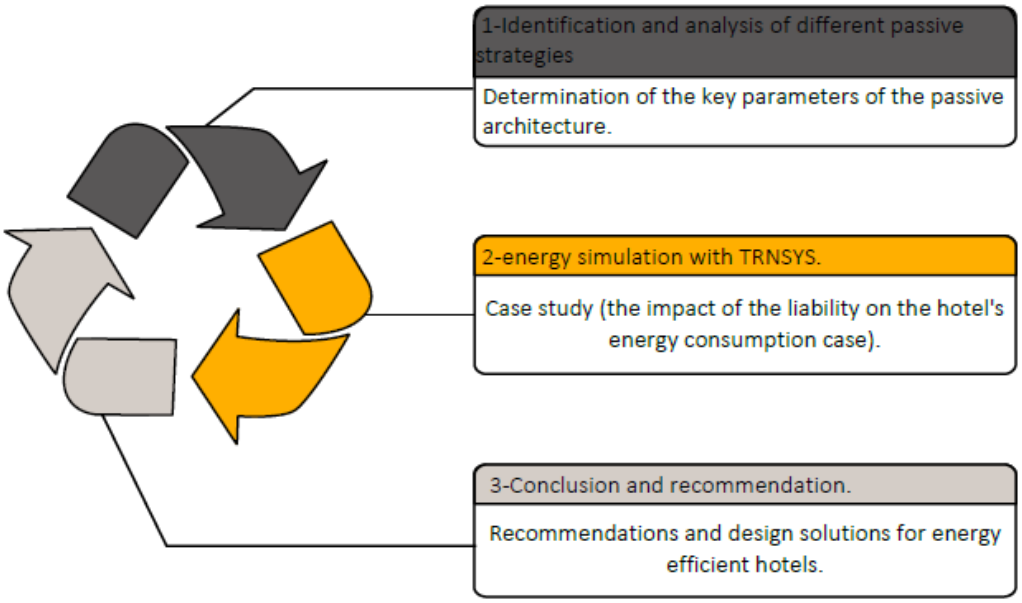
Thermal energy simulations allow to purify the design of the building and to study and compare the different solutions in order to achieve a high-performance building . The aim of this work is to improve the energy performance

of a hotel in Algiers by studying the effect of certain passive strategies on its energy consumption.

The research approach

In order to achieve the objective defined above, it is a question of combining a theoretical part in order to identify and analyze the various passive strategies which are intended to ensure energy efficiency and a case study has involved an energy simulation in order to study the impact of these strategies on the hotel's energy consumption.

The research approach:



Passive architecture: definitions and concepts.

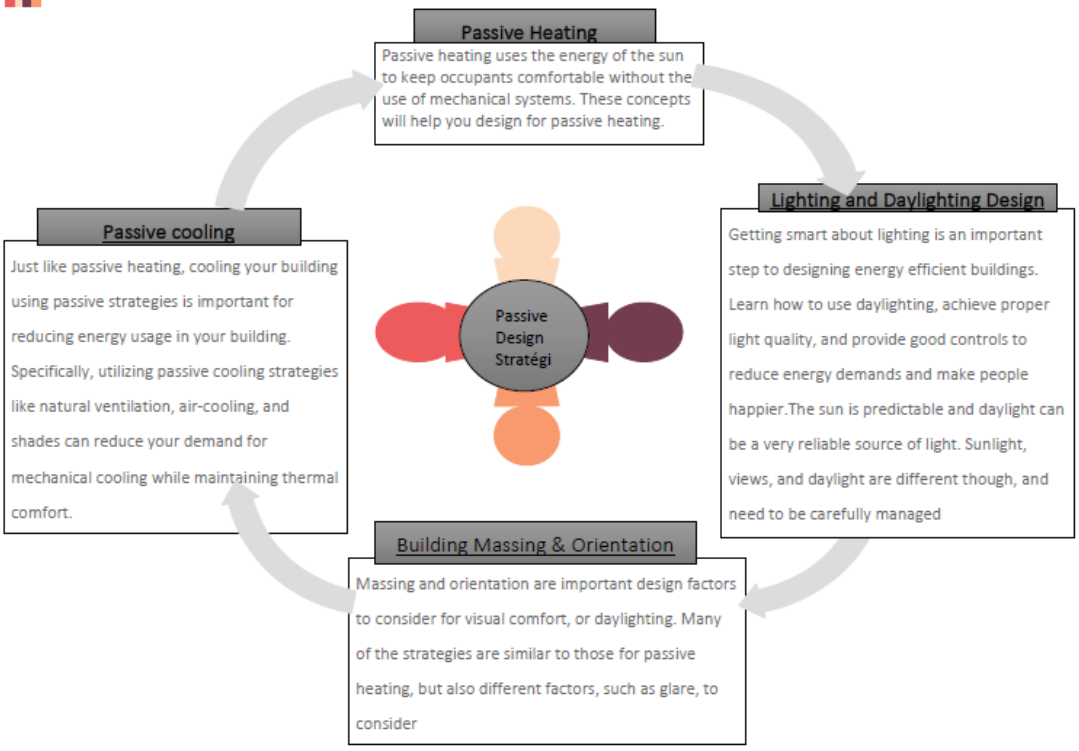
Passive solar architecture is defined as the art of building a home by taking advantage of solar radiation for heating or cooling purposes, The concept of passive building ("Bpas") was developed from the 1970s to produce buildings that are energy efficient and comfortable to use and livable[3]

Today, passive housing is based on: a very low-power construction concept, based on the use of heat input from the sun, a very strong insulation of the walls and windows, , lack of thermal bridges, high air tightness and ventilation control, The most important principle of passive solar architecture is to minimize the energy consumption of a building. This architecture is based on the judicious exploitation of natural phenomen such as climate and solar radiation. According to the Passivhaus Institut, a passive house must consume a maximum of 15 kWh / m² per year for its heating needs[4]

The main parameters of passive architecture.

The design of a passive building requires the fulfillment of certain essential criteria. The most important is the choice of the ground on which the building will be built after the choice of its orientation and form. Once all these parameters are determined, one thinks of its insulation, sun protection, internal arrangement and the arrangement of the openings, so it is important that the builder takes into account and keeps these criteria in mind:

The different strategies of passive design:



Building Massing & Orientation

1.Form of building:

The optimum shape of a passive building is one that will allow us to gain maximum heat in cold periods and a minimum during warm periods.

2.Orientation to the south:

A factor often underestimated is the orientation of the building on its ground: a passive building must have an important facade to the south, the main orientation of the building should not be the north-south axis, but the east-west axis[5]

Passive Heating

1.A good insulation

In a new modern building, architects, project managers and technicians must confront the issue of insulation. In general, 12 to 16 cm of insulation is sufficient. Rock wool, expanded polystyrene, cork, cellulose (from recycled paper) are used [6]

2.A good windows

Without the considerable progress made over the last ten years in the field of windows, passive technology would not be available today , or at least not so affordably accessible[7]

We used triple-glazed windows for which two of the six faces of the windows are equipped with a coating that captures the heat. The principle is simple: the light we see enters the hotel room through the windows and is there, like all light, transformed into heat when it reaches an object. This heat is nothing but infrared radiation. The coverings of our windows capture this heat which is trapped in the hotel room.

Thus, even in winter, the sun can heat the rooms: we can say that we live in a solar collector.

3.Sun protection: In hot weather, it is necessary to think about the sunscreens, in order to avoid having an uncomfortable housing because overheated. The principle is to stop direct and indirect heat inputs that are used in cold weather. These fixed or removable shades, artificial or natural, often play on the race of the sun to be “transparent” in winter and effective in summer[8]

Horizontal awning

The horizontal canopy is an exterior projection located above the window. It makes it possible to obscure the rays of the summer sun when they are very inclined.

Store:

The blind is the sun protection most used. Mobile, it can be vertical or horizontal. The advantage of this process is that it can adapt perfectly to the position of the sun.However, it must be operated manually unless an automation is installed. Another weak point, being movable and / or textile material, is used more quickly in time than an awning.

Natural trellis The natural trellis is a solar protection made with climbing plants clinging to a trellis.Generally horizontal, the trellis is located above the bay windows located full South.Its main advantage is that the vegetation develops according to the seasons, ensuring shade in summer, and allowing the light to pass in winter.

Sun blocker

Sun breezes can be horizontal or vertical. They use the difference in inclination of the rays of the sun thus letting pass the winter rays but not those of summer.

shading

Vegetation judiciously planted near the dwelling can serve as natural shade.Most often trees or "hardwood" shrubs are used. They have the advantage of masking the solar radiation of summer, and of letting pass that of winter.

Passive Cooling

The ventilation system : When walls, windows, floors and ceilings are well insulated, the heat losses caused by the use of ventilation become even more evident as well as losses in non-leaky locations (even if these losses play a role in indoor air renewal). In general, these heat losses via air account for 10 to 20% of the total losses of a dwelling. In a passive construction, it is very important that these losses are minimized and that at the same time there is a sufficient supply of air to breathe well. For this purpose a controlled mechanical ventilation (VMC) is used coupled to a heat exchanger [9]

Lighting and Daylighting Design

Getting smart about lighting is an important step to designing energy efficient buildings. Learn how to use daylighting, achieve proper light quality, and provide good controls to reduce energy demands and make people happier. The sun is predictable and daylight can be a very reliable source of light. Sunlight, views, and daylight are different though, and need to be carefully managed[10]

energy-saving lamps (fluorescent lamps or LEDs) can save up to 50% more energy than incandescent lamps (but they do not create heat like these incandescent lamps).

Consider turning off electrical appliances, Avoid Undue Lighting, Turn off the light when you leave a room, enjoy the daylight, regulate the temperature naturally

Before leaving, turn off the heater and close the windows in winter (curtains or shutters in summer, example while using air conditioners by closing all openings). 1 ° C less, 7% less energy consumption, use of low-consumption lamps can give the feeling of less brightness, but it is only a matter of time, they are more economical, for the air conditioning in think of the thermal insulation (reinforced external insulation not to leave the space heated).

Study of the impact of passive design on the energy efficiency of an urban hotel in Algiers

The case study

The building consists of a 3-star urban hotel located in the city of Algiers, built in 2008, built on the ground and facing south-west on a surface of 440m².

The hotel energy requirements are simulated using the TRNSYS version 16 software. We have calculated the energy requirements of the hotel in the current state then we have incorporated some parameters (passive strategies):

orientation of the hotel, integration of solar protection, use of triple glazing, insulation of roof, floor, walls with 10 cm polystyrene. At the end a comparison was made between the two results obtained before and after the integration of these passive strategies.

Simulation software:

TRNSYS is a dynamic simulation environment that can simulate very finely the behavior of a complex system, such as a building; ; it has been available since 1975

Simulation process: from the architectural data and the thermo-physical properties of the material, an analysis of the thermal behavior of the samples is carried out using the "TRNSYS V 16" software [11].

The course of the simulation took as follows:

1.The first step: the detailed description of the hotel case in the software (wall surfaces, openings surfaces, type of glazing, materials that make up walls, type of ventilation, number of people ... etc).

2. The second step: simulation and reading results using Excel.

Results

Hotel Case

1-The following table presents the results obtained before the integration of the passive strategies (current state):

The case	Energy requirement (useful energy) (KWh)		
Urban hotel in Algiers	Heating	Air conditioner	Total
	20450	22750	43200

Board . Hotel energy needs case (current)
(Source: Author 2017

Energy saving after the integration of different passive strategies:

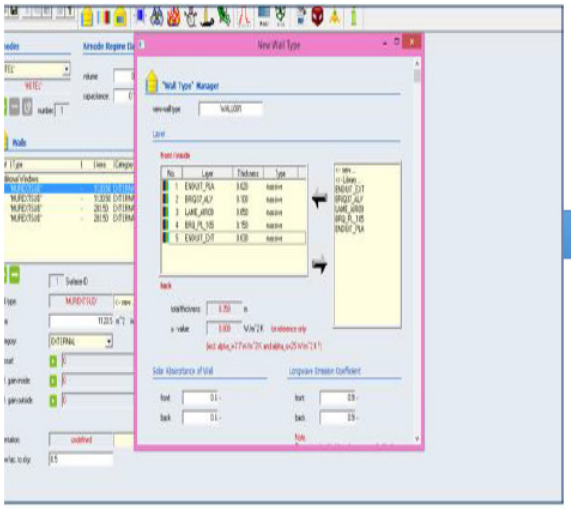


Fig. The materials that make up the walls in the current state (Source: Author 2017).

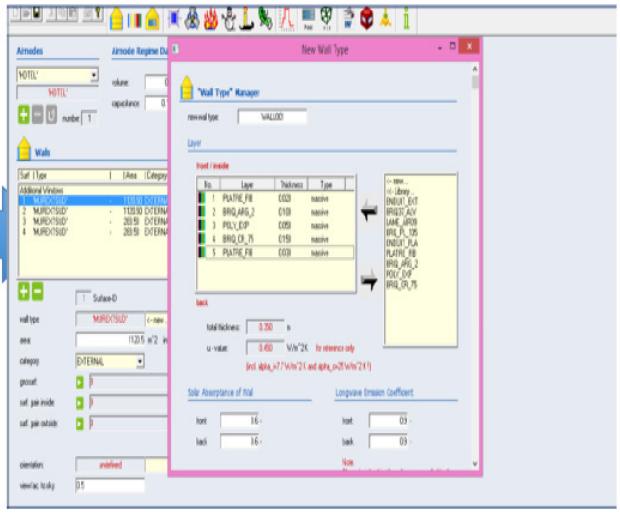


Fig. The layers that make up the walls change the materials. (Source: Author 2017)

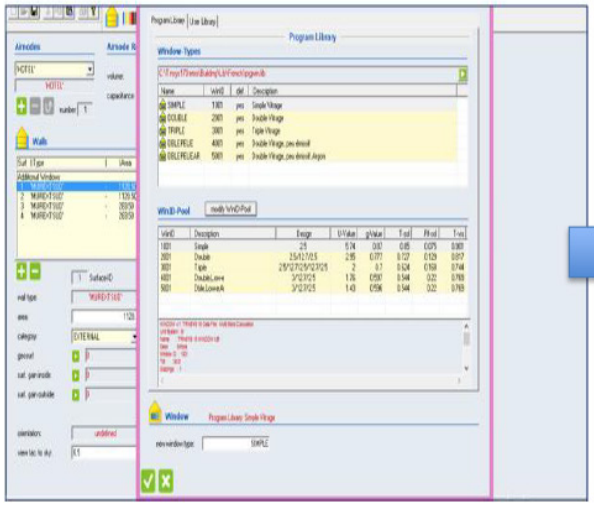


Fig Type of glazing in the current state (Source: Author 2017).

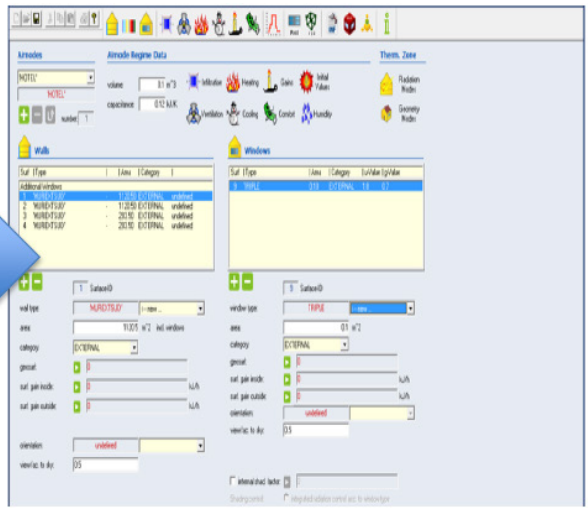


Fig change of type of glazing using triple (Source: Author 2017).

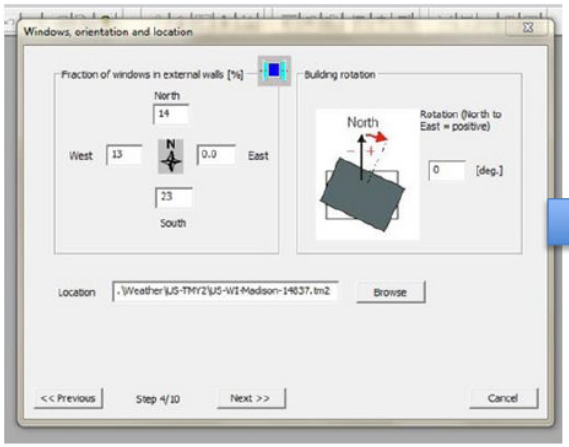


Fig. Orientation and distribution of openings in the current state.(Source: Author 2017).

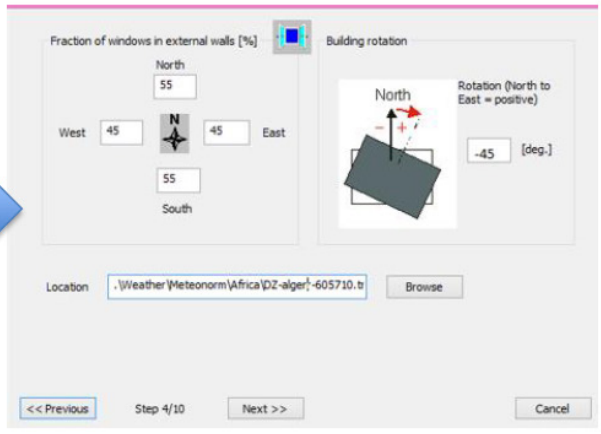
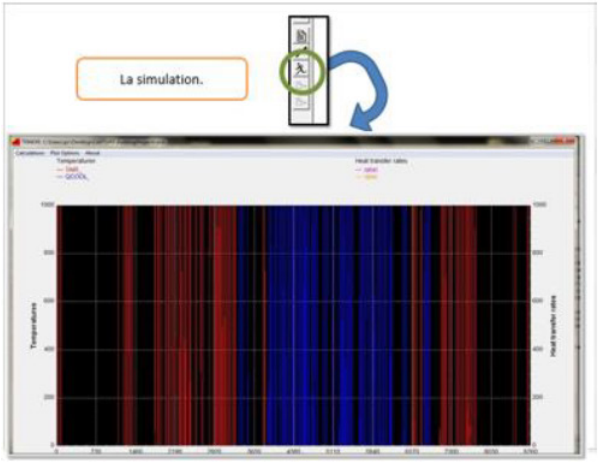
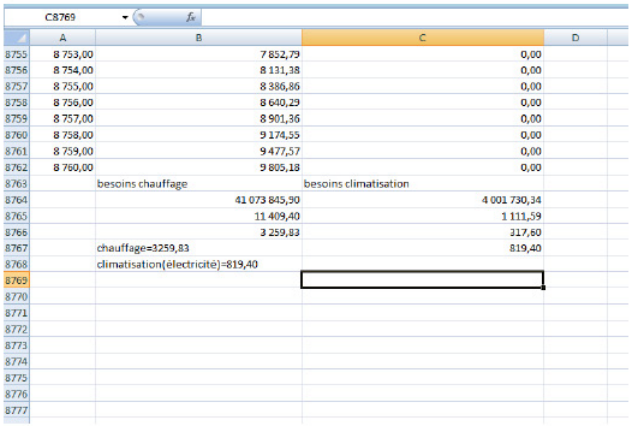


Fig South orientation and new distribution of openings. Source: Author 2017).





	A	B	C	D
8755	8 753,00	7 852,79	0,00	
8756	8 754,00	8 131,38	0,00	
8757	8 755,00	8 386,86	0,00	
8758	8 756,00	8 640,29	0,00	
8759	8 757,00	8 901,36	0,00	
8760	8 758,00	9 174,55	0,00	
8761	8 759,00	9 477,57	0,00	
8762	8 760,00	9 805,18	0,00	
8763		besoins chauffage	besoins climatisation	
8764		41 073 845,90	4 001 730,34	
8765		11 409,40	1 111,59	
8766		3 259,83	317,60	
8767		chauffage=3259,83	819,40	
8768		climatisation(électricité)=819,40		
8769				
8770				
8771				
8772				
8773				
8774				
8775				
8776				
8777				

-The following table presents the results obtained after the integration of the passive strategies:

The case	Energy requirement (useful energy) (KWh)		
Urban hotel in Algiers	Heating	Air conditioner	Total
	3259.83	819.40	4079.23

Table. Hotel energy case (after integration of passive strategies).

The results of the simulations after the integration of passive strategies show: that the integration of some passive strategies such as the south orientation of the hotel using triple glazing; ; the use of materials of good thermal insulation red brick a thickness of 15 cm outside, the insulation of the roof and floor walls with the expanded polystyrene with a thickness of 10 cm reduces the heating and cooling needs.

Conclusions & Discussions

The mode of development of our cities massively produced greenhouse gases (GHG), due mainly to the concentration of activities on the one hand, and the release of polluting gases (CO2) by industry and domestic equipment on the other hand. Thus, the act of planning and building is an act having a strong impact on the environment, fossil energy hungry and a major emitter of CO2, Algeria faces a real challenge where it must participate even more in contributions related to sustainable development and fight against climate change, and in particular to the construction of energy-efficient buildings, especially as at present.

the building designer must take into account a set of parameters from the beginning of the design in order to realize the expected energy savings. Le non maitrise de ces paramètres et le manque des savoirs faire conduit a des bâtiments énergivores les hôtels sont parmi ces bâtiments , the integration of passive strategies helps to reduce the heating and cooling energy requirements, the aim of this work is to study the impact of passive strategies on the energy performance of the building and explores the energy conservation potential in the design of hotels for a chosen climatic zone using building energy simulation by changing design parameters, the results of the simulation suggest that the reduction of energy consumption in hotels can be achieved by a combination of the parameters that must be integrated into the design of the hotels, thus improving energy performance can be achieved by :

- the removal of the simple walls, and the use of material of good thermal insulation as in our case we used the red brick.

-The insulation of a building has a serious impact on the reduction of its energy requirement by using the expanded polystyrene with a thickness of 10 cm.

-the increase of the ventilation rate to better cool the structure in summer.

-protective effects have a significant impact on reducing energy consumption, according to our study, when choosing orientation without maintaining the importance of solar protection, a low energy impact has been obtained. sunscreens are provided this reduces consumption.

-the location of the openings in the north makes it possible to promote lighting and natural ventilation in order to limit the return to artificial lighting and ventilation.

So you have to know that in order to reduce the energy needs of a hotel, it is possible to play several parameters, namely the building itself by the location and orientation of the building, its architecture and its envelope: choice of materials, window, type of glazing, breezes suns.

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