

Built to heal: How the built environment can affect our health and wellbeing

Research project

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Introduction

My field of design particularly questions and challenges the environments that we interact with on a daily basis, and the ways in which these can have an impact on our physical and mental health. After all, we now spend approximately 90% of our time indoors, according to a study published by the US Environmental Protection Agency (Klepeis et al., 2001). As our society becomes increasingly digitalised, and indoor-orientated, evaluating the effects of the built environment on our psychology seems to be an appropriate response in order to optimise our experience of Interior Design.

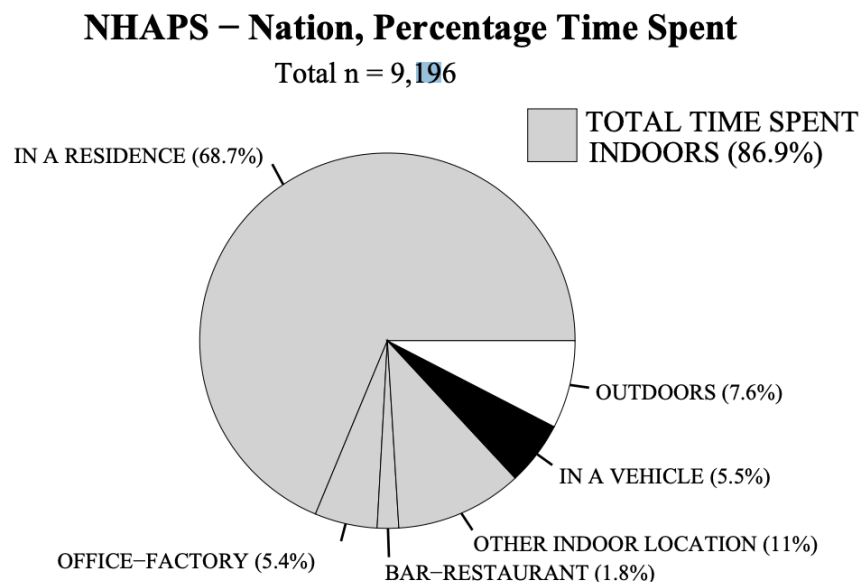


Figure 1- Building Green, 2016. Pie Chart Of Time Spent Indoors. [image] Available at: <<https://www.buildinggreen.com/blog/we-spend-90-our-time-indoors-says-who>> [Accessed 13 January 2021].

My research question has been prompted by my own experiences of the built environment, firstly in reference to healthcare environments, and secondly, my final practice project.

I particularly remember my anecdotal experience of a week-long stay in a hospital by how affected I was by the different environments I was placed in. At one point during the stay I was placed beside a window with a view of a nearby park, and on a sunny day, the sunlight filtered through into the ward, bathing everywhere in light. I remember feeling ‘healed’ from the sunlight on the skin and the fresh air; looking back on the

experience through a design lens, I consider how the placement of that window and the natural settings themselves was a significant contributor to my healing and recovery in hospital. Did the built environment I found myself placed in help my physical and mental recovery?

My final design project is to create a healing and nurturing ‘hive’ for young mothers to both prevent and treat pre/postnatal depression and encourage self-development. During my initial research for this project, I found a consensus that mothers under 30 are very vulnerable to developing mental health issues, but also of experiencing loneliness, isolation, economic difficulties and balancing a work/education/home life. Research by the Co-op and the British Red Cross found that 82% of mothers under 30 feel lonely some of the time, with 43% feeling lonely often or always (see Fig. 2). Between the ages of 18-25, 49% of young mothers felt lonely often or always, in comparison to 37% between the ages of 26-30, indicating that a sense of isolation is felt most acutely by younger mothers (Shocking extent of loneliness faced by young mothers revealed, 2018). BMC Psychiatry found that “young mothers are at increased risk for symptoms of postnatal depression which indicates the need for attention in pre and postnatal healthcare programs” (Agnafors, Bladh, Svedin and Sydsjö, 2019).

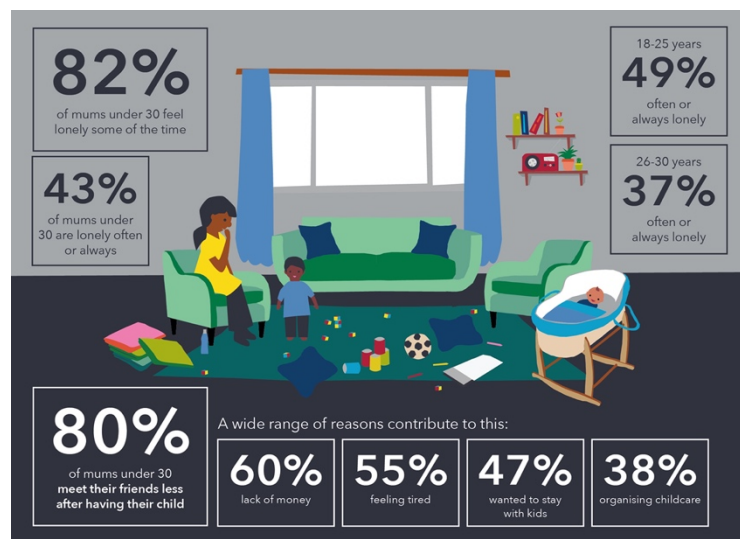


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Especially in the UK, I found that the resources for this demographic are quite limited, with few dedicated buildings to caring and nurturing young mothers, with support

groups often taking place in existing spaces such as church halls and schools (Pearson, 2018). I am aiming to challenge this traditional approach to giving support to mothers by creating a space dedicated to young mothers and their personal recovery and wellbeing; in order to do so, I will investigate how the built environment can have an impact on our health and wellbeing, examining biophilic and multi-sensory design, and other theory surrounding environmental psychology.

Biophilic design comes from the term ‘biophilia’, which is the idea that humans possess an innate tendency to seek connections with nature (Rogers, 2021); biophilic design seeks to create a connection between the built environment and the natural environment.

Multi-sensory design can be defined as design for all the senses; it has been developed from the idea that humans experience a space in numerous different ways rather than just visually.

Methodology

To develop my understanding of how the built environment affects our psychology and our physical and mental wellbeing, I will carry out research looking at the existing theory on environmental psychology and design, in broader settings and more specifically healthcare settings, and the ways in which these can be utilised to optimise our experiences of the built environment.

In my research I will explore the human relationship with the natural environment and the senses and the ways in which our interactions with both have shaped our mental psychology. I will study both the scientific and the theoretical research that currently exists; including scientific studies into how environments affect our physical attributes such as blood pressure and stress.

I will be analysing two case studies in which design has been used in a deliberate attempt to boost our health and wellbeing; Maggie's Leeds Cancer Centre and Butaro District Hospital. The two case studies I have chosen offer distinct solutions, one primarily focused on the psychological and one on the physical.

I have chosen to research and analyse case studies as opposed to carrying out a survey-based method of gathering data, as there is a strong body of research to suggest that studying the different ways in which design has already been practically used in the built environment will give a better indication of whether the design has been used effectively and does indeed have an impact on our health and wellbeing. Nature and our environments are arguably best experienced physically, and the pleasures and benefits we derive from it are most notable from prolonged, repeated experiences (Kellert and Calbrese, 2015). Therefore, a survey simply asking for opinions from the public and showing images of nature and environments in a visual way will perhaps not give an accurate measure of how people would be affected by the natural environment. Our environments are, after all, multi-sensory experiences.

In the next two sections, I will give an overview of the theory surrounding nature and the senses and how they came to be utilised in design theory and the built environment,

and the theories supporting biophilic and multi-sensory design's benefit to our wellness and health.

Historical context

Philosophical writings throughout history have revealed that humans have often thought in one way or another about our senses and nature. It is even evident that architecture of traditional cultures was created not just for visual pleasure but in consideration of the entire sensory palette (H.P., 2018). For instance, sacred buildings, many argue, seem to possess spiritual energies, and emanate an atmosphere facilitating meditation and ritual gathering.



Figure 3- Marshall, R., 2015. Notre Dame De Reims, Rose Window. [image] Available at: <<https://www.nytimes.com/2015/12/06/travel/paris-notre-dame-reims.html>> [Accessed 13 January 2021]

The human-nature relationship is also omnipresent in historical writings and literature. For instance, literature in the Romantic period (1785-1830) began to use nature as a primary subject (Gorodeisky, 2016). Gorodeisky writes that one of the Romantics central aims was to re-enchant nature, with the worry that modern science alienated human beings from nature.

Certainly, some of the earlier writer's view nature as a spiritual experience, such as the writings of Ralph Waldo Emerson (1836). He describes how a walk through nature gives him a "perfect exhilaration", and that "(...) I feel that nothing can befall me in life; no disgrace, no calamity, (leaving me my eyes) which nature cannot repair" (Emerson, 1836, p. 8). This alludes to the healing qualities of nature before it was ever applied to design.

A number of social science fields carried out early studies on environmental phenomena; for example, psychologists in the 1800s examined the effects of environmental perception, as related to light, sound, weight and pressure, amongst other variables, on learning and behaviour (Kopec, 2006, p. 7).

Nature and the senses can start to be recognised in modern design theory from as early as 1984, when the term ‘biophilia’ was first used by Edward Wilson, defined as “the connections that human beings subconsciously seek with the rest of life” (Biophilia and building design, 2020) and “the innate tendency to focus on life and lifelike processes” (Wilson, 1984, p. 1). Psychologists such as Judith Heerwagen expanded on this theory, undertaking extensive research into the relationship between buildings and psychological wellbeing (Biophilia and building design, 2020).

The theories of multi-sensory design applied to interior and inclusive-design is relatively modern, although indications of artists and designers starting to consider full-sensory experiences can be seen from the 1950s. The Gutai movement, for example, seemed to incorporate a full sensory experience into their performances and conceptual artworks (Bucknell, 2018). Fig. 4 shows Kazuo Shiraga, a prominent artist of the Gutai movement, at work, using the whole body to create artwork.



Figure 4- Unit London, n.d. Photograph Of Kazuo Shiraga At Work. [image] Available at: <<https://unitlondon.com/blog/87/>> [Accessed 13 January 2021].

Literature Review

Designing a built environment for human habitation is for many, to design in consideration of human needs over a purely aesthetic pursuit. Environmental psychologists have studied the relationship between humans and their environments since the early 19th Century, and understanding this bond is arguably an important component in creating good, considered design. Dak Kopec, an environmental psychologist, argues however, that whilst the design profession strives to conceive environments which consider people's behavioural needs, health and desire, most of these approaches are "haphazard" and have given "little consideration to a design's effects on the population it is intended to serve"(2006, p. xiii). This could be, for example, a television constantly playing in a waiting room; aimed to be a positive distraction, which might instead have a negative effect. On another level, Christopher Henry suggests that whilst the buildings of Zaha Hadid are visually exciting (see fig. 5), the materials used are almost exclusively tactilely cold and hard, and urges for more consideration into the physiological and social effects of such environments (Henry, 2011).

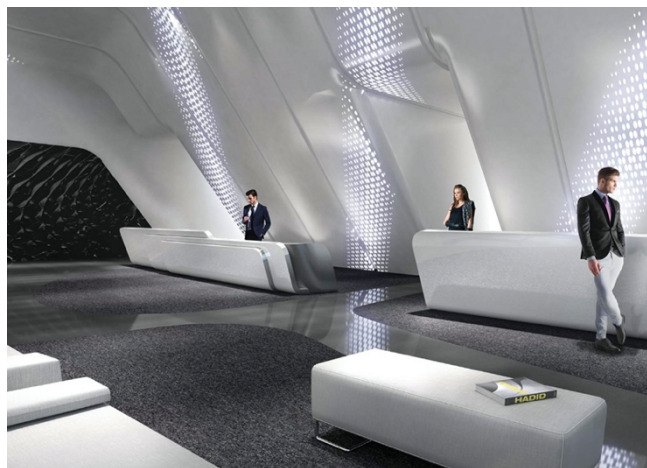


Figure 5- Dezeen, 2016. Lobby Of One Thousand Museum Tower, Miami, Zaha Hadid Architects. [image] Available at: <<https://www.dezeen.com/2016/05/12/zaha-hadid-interiors-one-thousand-museum-residential-tower-miami/>> [Accessed 13 January 2021]

Juhani Pallasmaa goes further than this, arguing that it has never been more apparent that there is an "ocular bias" in modern architecture (2005, p.30). He describes modern architectural structures as "flat, sharp-edged, immaterial and unreal" (2005, p.31) suggesting here that buildings have lost their tactility and sense of materiality, that was

once crafted for the human body. Pallasmaa advocates for a multi-sensory approach to designing for the built environment, declaring that the senses will “unite us” with the world whilst a vision-dominated architecture is “gradually increasing separation of self from the world”. Like a walk through a forest, which is a ‘polyphony of the senses’, Pallasmaa describes architecture as a fusion of several realms of sensory experience, all collaborating together (2005, p.41). Pallasmaa likens Frank Lloyd Wright’s *Fallingwater* to this experience, as he argues a live encounter of the textures and colours of the house, with the smells and sounds of the surrounding river, is a “uniquely full experience” (2005, p.44).



Figure 6- Ruschak, R., 2017. Frank Lloyd Wright's "Fallingwater". [image] Available at: <https://www.dezeen.com/2017/06/07/fallingwater-frank-lloyd-wright-pennsylvania-house-usa-150th-birthday/> [Accessed 13 January 2021]

Stephen Kellert (2015) also recognises the power nature has, detailing how ‘biophilic design’ can be used directly and indirectly in our built environment to increase our connection to nature, and thus improve our mental, emotional and physical health and wellbeing. Suggesting that the modern built environment is sensory deprived, and that nature is seen as an obstacle, and something to be tamed (2015, p. 5), he sets out a manifesto of sorts, detailing how ‘biophilic design’ can be used in our built environment to increase our connection to nature, from the use of natural light and air, to using natural materials and plants.

Kellert's theory and thinking is often theoretical; Howard Frumkin (2008) however argues for a need of a more scientific-research approach when it comes to measuring the effects of nature on our health and wellbeing. He dismisses an entirely theoretical approach, and instead offers the use of clinical epidemiology and large randomised trials as a way of gaining more insight into how environments affect us. For instance, he cites a 1980 study, in which an experiment in the State Prison of Southern Michigan found that an outside view of nature "may provide some stress reduction" (2008, p.11). However Frumkin does consider whether "perhaps we don't need such rigorous evidence when it comes to nature contact" (2008, p. 115), suggesting that a study of environmental psychology from a more theoretical approach is in fact valid.

Roger Ulrich (1991) also uses scientific research and studies to measure the effects of interior design on wellness. Ulrich advocates for "supportive design" in healthcare environments, centring around the concept of stress and stress reduction (1991, p. 99), and reinforces this by citing studies which link the viewing nature with stress control. Ulrich suggests that implementation of nature and multi-sensory elements into supportive and healthcare design is important to patient health and recovery.

Although the benefits to our health and wellbeing from having a view of nature from indoors are well-researched, Kent Bloomer (2008) however questions whether this goes far enough. Despite acknowledging the therapeutic properties of a view of the natural environment, Bloomer asserts that a large "picture window" in itself does not give us as big a connection and engagement to nature as it should (2008, p. 254). He argues that "Glass provides a powerful barrier and protection from heat, cold, wind, rain, insects and animals", suggesting a disconnection from the elements. Moreover, he claims, "Through glass, we observe the world outside comfortably and safely and without the challenges of actual engagement" (2008, p. 254). To enhance the experience of viewing, Bloomer suggests a multi-sensory approach that utilises the haptic system, as discussed by Pallasmaa (2005). By adding natural materials and organic forms onto windows (for example, timber mullions), Bloomer proposes that this can create a firmer 'connection' to nature by way of sense of touch. As nature itself is a multi-sensory experience, Bloomer suggests that use of multi-sensory design would enhance our connection to nature, thus increasing the pleasure of our experiences and our health and wellbeing.

Bloomer describes the act of looking as “passive” in comparison to touch and the other senses; although he acknowledges that looking can potentially evoke excitement or the potential for a direct experience, he maintains that it is “only through touching we again experience the simultaneity between action and reaction” (2008, p. 255). He considers how our childhoods were shaped by sensory experiences, and that “our visual perception of objects in the environment became largely a follow-up to our early encounters” (2008, p. 255).

Kopec also discusses our ‘place attachment’ to an environment, which refers to a person’s bond with the social and physical environment of a place. He suggests that settings such as these have deeper meanings for people because their identities become more “intricately woven into the spaces”, which therefore serve as “restorative environments” (2006, p. 62). Kopec argues that poor psychological health seems to be perpetuated most by uncomfortable environments, in which users are forced to surrender their control, such as hospitals, workplaces or schools (2006, p. 61), and advocates for designers to consider how users of an environment might become better connected to spaces through design.

Rachel Kaplan and Stephen Kaplan (1989) delve deeper into the idea of place attachment and restorative environments, suggesting that certain smells, artifacts and sounds within an environment can evoke memories and feelings. Kaplan and Kaplan define a restorative environment to be that of a preferred one, (1989, p.187), but they also examine the concept of a restorative environment in much more detail, this time how it is created by the natural environment. They break the restorative environment down into four key aspects; being away, other worlds, fascination and action/compatibility, and suggest that the very act of close contact to nature has the ability to increase satisfaction and thus contribute to improved health and wellbeing (1989, p.182).

I will now examine how these design theories have been used in practice, first looking at the Maggie’s Leeds Cancer Centre, and then at the Butaro District Hospital.

Case study one: Maggie's Leeds Cancer Centre, UK, by Heatherwick Studios



Figure 7: ArchDaily, 2020. Maggie's Leeds Cancer Centre. [image] Available at: <<https://www.archdaily.com/941540/maggies-leeds-centre-heatherwick-studio>> [Accessed 28 December 2020].

Maggie's is a charity that provides emotional support and practical advice to those who have been diagnosed with cancer, and have centres located in various areas around the UK and globally. Although these centres are often located near hospitals, they pride themselves on being distinct from a hospital environment in that every Maggie's Cancer Centre is designed to be a calm and welcoming space, as opposed to the clinical environment of a hospital. Unlike in a traditional hospital, the focus is on the psychological, ensuring those embarking on their arduous health journeys have solid support in order to ensure healing and mental stability.

Maggie's Leeds, designed and completed by Heatherwick Studios in 2020, like all Maggie's Centres, is hard to define as having one function; it is not quite a hospital and not quite a home. Charles Jencks, co-founder of the Maggie's charity, suggests that the idea of having a mixture of functions makes the Maggie's Centre's more effective in carrying out their work, and describes the buildings as a "hybrid building type" (2010, p. 28). Jencks rebels against the "monofunctionalism" of the modern city, which "dulls the sensibility as it turns citizens into drones", and instead creates a building that is "not quite a museum, church, hospital or home, but has aspects of each". Perhaps this

combination of elements from a church (spirituality), and a home (comfort and domesticity) work together to create the therapeutic and healing space that is desired by Maggie's.

According to Maggie's themselves, every one of their centres are original, uniquely designed by different architects and interior designers, yet all seem to feel a part of the same family (Maggie's, 2020). This, perhaps, is because of the design ethos that Maggie's sets out for all architects, in order to ensure that all centres are designed on the belief that design and architecture can be healing and can help people who come for support to feel better; a home from home of sorts, designed to feel more domestic than a hospital.

Examining the Maggie's Landscape and Architecture Brief (2015), their ethos and beliefs are reflected in the spatial requirements of the centres. To pick out a few examples, the entrance space of a Maggie's Centre, for instance, has no reception desk; instead, there is a discreet office space nearby where a member of staff can spot someone new coming into the centre, which creates a more welcoming and less intimidating environment for the user. There is a kitchen table at the heart of every centre, and a multitude of sitting rooms with seating, designed to create a more intimate atmosphere, as well as different retreat and private spaces that visitors are welcome to use. The inclusion of both private and social spaces is important here, as it allows visitors to feel in control of their experiences of the centre. Ulrich suggests that a lack of control (in reference to a healthcare context) is a "pervasive problem that increases stress and adversely affects wellness" (1991, p. 100), so in the context of Maggie's, it is important to foster a sense of control in visitors in order to reduce stress and provide somewhere that is psychologically supportive.

Jencks pioneered the concept of 'Kitchenism', a philosophy which describes a 'friendly' and 'convivial' atmosphere, and a "primary place of the dining table and a cup of tea", made available as soon as you walk through the door (2015, p. 16).



Figure 8 Wallpaper, 2020. Maggie's Leeds, Kitchen Table. [image] Available at: <<https://www.wallpaper.com/architecture/heatherwick-completes-maggies-centre-leeds-uk>> [Accessed 4 January 2021].

It could be argued that the inclusion of such a space at the entrance point in the building creates an environment which is easy to understand and navigate. Kopec emphasises the importance of doing this, as users with elevated levels of stress or degenerative illness may find their wayfinding abilities impaired. He maintains “the design should include simple configurations that allow people to move from one destination to another without having to plan their next move (...) provide visual access to all spaces and functions so that users can see and understand the environment” (Kopec, 2006, p. 218).

Architects and interior designers also work closely together to make sure there is a strong connection to nature both inside and outside of the centres, suggesting that Maggie's sees a link between nature and healing. According to the Architecture and Landscape brief “The interplay between the outside and inside space, the built and the ‘natural’ environment is an important one. Sheltered inside it helps to be reminded by a seasonal changing scene outside, that you are still part of the living world” (Maggie's Architecture and Landscape Brief, 2015).

Maggie's Leeds is arguably a good example of this interplay between nature and the built environment. The interior is designed around three-mushroom shaped volumes (or planters), which house spaces inside their pod-like interiors. The base of each of these volumes enclose private places for visitors to spend time by themselves, whilst spaces

between offer the relaxed and approachable social spaces for group conversation and activities (Heatherwick Studio, Maggie's Leeds, 2020), as shown in Fig. 9.

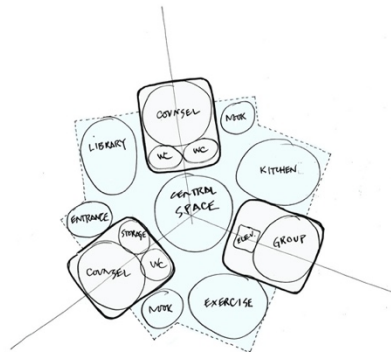


Figure 9- Heatherwick Studios, 2020. Sketch of Interior. [image] Available at: <http://www.heatherwick.com/projects/buildings/maggies/> [Accessed 13 January 2021]

Elements of nature are seen throughout the building, including in the materiality, the organic shapes and the thousands of plants both in the interior of the space and outside, designed to add colour, scent and interest. Many of the materials used in the centre come from natural origins, such as cork and beechwood. The use of sustainably sourced spruce wood as a main structural element gives the space warmth, whilst providing a textural and sensory property that is lost in, for example, a plain, plaster wall. The use of organic forms and shapes in the interior, as Bloomer (2008) has argued, have the ability to create a firmer connection to nature in a built environment. Subtle features of the design, such as the use of wood on the handrail of the staircase, perhaps allude to a deeper understanding of the sensory effects of material. The architects of Maggie's Oldham considered how those undergoing chemotherapy sometimes experience pain on touching cold objects (Maggie's Oldham, 2017), prompting the use of wood rather than metal materials. In this case, use of wooden materials in Maggie's Leeds not only provides connection to nature, but also considers the haptic experience of a space, rather than just the visual experience of a space.

The wooden structure of the centre has in-built, bespoke shelving designed to allow frequent visitors to bring personal items and mementos from home and display them (see Fig. 10). A sense of place develops when a level of comfort and feelings of safety are associated with a place, translating to a feeling of belonging (Kopec, 2006, p. 62).

Kopec discusses the importance of personal items and personalisation in long-term health facilities to create a sense of attachment and allowing patients to become more satisfied with their environments and better adjusted, all which support physical and mental health (2006, p. 216). In this case, Heatherwick's inclusion of places to put personal items could directly increase feelings of positivity and attachment of the users, allowing them to feel more comfortable and at home and thus increasing wellbeing.



Figure 10- ArchDaily, 2020. Shelving at Maggie's Leeds. [image] Available at: <<https://www.archdaily.com/941540/maggies-leeds-centre-heatherwick-studio>> [Accessed 28 December 2020]

As one of the only green spaces left on the medical campus of St James University Hospital, Maggie's Leeds reminds one of the idea of 'refuge', which Kellert (2015) describes as an adaptive response that humans have evolved over time. Refuge, Kellert suggests, is something that provides sites of both safety and security, and can be achieved through the built environment itself through biophilic design; whether this be through views of the outside, visual connections between nature and interiors or the occurrence of secure and sheltered settings (Kellert and Calbrese, 2015, p. 19).

As previously mentioned, a feature of every Maggie's Centre is a garden space, offering twists on the contemporary healthcare garden (Butterfield, 2015, p.99).



Figure 11- ArchDaily, 2020. Ground Floor Plan showing garden. [image] Available at: <https://www.archdaily.com/941540/maggies-leeds-centre-heatherwick-studio> [Accessed 28 December 2020]

Throughout history, as far back as 600 BC, gardens and plants have been associated with healing, and the belief that contact with trees, plants and flowers foster wellbeing and help to reduce the stress of early living is evident in Ancient Greek, Egyptian and Roman Culture (Butterfield, 2014, p. 39). In more recent history, incorporating a ‘healing garden’ into a hospital setting has been found to reduce stress, by providing places for individual reflection and psychological restoration for both staff and patients (Kopec, 2006, p. 224).

Looking at gardens and the actual physical process of gardening, a 1983 study into the significance of gardening (Kaplan & Kaplan, 1989, p. 170), with participants from members of the ‘American Horticultural Society’ and readers of ‘Organic Gardening and Farming’, found that a shared feeling amongst the two groups was that the peacefulness and quiet of gardening, nature fascination (working close by to nature) and the sensory aspects of gardening provided the most satisfaction. The study showed that gardening holds the gardener’s attention in a multitude of ways, perhaps indicating that in a healthcare environment, actively gardening would create a positive distraction for patients (1989, p. 170). Looking at these results, it seems that not only did the act of gardening itself have a positive impact on the participants, but they could also point to the fact that it could be the very act of being around nature that has the most benefit, as participants mention the quiet and the sensory aspects. The study concluded that in the short term, those with access to nearby nature (in this case gardens) were found to be “healthier than other individuals”, and in the long term, were found to have “increased

levels of satisfaction with one's home, one's job and with life in general" (1989, p. 173), contributing to the idea of nature as a restorative environment.

Angie Butterfield has extensively investigated into the role of Architecture and gardens at Maggie's Centres and their subsequent impacts on staff and users. Although Butterfield acknowledges that her initial findings pointed to minimal use of the gardens by visitors and staff, suggesting that the gardens had limited impact, she points out that later qualitative research reveals that lack of use did not mean a lack of importance, and that the presence of the gardens themselves were highly valued (2015, p. 100).

Butterfield identifies four 'essences' in her research, which highlight the qualities identified by staff and visitors of the Maggie's Centres gardens collected in her fieldwork, those being; thresholds, sensory richness, density of time and a sense of home (2015, p100). Looking specifically at the 'sensory richness' essence, it points to how the sensory presence of plants was valued by visitors and staff, and that they were "less positive about those gardens with less sensory moments" (2015, p. 103). A lot of participants emphasised the tranquillity of the sensory richness of the gardens involved in the study, prompting one participant to note "I love the fact that the plants are scented. The garden tickles all your senses. And it's nice to be able to smell as I can't taste anything at the moment." Design for all the senses seems to be appreciated here, and it could be concluded that the inclusion of a multi-sensory experience improves the wellbeing of users.

Butterfield and Martin's findings suggest Maggie's Centres are in fact "healing places", in which visitors can be guided towards feelings of sanctuary (2016, p. 703). Amongst benefits such as spaces for sociability, their findings identified the gardens as being spaces for "personal reflection, away from the institutional timetables they fit into elsewhere". The overall feedback and findings of their fieldwork and interviews support the arguments that the gardens have healing and therapeutic qualities.

Case Study Two: Butaro District Hospital, Burera District, Rwanda by MASS design group



Figure 12- Baan, I., 2011. Butaro District Hospital. [image] Available at: <<https://massdesigngroup.org/work/design/butaro-district-hospital>> [Accessed 13 January 2021]

In 2007, Burera was one of the last two districts in Rwanda without a tertiary care hospital, leaving a population of 340,000 without access to a single doctor. The 150-bed Butaro District Hospital was therefore developed to provide both inpatient and outpatient services, particularly with emphasis on maternity services (Butaro District Hospital | MASS Design Group, 2011).

It must be acknowledged that much of the writings, research and case-studies surrounding Butaro District Hospital focus on the sustainability of the building. However, I will be looking at this case study from the perspective of the healing and wellbeing of its users through design, and how certain design choices have a hand in this, particularly in reference to biophilic and multi-sensory design. In the words of Stephen Kellert and Judith Heerwagen, “Low environmental impact design, while fundamental and essential, fails to address the equally critical needs of diminishing human separation from nature, enhancing positive contact with environmental processes, and building within a culturally and ecologically relevant context, all basic to human health, productivity and wellbeing” (Kellert, Heerwagen and Mador, 2008, viii).

I was particularly interested in this case study after watching a TED Talk by Michael Murphy, one of the lead architects on the project and one of the founders of MASS Design Group. He acknowledges the patients experience of a hospital, and asks questions such as “Evidence shows that a simple view of nature can radically improve health outcomes, so why couldn’t we design a hospital where every patient had a window with a view?” (Murphy, 2016), showing consideration to how design can contribute to wellbeing.

Butaro District Hospital is different from the Maggie’s Centres in that it primarily deals with physical over mental health, and indeed, design and architecture have limitations in such a setting as safety and cleanliness is the priority. However, as I intend to demonstrate whilst investigating Butaro District Hospital, the built environment in a hospital setting can have an impact on health and wellbeing.

Ulrich describes the traditional hospital environment as “psychologically hard” (1991, p. 7), and Kopec details how hospitals evolved from “death houses for the poor” in the 1880s, to centres of scientific excellence, only moving to become warmer and more inviting environments in the 1970s (2006, p. 211).

Heathcote describes much of modern healthcare design to be in no way “architecture for the senses” and that healthcare buildings look the way they look because “that is the way they are expected to look” (Jencks and Heathcote, 2015, p.84); for instance, with stainless steel hardware, wipe-clean surfaces, laminated doors, lino floors, and a bland colour palette of white and beige. Heathcote suggests that this particular design language is not necessarily functional, and instead just continues the image of a hospital as a “functional machine”.

Heathcote instead points to pre-modern hospitals such as the Hospital de la Santa Cruz (Fig. 13) as having more consideration of patient’s health through design. These hospitals often had a courtyard built into the design of the hospital, which might suggest that these hospitals had an understanding of the senses and the benefits of nature to health and wellbeing.



Figure 13- Jose Luis Filpo Cabana, 2013. Hospital De La Santa Cruz, Toledo. [image] Available at: <[https://commons.wikimedia.org/wiki/File:Hospital_de_Santa_Cruz_\(Toledo\)._Patio.jpg](https://commons.wikimedia.org/wiki/File:Hospital_de_Santa_Cruz_(Toledo)._Patio.jpg)> [Accessed 28 December 2020]

It is interesting to consider this perspective, and it could be argued that the Butaro District Hospital takes on some of the features of these pre-modern hospitals, with its consideration of the nature surrounding it. Butaro District Hospital is a landscaped campus on a terraced hillside, centred around an umuvumu tree (Fig. 14), with a sizable courtyard. The umuvumu tree refers to a species of sycamore tree, and has significance in Rwanda, and holds many meanings; it is a source of raw material for products, a source of shade and shelter (Kaieteur News, 2019) and are often used as meeting places for the local community; it is where Rwandan people have historically gathered to share opinions and concerns on how to progress society (The Umuvumu Project | Melbourne Coffee Merchants, n.d.). Not only does this demonstrate how a natural object can have such cultural significance, it is perhaps fitting that the hospital surrounds the tree, as a hospital could be considered a vital part of any community.



Figure 14- Figure 14- Mass Design Group, 2011. Umuvumu Tree. [image] Available at: <<https://massdesigngroup.org/work/design/butaro-district-hospital>> [Accessed 28 December 2020]

spirit, a children's play area placed in the central courtyard (Butaro District Hospital | MASS Design Group, 2011). This has the dual effect of decreasing the chances of getting airborne diseases, whilst also increasing occupant's connection with nature whilst in a built environment.

The layout of the interior challenges the traditional layout of a hospital ward by inverting the beds, so that each patient has a large window with a view of the Rwandan landscape and increasing natural light and ventilation.



Figure 17- Baan, I., 2011. Butaro District Hospital. [image] Available at: <https://www.archdaily.com/165892/butaro-hospital-mass-design-group> [Accessed 13 January 2021]

The position of the windows in relation to the beds could be beneficial in two different ways; through the natural views seen through the window, and the natural light itself. Roger Ulrich's 1984 study reveals a possible link between different views through a window and the recovery times patients experience after surgeries. The 'tree view' patients had a view of natural environment, and the 'wall-view' patients had a view of a brick wall, i.e., a built environment. It concluded that patients with a view of trees, in comparison to the patients with a view of a wall, had a shorter postoperative hospital stays, fewer negative evaluative comments from nurses, took fewer moderate and strong analgesic doses, and had slightly lower scores for minor postsurgical complications (1984, p. 421). This would support the view of those such as Kellert, that implementation of views of nature is important to our health and wellbeing.

Ulrich discusses the use of "positive distractions" in physical environments as a way to elicit "positive feelings, holds attention and interest without taxing the individual, and therefore may block or reduce worrisome thoughts" (1991, p. 102). Ulrich argues that

these positive distractions provide just the right amount of stimulation to act as an effective stress relief and thus increase the wellbeing of patients. Stress, many have argued, is a key hindrance in the recovery of patients in hospital; perhaps then, a view of the natural world outside with its forever changing variance is the key to improve patient's recovery and wellbeing, providing just enough sensory stimulation.

In a healthcare setting such as Butaro District Hospital, light is a necessity for safety in carrying out medical procedures, however increasing research points to the advantage of using more natural light over artificial light, to improve patient and employee wellbeing, and also to increase the sustainability of built environments.

The utilisation of natural light into design and the built environment is a fundamental principle of biophilic design. It can be used in a creative way, assuming aesthetically pleasing forms due to the interplay between light and shadow and integrating with design to contribute to spatial properties (Kellert, 2015, p. 12). As well as this though, natural light could be used in a way that contributes to our health and wellbeing. For instance, natural light can facilitate movement and wayfinding, which could contribute to comfort and satisfaction. In a hospital or healthcare setting, this could be used as an advantage to ease the experience of users.

Although it must be noted that direct sunlight can produce glare which might interfere with tasks and performance, increasing scientific research has been carried out looking at the effects of daylight and sunlight on our health. For example, Vivian Loftness and Megan Synder cite studies in which it reveals that sunlight reduced the length of stay for patients recovering from surgery, bipolar treatment, and seasonal affective disorder treatment (2008, p. 121). Pallasma is particularly critical of artificial light and argues a constant high level of illumination "leaves no space for mental withdrawal or privacy; even the dark interiority of self is exposed and violated" (2005, p. 49).

As mentioned earlier, the project is well known for its use of sustainable design; the building uses local materials, such as volcanic rock from the Virunga mountain chain. Intentionally labour-intensive practices delivered sustainable design, thus reducing the embodied carbon of the project.

The Butaro District Hospital was designed and constructed involving grassroots business development, constructed with 100% local labour (Tanuwidjaja et al., 2016, p. 49). The aim of this was to create more community involvement and participation, thus creating jobs for the area. For example, the masonry technique for creating the walls and the structural columns of the building was easily found in local craftsmen of the area.

Looking at the use of materials and community construction from a different perspective though, perhaps the use of materiality does more than ease the strain on the environment, and in fact create an environment that is healing in and of itself, and likely to prompt an emotional attachment between environment and user. It could be argued that, through the very involvement of participation of the local community in building the hospital itself, was a healing experience for the entire community, and perhaps allowing users to feel a greater sense of place.



Figure 18- Baan, I., 2011. Butaro District Hospital. [image] Available at: <<https://massdesigngroup.org/work/design/butaro-district-hospital>> [Accessed 13 January 2021]

Considering the use of volcanic rock, in reference to elements of biophilic design, Kellert references “age, change and the patina of time” as a way to indirectly experience nature (2015, p. 17). Kellert proposes that people respond positively to the dynamic forces of growth and aging, and nature’s constant fluxing. Even in one day, nature has the ability to change; for instance, the sky has the ability to transform in appearance, from sunrise to sunset. Kellert suggests that these processes can be demonstrated in design strategies, such as naturally aging materials, weathering, and a sense of the

passage of time (2015, p. 17). Volcanic rock, as a material that is over millions of years old, fits the description of a weathered material which shows the passage of time.

Peter Zumthor also emphasises the importance of history, especially when it comes to creating an atmosphere in buildings. Zumthor argues “History is a good thing for human beings. Without it we would feel alienated and displaced” (Pallasmaa and Zumthor, 2013, p.63). Perhaps then, use of old materials in this project has the ability to create a greater sense of place attachment to the built environment, thus aiding patient’s health and wellbeing. A use of a locally sourced material, especially amongst locals, could have the ability to evoke familiarity, thus creating a sense of security and enhancing the users experience of the space, which is key to wellbeing. The use of materiality in this project would certainly fit in with Pallasmaa’s views about architecture, that “Modernity at large has been more interested in form and feeling, surface than materiality and texture” (2013, p. 53).

Conclusion

Considering the evidence, it seems that an environment can be built to heal, and that design choices can be implemented in such a way as to foster health and wellness in individuals. A typically stressful environment such as a hospital, in which health and wellbeing can be negatively impacted by stress and bad design, can become a much more restorative environment through design. Our visual experiences of space can be enhanced through multi-sensory experiences, whether this be materiality or smells. Implementation of design that increases our connection to nature, whether that be natural views or natural materials, can be beneficial to our mental and physical health. It is important to consider how design can foster a place attachment, for example, allowing users to feel more at ease by allowing them to bring mementos and reminders from home to display, also in turn, allowing them to feel more in control of their environments.

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