Architecture & Enlightenment:
An Exploration of the Experiential Possibilities of the Constituents of Architecture

‘A thesis submitted in partial fulfilment of the requirements for
the degree of Master of Architecture (Professional),
Unitec Institute of Technology, 2010’

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Abstract

There is a general acknowledgement of the lack of spiritual and emotional richness in contemporary architecture. This thesis attempts to address the issue of normalised and emotionless architecture, through the design of a Zen Centre for meditation and other community activities that unite the body and mind.

The project was grounded in the belief in the potential and ability of the key architectural constituents - structure, form, space, light, colours and materials - to produce an emotionally rich architecture. The investigation also involved extensive research into architectural precedents, the phenomenology of human perception and cognition, and the intangible qualities, or the essence and meaning of a spiritual architecture.

A key element of the design methodology were the concepts of ‘bliss’ and ‘flow’, which involved creative immersion in freehand modelling and pencil sketching, and supported the notion of ‘sensory thinking’ through the use of the hands in creative work.

The resultant scheme has an inseparable relationship to the theory behind the project and exists as a fusion of ideas from numerous strands of research on spiritual precedents, the architectural constituents, human perception and cognition and Zen philosophy.
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1.0 Introduction and Literature Review

1.1 Research Question

How can architectural spaces support our experiences and conceptions of the spiritual?

This question entails two main areas of research. Firstly, the concept of human experience and conception. Secondly, the idea of a ‘spiritual architecture’.

1.2 Experience, Perception and Conception

The earliest surviving writing on the subject of architecture is Vitruvius’ treatise De architectura from the 1st century BCE. The Roman architect’s ideas were highly influential in the Renaissance period and shaped the development of Western architecture as we know it today. According to Vitruvius, a good building should satisfy the three principles of firmitas, utilitas and venustas.\(^1\) Translated, firmitas relates to the ability of a structure to stand up robustly and remain in good condition, utilitas that it should be useful and fulfil its purpose, and venustas, that is should delight people and raise their spirits. A somewhat prosaic but more concise translation of the three principles is strength, commodity and beauty. The first two principles, durability and utility are straightforward and rational objectives. They relate to the practical requirements that a building should meet in order to shelter and protect its inhabitants. It is the third principle, beauty,

which appears to be more complex and raises some interesting architectural questions of significance to this paper.

*Venustas*, relates to the ability of a building to ‘delight people and raise their spirits’ and appears as a much more complex architectural objective when compared to the practical nature of *firmitas* and *utilitas*. Norberg-Schulz acknowledges the more complex aspects of our life-world in his statement:

> *Our everyday life-world consists of concrete ‘phenomena’. It consists of people, of animals, of flowers, trees and forests, of stone, earth, wood and water, of towns, streets and houses, doors, windows and furniture... But it also comprises more intangible phenomena such as feelings.*

Delight is an emotion, a feeling, and hence an ‘intangible phenomenon’. Vitruvius was referring to the intangible, psychological and emotional effect that architecture can have on the human spirit. The task of an architect to achieve delightful buildings raises questions of perception, as experience is subjective. The ability of a building to induce an emotional reaction will of course depend on the individual inhabitant, as some people may be more susceptible to such experiences than others. The degree to which a building or space can reach out to psychologically affect the most disengaged of visitors, is perhaps a way to measure the quality of the architecture.

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Architecture that appeals to the emotions appears to be a complex design ambition. According to Pallasmaa, “an impressive architectural experience sensitises our whole physical and mental receptivity. It is difficult to grasp the structure of the feeling because of its vastness and diversity.”\(^4\) The issue of subjective experience relates to the philosophical field of research known as phenomenology. In the late 20\(^{th}\) century, Norberg-Schulz proclaimed, “After decades of abstract scientific theory, it is urgent that we return to a qualitative, phenomenological understanding of architecture.”\(^5\) Aravot, who stresses the importance of phenomenology in contemporary architectural discourse, describes phenomenology as “a

core field of philosophy” that is “rooted in the first person perspective and seeks inter-subjectivity, the shared cognition that shapes our ideas and relationships with the world surrounding us.”6 Today there are numerous contemporary architects who are recognised for their phenomenological approach to architecture, which is based around the concept of ‘the body in space.’ Jonathan Hale refers to the work of Tadao Ando in Japan, Herzog and De Meuron in Europe and Steven Holl in America and notes their “desire to articulate material qualities, in order to heighten our perceptual awareness of the encounter between the body and the world of things.”7

Most architecture is designed to be inhabited and hence it is inevitably experienced. The poet Jorge Luis Borges wrote, “The taste of the apple ... lies in the contact of the fruit with the palate, not in the fruit itself; in a similar way ... poetry lies in the meeting of poem and reader, not in the lines of symbols printed on pages of a book.”8 A comparable statement by Pallasmaa reads, “The artistic dimension of a work of art does not lie in the actual physical thing; it exists only in the consciousness of the person experiencing it.”9 Like the apple, the poem and the work of art, the same principles surely apply to a work of architecture. Does the expression of a piece of architecture lie in the physical building or in the consciousness of the person experiencing it? On the subject of experience Holl stated, “A real architectural experience is not simply a series of retinal images; a building is encountered – it is approached, confronted, encountered,

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9 Pallasmaa, Theorizing a New Agenda for Architecture, ed. Kate Nesbitt, 449.
related to one’s body, moved about, utilised as a condition for other things, etc.\textsuperscript{10} Experience is the act of apprehending by means of the senses. In his writing Holl refers to the importance of buildings that acknowledge all the senses. He expresses his concern for contemporary design that has become solely about the visual sense, “The architecture of our time is turning into the retinal art of the eye ... instead of experiencing our being in the world, we behold it from outside as spectators of images projected on the surface of the retina.”\textsuperscript{11} The traditional five senses proposed by Aristotle are sight, hearing, touch, smell and taste. However, in \textit{Questions of Perception} an additional two senses are proposed. Pallasmaa suggests that we have in fact seven senses and that muscle and bone are also involved in human cognition:

\begin{quote}
Similarly, an architect internalises a building in his body; movement, balance, distance and scale are felt unconsciously through the body as tension in the muscular system and in the positions of the skeleton and inner organs. As the work interacts with the body of the observer the experience mirrors these bodily sensations of the maker.\textsuperscript{12}
\end{quote}

His argument for the additional two senses is based on the idea of the human body as a dimensioning and proportioning tool. Muscle and skeleton serve as the devices for the intricate movements of the body and therefore measure and evaluate spatial proportions and relationships.

\textsuperscript{11} Holl, Pallasmaa and Perez-Gomez, \textit{Questions of Perception}, 29.  
\textsuperscript{12} Ibid., 36.
1.3 The Spiritual

The meaning of the word spiritual has developed over time and today has numerous meanings and connotations. Traditionally it was associated with religion, religious experience and the Holy Spirit. However, the modern-day, secular and broader meaning of the word refers to a sense of otherworldliness. It has become a word that is also commonly used as way to describe intangible things that lack a straightforward explanation. It is generally accepted that spirituality can be found in music, nature, art, poetry, in many other areas of life and of specific relevance to this paper in that it can be found in architecture.

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Perhaps spirituality can be found in anything and everything, but is it how we perceive spirituality that makes it exist or is it absolute? Moreover, what constitutes a spiritual experience? Is it the ability of

something in our life-world to move or evoke emotion in us? Perhaps it is the ability of something to alter our mood or affect us psychologically. Norberg-Schulz referred to ‘intangible phenomena’ in our life-world such as ‘feelings’.¹⁵ Like feelings, a spiritual experience is perhaps also an intangible phenomenon. It is an experience that we know can take place but is also an occurrence that is hard to define, describe or label in concrete terms.

In an attempt to define such phenomena let us focus for a moment on a spiritual architecture in the simplest terms possible. Should such architecture not ultimately be about the ability of a space or place to move us and affect our spirit or soul? In his acceptance speech for the Pritzker Prize in 1995, Ando speaks of a similar intent: “What I have sought to achieve is a spatiality that stimulates the human spirit, awakens the sensitivity and communicates with the deeper soul.”¹⁶ Pallasmaa also may have captured the essence of a spiritual space in his statement, “An impressive architectural experience sensitises our whole physical and mental receptivity. It is difficult to grasp the structure of the feeling because of its vastness and diversity.”¹⁷ Hence, although a spiritual experience may be intangible and difficult to grasp, it can also be that a spiritual architecture is something that simply moves us by affecting our seven senses in some way to evoke our inner emotions on a deeper level.

Architects such as Pallasmaa and Barragan have acknowledged the disconcerting lack of spiritual and emotionally rich architecture that seems to characterise modern trends. According to Pallasmaa:

¹⁵ Norberg-Schulz, Genius Loci, 6.
¹⁷ Pallasmaa, Theorizing a New Agenda for Architecture, ed. Kate Nesbitt, 453.
The buildings and townscapes of our time commonly lack a spiritual and emotional content. The sense of emptiness, distance and rejection they do possess derives from the inability of modern settings to resonate with the unconscious sensibilities of the human mind. The progress of modern architecture has normalised human emotions, and consequently is unable to reflect emotional extremes such as ecstasy and melancholy.18

Barragan holds a similar point of view that is enforced by his statement “I believe in an ‘emotional architecture’. It is very important for humankind that architecture should move by its beauty; if there are many equally valid technical solutions to a problem, the one which offers the user a message of beauty and emotion, that one is architecture.”19

Pallasmaa acknowledges that “At the turn of the millennium, the great challenge for architects is the re-sensualisation, re-mythologisation and re-poetisation of the human domicile.”20

20 Juhani Pallasmaa, Encounters, 70.
1.4 The Constituents of Architecture

In summary, as early as the 1st century BCE, Vitruvius had acknowledged with his third principle ‘venustas’ the psychological and emotional effect of good buildings. In recent years the phenomenologist Pallasmaa captured the essence of a spiritual space when he stated, “An impressive architectural experience sensitises our whole physical and mental receptivity. It is difficult to grasp the structure of the feeling because of its vastness and diversity.”21 And although as accredited by Norberg-Schulz as an ‘intangible phenomenon’, for my purposes it can be argued that a spiritual architecture is something that simply moves us by affecting our seven senses in some way to evoke our inner emotions on a deeper level.

It can therefore be acknowledged that architectural spaces can be perceived as spiritual, but the question remains as to what qualities a space must encompass in order to induce such a response from its visitors. The Norwegian architect, Birgit Cold, has published her views on spirituality in architecture:

> Spirituality as well as beauty is created or comes to life when the constituents of architecture - structure and form, form and space, space and light, colours and materials - interact as a piece of art, communicating with the intellect, the emotions, the spirit and the senses. As you see from these descriptions the beautiful, true and

21 Pallasmaa, Theorizing a New Agenda for Architecture, ed. Kate Nesbitt, 453.
good are also interrelated in architecture with the sensuous - aesthetic and vigorous quality.  

Cold’s statement introduces the idea of four pairs of architectural constituents that when designed successfully to ‘interact as a piece of art’, can produce good architecture that is spiritual and beautiful. Thus, these four constituents must be researched and explored to begin to understand how ‘architectural spaces support our experiences and conceptions of the spiritual’. 

1.4.1 Structure and Form

The first pair of architectural constituents proposed by Cold is ‘structure and form’. The essential purpose of structure is to allow building elements to create space and form by overcoming gravity. Structural elements transport loads from the point of origin down to the ground and respond to such loads based on their geometrical and material properties. The formal expression of structural components both individually and collectively, in terms of materiality and the loads that they carry will determine their unique tectonic language.

Bjorn Sandaker speaks of the relationship between aesthetics and structure, stating, “If we can aesthetically understand the structure’s visual appearance, we will appreciate it fully, both with our 

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intellect and with our senses.”\textsuperscript{23} His statement points out the potential to instinctively understand the appearance of structure and he is hence referring to the notion of tectonic expression. In regards to tectonics, Niemeyer makes an interesting proposition on the ability of structure to exhibit beauty. According to Niemeyer, “The correct structural solutions are aesthetically the most satisfactory and, through a refinement of details, may possibly become a source of real architectonic beauty.”\textsuperscript{24} Here the idea of the authenticity of structure is reinforced. Niemeyer supports honest structural expression and the belief that the ‘correct’ structural solution will also be correct aesthetically. When Niemeyer mentions architectonic beauty, he also begins to hint at the intangible and emotive qualities that structure can possess.

If we consider architecture to have a structural language, perhaps structural details and joints are the points of interest for comprehending such a language. Frascari writes about the importance of the joint for ‘tectonic endeavours’ noting its value as the fundamental source and primary exhibitor of structural language. He recognises architecture as an art because of its concern for “putting together, spaces and materials, in a meaningful manner”.\textsuperscript{25} He states, “the joint, that is the fertile detail, is the place where both construction and the construing of architecture takes place”.\textsuperscript{26}

\textsuperscript{26} Ibid.
Independently, Frascari, Niemeyer and Sandaker have proposed that architectonic beauty can be produced by authentic structural expression and will be articulated through the joint or detail. Kenneth Frampton takes this discussion an important step further and speaks of the spiritual value of such a detail:

*There is a spiritual value residing in the particularities of a given joint, in the thingness of the constructed object, so much so that the generic joint becomes a point of ontological condensation rather than a mere connection. We need only to think of the work of Carlo Scarpa to touch on a contemporary manifestation of this architecture.*

Frampton suggests that the spiritual value of structure and the consequential form it produces comes from the ‘particularities’ of the joints and details. Carlo Scarpa’s work is used as an example to show how well-constructed components can result in a powerful and emotive architectural result. His suggestion of the spiritual value in the detail also brings to mind, the famous saying by Mies van der Rohe, “God is in the detail.”

Hence, although structure and form are concerned with the practical requirements of providing shelter, transporting loads and connecting parts, it is the thought and meaning that are infused into the solutions to such problems that allows an expressive formal language to develop. This language can be interpreted

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particularly well at joints and details and has the potential to add emotive and spiritual value to the building through its inherent architectonic beauty.

Figure 4  Indian Institute of Management, Louis I. Kahn

1.4.2 Form and Space

The second pair of architectural constituents proposed by Cold is ‘form and space’. The concept of space is a difficult topic to define, as there are no concrete answers as to whether space is an entity in its own right, a relationship between entities or rather part of a conceptual framework. Intriguingly, Cold pairs space with both form and light, encouraging the notion of a relationship between these entities.

Tschumi makes an interesting proposition on the concept of form and space. He proposes two systems for understanding the concept of space in architecture and describes these as the ‘labyrinth’ and the ‘pyramid’. According to Tschumi, the pyramid stands for “those trends which consider architecture a thing of the mind, as a dematerialised or conceptual discipline, with its linguistic or morphological variations”. The pyramid is “empirical research that concentrates on the senses, on the experience of space as well as on the relationship between space and praxis”. The pyramid is therefore concerned with the concept of space whilst the labyrinth is concerned with the experience of space. The pyramid is about language and the mind, while the labyrinth is about perception and the body. Tschumi points out the restrictions of the labyrinth, reminding us that within the labyrinth:

One can participate in and share the fundamentals of the labyrinth, but one’s perception is only part of the labyrinth as it manifests itself. One can never see it in totality, nor can one express it. One is condemned to it and cannot go outside to see

30 Ibid.
the whole... the nature of the labyrinth is such that it entertains dreams which include the dream of the pyramid.\textsuperscript{31}

In the labyrinth, senses and feelings are enhanced and the moment of perception is the fundamental sensory experience. However, the space is not experienced in absolute terms, the experience is only a result of sensory data that is being perceived at each individual moment in time. Tschumi points out that whilst standing within a cube we may see “a corner, or a side, or the ceiling, but never all defining surfaces at the same time”.\textsuperscript{32} Hence, through the body in space, we experience form, but only parts of a whole can be experienced. Tschumi sheds further light on the concept of space in his statement:

\textit{Space is real, for it seems to affect my sense long before my reason. The materiality of my body both coincides with and struggles with the materiality of the space. My body carries in itself spatial properties and spatial determination: up, down, right, left, symmetry, dissymmetry. It hears as much as it sees. Unfolding against the projections of reason, against the absolute truth, against the pyramid, here is the sensory space, the labyrinth, the hole.}\textsuperscript{33}

\begin{footnotesize}
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\item Ibid., 28.
\item Ibid., 22.
\item Ibid., 21.
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Tschumi’s ideas on space and form are of relevance to understanding human perception and hence are surely of importance to the formation of a spiritual architecture. It is somewhat difficult to make a judgement as to whether such an architecture should be that of the pyramid or the labyrinth. However it can be pointed out that many of the spiritual precedents that have relevance to this project, such as Ando’s Chichu Art Museum, Scarpa’s Brion Cemetery and Zumthor’s Thermal Baths all seem to portray

characteristics that bear a resemblance to ‘the labyrinth’. Ultimately, what can be gained from Tschumi’s proposal is the understanding of the limitations of both approaches. Within the labyrinth, the absoluteness of the pyramid cannot be experienced but when experiencing the pyramid the intimateness of the labyrinth is absent.

1.4.3 Space and Light

The third pair of architectural constituents proposed by Cold is ‘space and light’. Throughout history, light has played a primary role as the mechanism for the design of powerful and emotive spaces. Steven Holl mentions that it is unsurprising that some architects have “written that the entire intention of their work revolves around light”. In the ancient cathedrals, churches and civic buildings, light was commonly used to draw the eye upwards connecting the observer to the sun, moon and stars. Light was traditionally used to represent the gods, the heavens and the metaphysical. In architecture today, signs of the human fascination with light are still visible; however, the metaphorical implications produced by such spaces have changed. Henry Plumer discusses how light is no longer used to represent “static and unchanging absolutes” but rather “a more liberating reality in which the only thing believed permanent is change – a reality ideally conveyed by a medium that is the essence of change”. Light grounds humanity by reminding us of the forces in this world greater than us and by representing space, time and the inseparable nature of light and time. Plumer remarks on the relationship between time, space and light:

35 Holl, Pallasmaa and Perez-Gomez, Questions of Perception, 63.
36 Plumer, The Architecture of Natural Light, 11.
Fluent energy and visible motion also provide a means to express the widespread belief, perhaps defining our age, that space can no longer be understood apart from time, and that reality includes a fourth dimension, a temporal one in which light and time are one and the same.\textsuperscript{37}

In the 21\textsuperscript{st} century, the spiritual nature of light, for many, comes from delight at the transient beauty of light and shadow in space. Movement indicates life and hence, space is brought to life as time passes and seasons change. The concept of ‘investing time in order to experience time’ is another engaging trend of contemporary architects. Steven Holl, Tadao Ando and James Turrell are just a few examples of the architects who frequently use light as a material or medium in their work and have designed spaces with rays of light that move and ‘mutate’ as time passes, reminding the observer of the past, present and likely future. Peter Zumthor expresses his fascination and gratitude for light and acknowledges its spiritual quality:

*Daylight, the light on things, is so moving to me that I feel it almost as a spiritual quality. When the sun comes up in the morning – which I always find so marvellous, absolutely fantastic the way it comes back every morning – and casts its light on things, it doesn’t feel as if it quite belongs in the world. I don’t understand light. It gives me the* 

\textsuperscript{37} Ibid., 19.
feeling that there’s something beyond me, something beyond all understanding. And I am very glad, very grateful there is such a thing.\textsuperscript{38}

Figure 6  Guerrero House, Alberto Campo Baeza\textsuperscript{39}

Zumthor makes the connection between the mysteries of daylight and the spiritual. Tadao Ando, who often refers to his architecture as spiritual, is renowned for his clever use of light. His work tends to use light sparingly in a careful and appreciative manner and he often talks of the special qualities of spaces designed below the earth’s surface. He states, “Beneath the earth’s surface, light is reduced, the sense of depth increases, and darkness is born. I have long imagined space as something into which one descends, until light is gradually reduced and one is wrapped in the atmosphere of cool tranquillity.”\textsuperscript{40} James Turrell who worked with Ando on the Chichu Art Museum bases his work on the spiritual qualities of light. He

\textsuperscript{39} Plumer, The Architecture of Natural Light, 42.
\textsuperscript{40} Philip Jodidio, Tadao Ando at Naoshima (New York: Rizzoli, 2006) 8.
states, “We have a spiritual relation to light...there is also the quality of light seen in a dream, this is the light that is not seen with the eyes.”41

Figure 7  Light Well, Salk Institute for Biological Studies, Louis I. Kahn42

41 Ibid., 22.
Light allows us vision, but architecturally light can do many things and has been acknowledged for its spiritual qualities by various prominent architects. It can create movement in space, bringing architecture to life. It can illuminate and materialise, bringing out the intrinsic qualities of surfaces. It can be reflected, refracted and absorbed by different materials as well as revealing transparency levels in a surface. It can manipulate the atmosphere of space, changing moods and experiential qualities. It can highlight and hide different architectural elements and be used as a tool to direct visitors through a space. It can remind us of the negligible part we play in the greater scheme of things, of the passing of time and of the past, the present and make us ponder the future. Each of these different qualities in turn can be used to achieve powerful architectural experiences and assist in the achievement of a spiritual architecture.

1.4.4 Colours and Materials
The last pair of architectural constituents proposed by Cold is ‘colours and materials’. Materials and their colours play an important part in defining the ways in which we perceive space. Although materials are experienced visually, the supporting power of the tactile, aural and olfactory qualities must not be underestimated. The way a space feels in terms of both the hardness and texture of the material, the degree to which sound moves and reflects off its surface, and the smell and taste of the air surrounding it, also make a strong contribution to the sensory qualities of a space.

Zumthor, who is highly regarded for his honest use of materials, speaks of his belief in expressing the inherent qualities of a material in conjunction with its architectural context, “We must constantly ask ourselves what the use of a particular material could mean in a specific architectural context. Good
answers to these questions can reveal both the way in which the material is generally used and its own inherent sensuous qualities.”

The exhibition of a material’s inherent qualities or the ‘honest’ use of materials is a design philosophy that was prominent in the Modern Movement. It was based on the idea that materials should be celebrated for what they are, rather than disguised as something they are not. Perhaps one of the most renowned modernist architects who is remembered for his authentic use of materials is Frank Lloyd Wright. Anne-Catrin Schultz comments, “Wright develops the ideal that every material must be used in accordance with its nature on the basis of a characteristic grammar that honours the material and its own striving for form. Characteristics such as grain, structure and colour determine design and use.”

Figure 8  Tindaya Mountain Project, Eduardo Chillida Juantegui

45 Francisco Asenio Cerver, *International Landscape Architecture* (Spain: Ganduxer, 1997), 84.
Pallasmaa also refers to the importance of tectonics and the honest use of materials in his writing. On the topic of materiality, he points out the strong sensory qualities that are possessed by natural materials. He states, “Natural materials – stone, brick and wood – allow our vision to penetrate their surfaces and they enable us to become convinced of the veracity of matter. Natural materials express their age and history, as well as the story of their origins and their history of human use.”

Holl, who has closely linked views to Pallasmaa, communicates his disappointment in modern materials such as “sheets of glass, enamelled metal and synthetic materials” that fail to convey their “material essence or age”. He does not condemn such materials altogether but encourages treatments such as “sand-blasting, bending and acid oxidation” to increase the surface colour and texture. Such statements show Holl’s desire for materials that have substance, texture and depth and his appreciation of materials that portray their age and gain character as time passes and they become weathered by the elements.

The Dutch artist, Theo van Doesburg, suggested that the inner energy of a material is heightened by its proper use, “When reinforced concrete was first used correctly...the tension, the energy of the concrete came into its own in such a way that architecture was unintentionally, without aesthetic ulterior motives, enriched by a new kind of beauty.” Holl takes the concept of intrinsic energy one step further by suggesting the power created between two contrasting materials, using the allegory ‘feather and stone’ as an example, “A phenomenal architecture calls for both the stone and the feather. Sensed mass and

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48 Schultz, *Carlo Scarpa Layers*, 68.
perceived gravity directly affect our perceptions of architecture."49 In reference to Sigurd Lewerentz’s St. Mark’s Church outside of Stockholm he states, “A duality exists in the bricks’ weight pressing in on the dim light. The power and soul of this place would be erased if the space was built in lightweight metal construction.”50 Holl emphasises his belief in the power of the expression of the contrasting elements of ‘mass and gravity’ and the influential effect of this type of tectonic language.

It is possible to conclude that the views on authentic material use that became prominent in the Modern Movement are still regarded highly by many architects today. Zumthor encourages the expression of the inherent sensuous qualities of materials in their rightful context. Pallasmaa believes in the beauty of natural materials because they reveal their age and history. Van Doesburg emphasises the inner energy of materials that can be heightened by their proper use. Holl expresses his desire for substance, texture and depth and makes an interesting proposition on the concept of the ‘stone and feather’ a metaphor for materials whose own qualities can be made greater through contrast. Thus, through authentic material expression, the inner beauty of the material and its true colour is brought to life and the overall effect can contribute to beauty and the spiritual nature of the architecture.

1.4.5 Review of Constituents
In terms of ‘structure and form’, it was revealed that the thought and meaning behind structural systems and the careful detailing of joints and connections can create architectonic beauty and a spiritual value.

49 Holl, Intertwining, 14.
50 Ibid.
Research into ‘form and space’ revealed the two approaches of the ‘labyrinth’ and the ‘pyramid’ and the limitations of both approaches. Within the labyrinth, the absoluteness of the pyramid cannot be experienced but when experiencing the pyramid, the intimacy of the labyrinth is absent. With regards to ‘space and light’, it became apparent that the modern day spiritual fascination for many, comes from delight at the transient beauty of light and shadow in space. Light grounds humanity by reminding us of the forces in this world greater than us and by representing space, time and the inseparable nature of light and time. In terms of ‘colours and materials’, substance, texture and depth were important as well as the expression of character and age. The power and energy that comes from architecture made of contrasting materials was also an important revelation.

1.5 The Phenomenology of the Brion Cemetery
To look more deeply into the concept of the spiritual in architecture, a critique on a work that encompasses beauty, emotion and spiritual qualities was carried out. The chosen work is the Brion Cemetery, which is located in the town of San Vito d’Altivole, Italy. The critique is based on a visit to the cemetery that took place in July 2009. Carlo Scarpa completed the project in 1978, and it is described by George Ranalli as “the triumphant masterwork of Scarpa’s final years, raising his material, formal, and symbolic inquiry to a poetic level unparalleled in its time”. The cemetery also includes well-executed examples of Cold’s spiritual constituents: structure and form, form and space, space and light and colours and materials.

The project comprises a meditation pavilion, chapel, tomb for the Brions, a space to hold the family headstones and various intricately designed pathways, pools and connecting architectural elements. Scarpa accredits Japan as a key source of inspiration for the project, speaking of the “Animist and Buddhist traditions and the different poetic values of the two.”\(^\text{52}\) He also mentions his admiration above all for Japanese “supreme good taste” and states, “the intentional treatments of materials, the deliberate use of the effects of light and shadow, the poeticising of symbolic function of spaces and elements are commonalities that have to do primarily with an attitude of mind”.\(^\text{53}\)

\(^\text{52}\) Guido Guidi “Thinking with the Eyes” in Carlo Scarpa Architect: Intervening with History ed. Nicholas Olsberg (Montreal: Canadian Centre For Architecture, 1999), 211.
\(^\text{53}\) Schultz, Carlo Scarpa Layers, 54.
\(^\text{54}\) Schultz, Carlo Scarpa Layers, 61.
When walking through the adjoining spaces in the complex, the emotive qualities of Scarpa’s architecture are extremely powerful. The level of detailing with regards to structure and form is breathtaking. Scarpa celebrates joints, openings and changes in level through meaningful artistic expression. Even underneath the water in the reflection pond, surface detailing is as prominent as ever.

In terms of form and space—Cold’s second pair of constituents, the cemetery appears to be designed for ‘the body in space’. Passageways and open areas enable the cycle of the ‘existing view’ and the ‘emerging view’ to interplay through the motion of the body. Despite the large amount of open lawn space, the enclosing forms seem to dictate the journey through the cemetery.

Cold’s third constituent ‘space and light’ certainly plays a fundamental role in forming the architectural language that characterises the cemetery. The remarkable integration of the elements of light, shadow and space are directly perceivable. Intriguingly, most of the lines and pathways on the site run directly along the axes of north-south and east-west. The only elements that diverge from this pattern are the tombs and the chapel, which both sit on a forty-five degree angle to the prevailing axial arrangement. Although Scarpa’s astute knowledge of light and its qualities are evident throughout the complex, the chapel stands out as a captivating example of the poetic use of light and space. Light manages to enter the chapel on each of its faces, highlighting different internal elements and angles throughout the day and year. Light also enters through a pyramidal volume on the top of the chapel adding to the atmospheric discrepancies. Saito comments, “At sunset in May, rays cast a wide ‘pat of light’ across the floor, transforming the chapel
into a surrealistic place suggesting that one might be spirited off to another dimension should one venture to wonder where it leads."\textsuperscript{55} Scarpa plays with, and controls the light throughout the complex, creating movement and captivating contrasts between light and shadow. His use of natural light and its unpredictable movement through the space symbolises life and time and encourages thought, contemplation and meditation.

With reference to colours and materials, the cemetery is now just over thirty years old, and its beauty appears only to be strengthened by the weathering external concrete walls. Vines and moss cover different surfaces, daisies grow in the lawn, water lilies fill the pond, and the sense of place is undeniable. Other than the glass tiles that are featured throughout the cemetery, colour seems to be drawn from the intrinsic nature of the materials, such as weathered grey timber, bronze detailing and moss covered concrete.

The Brion family had wanted “an architectural design that would touch a responsive chord in people’s hearts, inspiring poetry”.\textsuperscript{56} This appears to be exactly what Scarpa has delivered.

\textsuperscript{56} Saito, \textit{Carlo Scarpa}, 16.
Figure 10  Visit to Brion Cemetery, July 2009
2.0  Project Development

2.1  Design Issues and Programme
As a way to test the idea of the ‘spiritual’ in architecture and create an architecture that can appropriately encompass research findings on the phenomenology of perception and Cold’s constituents, the programme for this architectural investigation is a Zen Centre. Zen is a school of Buddhism that originates from the East and in modern times has become an increasingly popular life choice for Westerners. Zen was chosen as the context in which to explore spirituality in architecture due to its unregimented nature and the general positive and accepting culture of its followers. It is a belief system that rests unchallenged by modern society, as it is not dogmatic, hierarchical or bureaucratic. The challenge will be for the architecture to evoke a heightened sense spirituality and awareness in its visitors and deliver a physical setting where meditation and other activities that unite the body and mind can be conveyed and practised.

The Auckland Zen Centre encourages “individual, daily practise” describing it as the “keystone to contemporary Western Zen”.\(^{57}\) They are referring to the meditative practice called zazen:

> “Besides bringing us to a more profound understanding of life and death, daily zazen brings greater focus, sharpening our attention and clarifying our sensory experience. All experience and activity is enhanced through greater concentration, as athletes and

\(^{57}\) Auckland Zen Centre, What is Zen? (Auckland: Auckland Zen Centre) 2.
performing artists know. With zazen we discover the power of a concentrated mind, becoming more present in the here and now.\textsuperscript{58}

Hence, the resultant architecture will essentially be about a place to encourage both individual and collective zazen practice. It will be located in the inner city suburb of Eden Terrace. The aim will be to create a type of urban sanctuary or retreat, allowing visitors to escape from stressful city life in exchange for calmness and tranquillity. The centre will allow for spaces of solitude, stillness and reflection as well as spaces for more physical, social and interactive activities. In addition to extensive meditation facilities, the centre will also include a small theatre, gallery spaces, exercise spaces, library and dining space. The centre’s architectural language should act to encourage wellbeing and the connection between body and mind.

It must be acknowledged that this project raises questions of whether architecture actually matters in Zen. Perhaps Zen is simply about training the mind, in which case the physical setting might not matter? The answer to this is not clear-cut and it is likely that different members of the Zen community may have different outlooks on the issue. Despite this, it is definitely possible to take the affirmative view on this issue and argue that architecture is indeed important. The emphasis on physical well-being that is enforced through activities such as yoga, meditation and martial arts, where posture, breathing and balance are the focus, surely means that the physical setting is important and hence the architectural environment does matter.

\textsuperscript{58} Ibid.
2.2 **Users**

Although there are of course exceptions, research and statistics show people who practise Zen in the West often have many of the following characteristics. First of all they tend to liberal, left-wing and open minded members of society. They will often have strong humanitarian values and will usually be environmentally conscious. Statistically, they also tend to be an exceptionally highly educated group of people. Zen appears
to attract people with artistic temperaments such as painters, musicians and writers as well as athletes and people who are simply looking for relief from the stress of their hectic lives.

2.3 Site
The site of choice for the centre is located on the southern edge of Basque Park, in Eden Terrace. A central Auckland location was important to ensure a suitable proximity between the centre and the workplaces and homes of the liberal community that would be likely to use it. At present, there is a partially built, abandoned, concrete skeleton on the site. The bunker-like ruin is a fairly large, two storey building with an intriguing unfinished desolation. It has been built using concrete column and beam construction. The decision was made almost straightaway to preserve the ruin and include it as part of the future building.

The site slopes downhill out towards the North and the city skyline is visible in distance. The park is important to the programme because it will act as a generator of natural sounds such as water, birds and nature, despite the site’s urban setting.
Figure 12  Rendall Place, Eden Terrace, Auckland

Figure 13  Wider Context of Site
3.0 Methodology and Design Process

3.1 Bliss and Flow
Cold’s four constituents are of relevance and importance in understanding how architectural spaces can ‘support our experiences and conceptions of the spiritual’. However, what Cold does not address in her writing is the design methodology for producing such architecture that will allow these four constituents to successfully ‘interact’ and bring ‘spirituality and beauty to life’. The interrelated concepts of ‘bliss’ and ‘flow’ may perhaps offer insight into a suitable method for designing spaces that demonstrate the intangible qualities of ‘spirituality’ and ‘beauty’.

The concept of ‘bliss’ comes from the American mythologist, Joseph Campbell:

If you follow your bliss, you put yourself on a kind of track that has been there all the while, waiting for you, and the life that you ought to be living is the one you are living. Wherever you are—if you are following your bliss, you are enjoying that refreshment, that life within you, all the time. 59

The concept of ‘flow’ is a seminal theory by psychology professor, Mihaly Csikszentmihalyi:

The idea of flow is identical to the feeling of being in the zone or in the groove. The flow state is an optimal state of intrinsic motivation, where the person is fully immersed in what he or she is doing. This is a feeling everyone has at times, characterised by a feeling of great absorption, engagement, fulfilment, and skill.60

To fill in the gaps in Cold’s formula for a spiritual architecture, the fundamental principles of ‘bliss’ and ‘flow’ can be applied as a type of design methodology. The unregimented, creative and Zen-like approach implied by the two interrelated theories appears as a suitable way to approach the complex design task. So in an attempt to explore the possibilities of a spiritual architecture that successfully utilises the four constituents, a technique of ‘bliss’ and ‘flow’ will be employed.

3.2 Desire Lines, Axes and Intersecting Planes

The concrete structure on the site meant that the project had a strong three-dimensional grounding from the beginning. Instead of starting with a blank page, a language was already existent. The character of the ruin and its open, axial nature acted as the ‘concept’ or starting point for the project.

Sketching and modelling took place to explore the relationship between the ruin and its wider context. A language of axes and planes that intersected and rotated began to form, which was derived from the mixture of angular and orthogonal lines present in the ruin. Initial design work moved between modelling and sketching until a solid proposal began to form. Throughout this process, ideas and findings from
literature and precedents, as well as knowledge gained on the constituents, (structure, form, space, light, colours and materials) were infused into the scheme.

Once the ruin had been measured up, early sketch design could take place over the top of the drawings (see Figure 16). Modelling over the top of sketches, allowed conceptual ideas to be moved into three-dimensions (see Figure 17). Hand modelling and sketching was the predominant design methodology. Pallasmaa acknowledges the importance of the ‘thinking hand’ for art and creative work. He notes the
benefits of using the hands for drawing, sculpturing and design work, especially in the early stages of the design process. He encourages the acknowledgement of “sensory thinking and embodied intuition as counterparts and complementaries of conceptual thought, as a means of understanding the multi-dimensional and layered essence of art and creativity”. In conjunction with Pallasmaa’s views on the ‘thinking hand’, early design work was produced entirely through a method of free-hand sketching, conceptual modelling and sculpturing (See Figure 18).

61 Pallasmaa, Encounters, 138.
Figure 17  Axes Model
Figure 18  Hand Model, Scale 1:500
Figure 19  Entranceway Sketch
Perspective sketch design took place exploring the qualities of the spaces within the centre. Conceptual ideas for the entranceway as a journey were expressed, featuring a glowing sandblasted wall mirroring an in situ concrete wall. An emphasis on the ‘labyrinth’ as the spatial system began to develop that relates to the experience of space, perception and the body (see Figure 19).

Figure 20  Conceptual Ideas for Meditation Hall
4.0   **Design Outcome: A Sensory Journey**

To convey the resultant scheme, a narrative or journey will be used as a method of describing the atmospheres of the series of spaces, as they could be perceived by a visitor to the centre. Many of such spaces will be linked to spiritual precedents that were used as a source of inspiration to the design. Each of the spaces within the journey will also be related back to the constituents of architecture: structure, form, space, light, colours and materials.

4.1   **The Entrance Journey**

The entrance journey is important as the space acts to create a transition from the chaotic outside world into the tranquil core of the centre. Visitors enter into a narrow concrete and sand blasted glass passageway and ascend upwards through a central axis line on the site. The journey draws the visitor underground, through the lower level of the existing concrete structure and feeds them into the upper level of the structure.

Throughout this journey, space, light and materials are emphasised. Firstly, the visitor passes a glowing sandblasted glass wall that illuminates the passageway and brings out the grain, texture and roughness of the in situ concrete wall that mirrors it. The visitor then moves into a darker space as they continue to move upwards towards the daylight visible ahead. This progression from light to dark to light is intended to encourage a feeling of departure from the world outside, and give the visitor time to clear their mind and leave stress and inhibitions behind them.
The entry was influenced by Tadao Ando’s architecture, which often makes the act of approaching and entering a space into a complex and meaningful journey. It also draws inspiration from Ando’s meticulous use of light (see Figure 5). His work tends to use light sparingly in a careful and appreciative manner and he often talks of the special qualities of spaces designed below the earth’s surface. In reference to the Chichu Art Museum, he stated:

_Beneath the earth’s surface, light is reduced, the sense of depth increases, and darkness is born. I have long imagined space as something into which one descends, until light is gradually reduced and one is wrapped in the atmosphere of cool tranquillity._62

The other element of architectural significance in the entrance journey is the stair and the notion of ascending. Pallasmaa describes the ‘stair’ as the “element of architecture that is encountered most concretely and directly by the body”.63 He also comments on the “cosmological ideas and spiritual aspirations” that the stair has represented throughout history.64 Hence, the journey upwards is not only intended to begin to invigorate the senses of the visitor, it is also intended to symbolise the ascent away from the realities of our life-world, creating expectations and promise of calm and tranquillity.

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62 Jodidio, _Tadao Ando at Naoshima_, 8.
63 Palasmaa, _Encounters_, 63.
64 Ibid., 65.
4.2  Gallery
The function of the gallery space is to act as foyer and open area where exhibitions and small gatherings can take place. It is also intended as a possible meeting point within the centre where groups can assemble before a workshop or sitting. The space is located within the upper level of the existing ruin and the visitor is exposed internally to the concrete skeleton structure. No attempt will be made to hide or conceal the age and history behind the structure, with the intent to authentically express the texture and depth that it has obtained through its exposure to the elements.

The sandblasted glass face that encloses the eastern side of the gallery can be swung open, exposing the space to the East and creating a sheltered outdoor space that can be used for outdoor activities including outdoor meditation.

4.3  Light Well
The light well acts as a source of natural light to the internal and underground spaces within the structure. The high roof and vastness of the space is intended to encourage the visitor to contemplate the bigger picture and the forces on this earth that are beyond humanity’s control. The negligible human scale in relation to the height of the space is intended to remind the visitor of their ultimate insignificance in the greater scheme of things. In particular, the space is designed to discourage self-centeredness and eliminate the ego by reminding the visitor of the forces of light, shadow and time that are beyond our control in this world.
The Church in Foligno, Italy, designed by Fuksas Architects was a source of inspiration contributing to the ideas behind this space (see Figure 21). Like the church by Fuksas, the light well is glazed on the top to allow daylight to flow down through it. It transports light down to the ground level and illuminates the sandblasted glass wall, which visitors initially walk past during their entrance journey.
4.4  Body and Mind Studios

Beneath the filtered light that enters from the light well above, is a space available for workshops and classes that focus on enhancing the connection between the body and mind. Mental and physical wellbeing will be sought and breathing, posture, balance, flexibility and fitness will be emphasised through the range of activities available.

4.5  Meditation Hall

The meditation hall is located adjacent to the main foyer space. To enter into the hall the visitor ascends a suspended stair which is cantilevered out from the sidewall. The cantilever is a reference to the weightlessness felt during meditation. The visitor then passes through an angular space created by a sandblasted glass wall which directs and rotates them back around into the meditation hall (see Figure 22).

The tectonic language of the meditation hall is about sensed mass and perceived gravity, which is created through the two contrasting materials of concrete and sandblasted glass. Steven Holl states, “A phenomenal architecture calls for both the stone and the feather. Sensed mass and perceived gravity directly affect our perceptions of architecture.”65 The contrast created through the weight of the concrete and the ‘feather-like’ qualities of the translucent, lightweight glass, creates harmony and strengthens the intrinsic qualities and power of each material independently. According to Holl:

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65 Holl, Intertwining, 14.
Architecture’s expression of mass and materials according to gravity, weight, bearing, tension, torsion and buckling—like the orchestration of musical instruments—is made more dynamic by the contrast of heavy (bass, drums, tuba) and light (flute, violin, clarinet)...music’s materiality is resonantly conveyed via the instruments to aural temporal experience.66

Holl encourages the use of contrasting materials to create dynamic and vibrant spaces and uses the metaphor of an orchestra to prove his point that harmony is created through contrast.

Other than the wholesome expression of materials, the meditation space is reduced to its necessary elements. It is simple and unpretentious, yet possesses spiritual qualities that are achieved through powerful yet honest expression of materials. The space demonstrates the beauty that can be found in simplicity and intends to create an atmosphere where material values like wealth and status no longer feel relevant or important.

4.6 Conference and Theatre Space
The theatre is a place that can accommodate large audiences. Stepped seating allows a functional space where high quality presentations and discussions can take place. The theatre will allow Zen philosophy and theory to be conveyed and explained to groups of people. The theatre could also be used for community meetings, conferences, theatre groups and other educational purposes.

66 Ibid.
4.7 Enlightenment Space

At the northern end of the building is a space that is located at the highest point reachable from within the centre. It sits cantilevered out from the sloping site, symbolising weightlessness, and the ability for mass to overcome the forces of gravity. The visitor passes underneath this space during their initial entry into the centre and glimpses its promise and attraction from below. From this space, the view out across the park
towards Auckland’s CBD is revealed to the visitor. This space is the enlightenment space and symbolises acceptance and peace with the world and oneself. It is a place where visitors can meet over refreshments after their sitting and reconnect to the city they live in with fresh enlightened eyes.

Figure 23  Cantilevered Enlightenment Space
With regards to the Chichu Art Museum, Turrell points out that “each visitor is left with his own thoughts, but few can come away unmoved”\(^{67}\). Like the Chichu Art Museum the centre also intends to make it difficult for its visitors to come away unmoved, in an effort to depart from the normalised and emotionless architecture that characterised much of the 21\(^{st}\) century. Through the carefully researched implementation of Cold’s architectural constituents, (structure, form, space, light, colours and materials), the spaces within the centre are designed to invigorate the senses of the visitor in an effort to sensualise, poetise and ultimately spiritualise the spaces within the centre.

5.0 Conclusion

To recapitulate, Juhani Pallasma expressed a critical view on contemporary architecture when he pointed out the lack of spiritual and emotionally rich architecture that seems to characterise postmodern times. He was forthright in pointing out that the “progress of modern architecture has normalised human emotions, and consequently is unable to reflect emotional extremes such as ecstasy and melancholy”\(^{68}\). In an attempt to move away from the detached and emotionless type of architecture that Pallasma describes, the focus of this project became an understanding of the qualities involved in a spiritual architecture and the ways in which such an architecture might be designed. Hence the research question was formed:

*How can architectural spaces support our experiences and conceptions of the spiritual?*

\(^{67}\) Jodidio, *Tadao Ando at Naoshima*, 36.  
\(^{68}\) Pallasmaa, *Encounters*, 70.
The question entailed two main areas of research. The concept of experience and conception, and also the idea of a ‘spiritual architecture’.

In terms of the phenomenology of perception, the idea of the ‘body in space’ became the fundamental idea or strategy for which the spaces were designed. The senses also became important considerations, as the design had to fully engage its visitors through a sensory experience that involved much more than just the visual sense. As Steven Holl reminds us, “A real architectural experience is not simply a series of retinal images; a building is encountered – it is approached, confronted, encountered, related to one’s body, moved about, utilised as a condition for other things, etc.”

Although it was at first difficult to define exactly what constitutes a spiritual architecture, it became possible to draw meanings from internationally respected architects whose work demonstrates such qualities. Ando mentioned a “spatiality that stimulates the human spirit, awakens the sensitivity and communicates with the deeper soul”. Whilst Pallasmaa captured the essence of a spiritual experience in his statement, “An impressive architectural experience sensitises our whole physical and mental receptivity. It is difficult to grasp the structure of the feeling because of its vastness and diversity.” Ultimately, it became possible to argue that spirituality can be found in architecture and although perhaps hard to label in concrete terms, it may be an architecture that evokes our inner emotions, appeals to our senses, can potentially alter our mood or can affect us psychologically or emotionally.

69 Holl, Pallasmaa and Perez-Gomez, Questions of Perception, 35.
71 Pallasmaa, Theorizing a New Agenda for Architecture, ed. Kate Nesbitt, 453.
The question remained as to what qualities a space must encompass in order to induce such a response from its visitors. Birgit Cold proposed four architectural constituents that could be utilised to create a spiritual architecture:

*Spirituality as well as beauty is created or comes to life when the constituents of architecture - structure and form, form and space, space and light, colours and materials - interact as a piece of art, communicating with the intellect, the emotions, the spirit and the senses.*

By exploration of the constituents through literature, precedents and a visit to and critique of Scarpa’s Brion Cemetery, knowledge and design ideas were gained as to ways in which the constituents could be integrated into the project to contribute to a spiritual architecture. Within the final scheme, the spaces each portray different ideas and findings on structure, form, space, light, colours and materials. The idea of the ‘body in space’ as well as Zen philosophy also influenced architectural decisions. The spaces are designed to invigorate the senses of the visitor, and the final scheme has elements to appeal to each of the seven senses, (hearing, taste, touch, smell, sight, muscle and bone). Each of these design moves are devices that have been strategically used to produce architectural spaces that could support a visitor’s ‘experiences and conceptions of the spiritual.’

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There are of course limitations and it must be pointed out that architecture can only support—not produce—experiences such as this. Experience is subjective and perhaps, like in Zen Buddhism, a degree of ‘openness’ is required for a visitor to be able to gain the full rewards from the architecture.

Ultimately, this project revealed three approaches to producing ‘architectural spaces that can support our experiences and conceptions of the spiritual’. Firstly, through the strategic and knowledgeable use of the tools of structure, form, space, light, colours and materials. Secondly, through a phenomenological approach that emphasises ‘the body in space’ and the encounter between the body and the world of things. This involves spaces that acknowledge and appeal to all the senses and that ensure the visitor is by no means a spectator but an intrigued and expectant participator within the sequence of spaces. Thirdly, through creative immersion in the design process and the technique of ‘sensory thinking’ that comes from the use of the hands in early design work.

To conclude, the spaces within the centre exhibit these three approaches and thus act as an example as to how ‘architectural spaces can support our experiences and conceptions of the spiritual’.

6.0 Critical Appraisal

It might be that ultimately society does not need enchanting and spiritual architecture. Like poetry, music and art, it exists as a construct that is in a sense unnecessary, but can enrich our lives if we let it.
Spiritual experience is subjective and people’s perceptions and interpretations will vary, meaning that the findings in this thesis cannot be considered as the definitive answers, or as the only answers to the research question. Nevertheless, Juhani Pallasmaa and many others have clearly stated the problem with postmodern architecture - the lack of spiritual and emotional richness - and this thesis has done its best to address this important issue. How can we measure the project as successful in producing spiritual and emotionally rich architecture? As architects, we have learned to experience spaces through the language of architecture, which exists in plans, sections, models and many other forms, but there are perhaps some limitations to this. Although the design ideas in this project have been carefully conveyed through extensive creative energy with the methods available, perhaps the only way to truly test the emotional and psychological effect of the design would be to actually build it. But this further delays the question of how to measure the emotional effect. Perhaps you either feel it or you do not and perhaps the success or failure of such an architecture can only reside in the consciousness of those who have visited it or experienced the representations of it. Despite this, the ideas that shape the project remain as a contribution to architectural discourse and as a proposal to future students of architecture.
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ENLIGHTENMENT SPACE
7.0 Bibliography

Books:


Journal Articles:


Websites:

8.0 Declaration

Name of candidate: Nina Horvath

This thesis entitled ‘Architecture & Enlightenment: An Exploration of the Experiential Possibilities of the Constituents of Architecture’ is submitted in partial fulfilment for the requirements for the Unitec degree of Master of Architecture (Professional).

I confirm that:
- This Research Project represents my own work;
- Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

Candidate Signature: ____________________________

Date: __________________

Student number: 12345678