ASSESSING MULTI-SENSORY DESIGN AND ITS IMPACT ON FORM AND MATERIALS:

A Proposed Children's Centre and Knowledge Centre for Durban

By

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"As candidates supervisor I have/have not approved this thesis/dissertation for submission"

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ABSTRACT

Over the evolving years, sensory information has aided in the communication between living organism and environment. Significantly aiding in our perception of places, it has the ability to affect society in their involvement, interaction and learning circumstances. However environments created in today's society are tending away from multiple layers of experience, creating spectators rather than the participating individuals and devoid of interaction and experiences vital to the learning component of the organism. Schools, curriculums and classrooms have further adopted universal approaches, where the creative and unique child is outcast in any event when known to be different to the social 'norm'. This can then lead to the misdiagnosis of children with gifted learning abilities in other areas, to children with slight difficulties in learning and with children who genuinely suffer a mental disorder of significance. Nevertheless children; prone to learning challenges and adaption in growth, have proven to be creative beings whose multiple sense involvement aid in enriching their experiences and multiple ways of learning.

"Intelligence is diverse… we think visually, in sound, in kinetics, in abstract terms and in movement; it is dynamic… where creativity comes from interaction in different disciplinary ways of seeing things; and it is distinct… where every child has a unique talent or strength." (Robert; 2006)

Multi-sensory intervention is also the most significant treatment or therapy in children with learning disorders; whose statistics in South Africa are ever increasing. *Multi-sensory design*, a design sensitive yet powerful in its outcomes, is therefore the conscious design required to target all or most of the senses.

Ayres on her theory of Sensory Integration:
"Essentially, the theory holds that disordered sensory integration accounts for some aspects of learning disorders and that enhancing sensory integration will make academic learning easier for those children whose problem lies in that domain." (Ayres, 1972; pp.1)

This dissertation aims to create an understanding of children and schooling environments where circumstances have led to further difficulties. The purpose of this research is then to take this further, to explore how *multi-sensory design* can be investigated and utilised, through its

composition of form and materials, in order to elevate and educate children with learning difficulties within the schooling community of Durban. Three philosophical theories are identified within the research which is coherent in understanding the basis of the dissertation, such as; *'phenomenology'*, *'gestalt theory'* and *'existentialism'*. These theories will be investigated to generate core literature review, a key component to this document and will further inform relevant precedent and case studies which will be critically analysed. The key theory is identified as *'phenomenology'* in order to connect both the literature and architectural intervention, as understanding its pivotal role in experience and consciousness necessary to generate knowledge gain. The gathered information of this research document will seek to determine a comprehensive response and appropriate architectural intervention for the design of a Knowledge Centre for the children who live in South Africa and are ever increasing.

"The history of education for learners with 'special educational needs' and of educational support services in South Africa… reflects massive deprivation and lack of educational provision for the majority of people." (Du Plessis; 2001)

This centre will be located in Durban.

DECLARATION

I declare that this dissertation is my own, unaided work and carried out exclusively by me under the supervision of Mr J. Solis-Arias. It is being submitted for the degree of Master's in Architecture in the University of KwaZulu-Natal. It has not been submitted before for any degree or examination in any other University.

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DEDICATION

This thesis is dedicated to my brother, Gary Muir, for showing me that no matter how difficult the road to success is; it is always worth the journey travelled. Seeing the effort and hard work you have put in has inspired me to be who I am today and encouraged me to tackle this topic of choice. Thank you for all the love you have given me along the way.

I leave you with a saying:

"Genius is 1% talent and 99% hard work…"

Albert Einstein

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CHAPTER ONE:

INTRODUCTION

CHAPTER 1 – INTRODUCTION

1.1 INTRODUCTION

1.1.1 Background

This dissertation intends to analyse the provision of learning centres for knowledge as facilities that address the needs of children with learning disabilities in Durban, South Africa. As Wise (1997) explains due to surveyed information; many children undergoing disability testing and their families feel like they are not receiving enough information and support, with many professionals having a limited knowledge on learning disabilities and where the diagnosis process may take a number of years and be indefinite, affecting the services and benefits which children need.

Du Plessis adds an explanation to such difficulties and (2001) explains that due to apartheid many children from underprivileged races experienced poor education and facilities, and a few generations down the line their children are suffering the effects of disabilities and poverty. Revealing two types of educational difficulties, one intrinsic in nature explains deficits which affect the brain's function (neural) and requires highly specialised education for most of one's life, and the other of an extrinsic nature caused by socio-economic disadvantages to require institutions that support and help the child overcome these difficulties in schooling (Englebrecht, Kriegler and Booysen, cited in Du Plessis; 2001). The diagnosis between these two difficulties poses problems in the academic field with capable but underprivileged students requiring expensive special education far from home.

If this situation could not get any more difficult, Brody and Carol (1997) explain that within the field of neurological disorders; some of these students although showing major difficulty in academic or other areas, are in fact gifted and talented in similar or other areas. Misdiagnosis within this situation usually occurs where a student's gift masks the learning disability experienced and creates a student of average grade, seemingly coping in the school system. Brody and Carol (1997) further explain that this situation catches up to the student in subsequent years, when curriculum becomes more demanding and the child has gaps in his/her education, creating a misunderstood and under-served population of students who fail to achieve their potential.

Robison also believes in the great ability and gifts such students poses, however (2006) explains that the schools of today contain a 'universal approach' to curriculums and the design of classrooms, which only worsen the situation. Children who battle in literacy or numeracy (skills required in all areas of the curriculum) and those affected by the stressful situations in the built environment

(become disruptive, disrespectful and/or uninterested in class) are sent to special/remedial schools and excluded from mainstreaming. Jencks and Kropf (1997) explain that the visual image is projected onto our retina in order to create spectators rather than participants, creating architecture which has lost its multiple layers of experience and have become rather symbols of advertisement and instant persuasion, inconclusive with children and the learning environment.

1.1.2 Motivation

This research is inspired by a personal situation, growing up with a story close to the researcher's heart and the success of a sibling has sparked a need to understand how it is possible that a child with a lot of family support and intervention was possible to accomplish so much in such a short period of time. What is the built environment's role in this situation, questioning how spaces and facilities may have lent added support and intervention? Children are creative beings; they learn in multiple ways and benefit from approaches targeting individual pace of learning and enriching experiences to accelerate and ensure growth (Robison, 2006 & Brody and Carol, 1997). The built environment therefore consisting of form and materials plays a vital role in their development and sensory devices not only create this enriched environment but also affect the emotions and interaction of people in them. By creating an enriched environment a child's potential and ability can be discovered which will 'enable' them in a society which previously restricted, pushed away or forgot about them.

"It is one thing to delimit space by structural devices such as walls. It is quite another to infuse the space with a spirit which relates to the activities that take place in it and which stirs the senses and emotions of the people who use it." (Bacon 1976, cited in Jencks & Kropf; 1997)

1.2 DEFINITION OF THE PROBLEM, AIMS AND OBJECTIVES

1.2.1 Definition of the Problem

Although apartheid has been eradicated, new government policies with intent to achieve equality and education of the same standard for all, not much has been done in educational environments and facilities to help children and the affected communities outgrow the effects of the past period. Also present lie issues of educational systems in assessment; support and information and providing appropriate facilities for children with high sensory abilities has caused the society to fail in identifying unique talent offered by some of our highly gifted children. Both form and materials of the built environment of schools add up in the rejection of these unique children and create worse situations of 'fear' and feeling 'lost' (Jencks & Kropf, 1997). This can create panic or isolation where

they deal with the circumstances the only way they know how and could be detrimental to their learning process and development.

Both the assessment of children and the built environment of schools, should work dependently on each other, creating spaces in learning environments where the assessment of children can be regulated and useful whilst calming and meeting their needs. Architecture therefore has the ability through its creator's hands, to be more personal, to enrich the encounters we experience, ease stressful situations and educate and create awareness of such an intervention in one's community, so that the building adapts to become the therapist in assessment. This facility with clever thought may create a central point that affords support and information to this population and becomes one that the entire community gets involved in, utilises and further supports.

1.2.2 Aims

The aim of this research is to seek to make a meaningful contribution to the academic debate which will influence the architectural design of a children's knowledge centre sensitive to the needs of learners with disabilities. By identifying methods, approaches, forms and materials necessary in the built environment to effectively educate and correctly assess children in these predicaments. This will create an opportunity to harness the rare talent that children in Durban have to offer the world.

Focusing the research on the needs of children with learning disabilities will allow for a design that tackles the most severe problems and solutions which will also benefit children without these problems, attending mainstream schools. The active role of teachers and parents in a child's development necessitates their involvement in the research and importance of their inclusion in the architectural design.

1.2.3 Objectives

The main objective of this research is to assist members of society with disabilities in achieving their full potential regardless of the learning difficulties they may face in the early stages of their education. Furthermore this research will find architectural design solutions that will allow members with disabilities to be housed in physical and emotional conditions conducive to enhancing learning experiences.

To identify suitable architectural interventions that aid in learning and assessment, for early intervention.

To explore multi-sensory design and its ability to aid in the learning and assessment processes, in the aid to formulate design principles and techniques which create an environment best tailored for children with learning disorders.

To investigate approaches in eliminating stressful situations and environments to create beneficial stimulation for children.

1.3 SETTING OUT THE SCOPE

1.3.1 Delimitation of Research Problem

This research will focus on the perception and interaction of children within psychological, physiological and physical aspects, ranging between the ages of one and five years (pre-school ages) and five and eleven years of age (primary-school ages*).* These 'prime years' are where it is more likely to encounter a genuine problem in intrinsically disabled children. It also allows us to rectify problems, discover other ways of approaching education and give more attention to those with an extrinsic disability through the different approaches afforded by this research. Although more senses have been discovered due to technological advances, this study will focus on the main senses in which we explore the built environment, such as; vision, hearing, smell and touch.

This research will not in any way deal with socio-political and economic issues involving education systems. It will also not deal with the challenges faced and short comings of the educational systems in South Africa. Finally the research approach will result in the appropriate design tools needed for a knowledge centre for the education of children with disabilities, due to the approach within society and large numbers of children with different types of disabilities.

1.3.2 Definition of Terms

Some of the architectural, scientific and general terms that are commonly used in this research have been briefly explained bellow for the ease of reference.

Assessment – Data gathered through formal and informal measures, such as testing and observation of a person's behaviour or settings. (Centre for Mental Health in Schools; 2008)

Multi-sensory – Noting structures for conveying impulses that results or tends to result in sensation, as a nerve. 'Multi' suggesting the many ways people receive impulses through sight, hearing, taste, smell and touch.

Form – External appearance of a clearly defined area, as distinguished from colour or material.

Materials – Substance or substances of which a thing is made or composed.

Disability – Specific learning problems which affect the development of certain skills such as reading, writing, listening, speaking, reasoning and doing math.

Disorder – Official clinical diagnosis whereby individuals meet certain criteria, determined by psychologists.

Intrinsic – Belonging to a thing by its very nature; belonging to or lying within a given part.

Extrinsic – Being outside a thing, outward or external; operating or coming from without.

Giftedness – Defined as a high general intelligence, high aptitude in a specific area and interaction among high ability, task commitment and creativity. (Wise; 1997)

Knowledge – Has a dual meaning:
In relation to children – facts, information and skills acquired through experience or education.
In relation to community – to be familiar, aware or understanding of someone or something.

1.3.3 Stating the Assumptions

The following assumptions allow for research to continue in the relevant direction proposed.

- Assessment methods focus on the problems within children rather than what propel them to occur.

- Children, in general, learn more from interaction and the 'hands on approach' than normal teaching and learning approaches.

- Children are attracted and react to stimuli more by spaces that are appealing to them and interact more physically within these spaces than adults.

- Focusing on the needs of children with the most severe problems will appropriate a solution for all children.

1.3.4 Key Research Questions

This research will address a primary question and secondary questions which are pertinent to the search for possible solutions to the problem at hand.
Primary Question:

How can an architect's understanding and perception of the built environment, enhance the sensory experience, and should this be done in schools for children with learning disabilities?

Secondary questions include:

1. What aspects of multi-sensory design through physical and psychological interventions, aid in the learning and development process of children?

2. How does the built environment, in its composition of form and materials affect the way children with learning disabilities, understand, feel and interact within immediate surroundings?

3. Why is it important to elevate, educate and empower children with learning disabilities in their discovery and existence of themselves, by creating encounters they need, want and engage with?

1.3.5 Hypothesis

Through the intervention of multi-sensory architectural design, new approaches to assessment and learning facilities will produce a centre for children and knowledge to educate society and create a catalyst for the greater Durban area.

1.4 THEORIES AND CONCEPTS

1.4.1 Introduction

As a result of personal involvement, parents in the home environment first noticed small discrepancies in a child's development and/or behaviour, showed concern however little knowledge on the issue rendered it baseless. As this became clear, the second step of assessment was usually done by teachers in school environments where problems with development and behaviour were noticed and sometimes unsolvable or unbearable. In the third and final step, parents were expected by the school to take the child to a third mediator in the assessment process before continuing schooling, particularly an educational psychologist to assess the problem and determine a way forward. During this process as seen in **figure 1.1**, the constant change in environment during the assessment process is evident and this could be detrimental to the problem at hand. The concepts of multi-sensory, form and materials as well as a knowledge centre are proposed to create spaces which are dynamic to the learning experience, conform to how children best perceive and interact with their surroundings as well as create a constant environment ultimately aiding in the learning process rather than rejecting any child with difficulties.

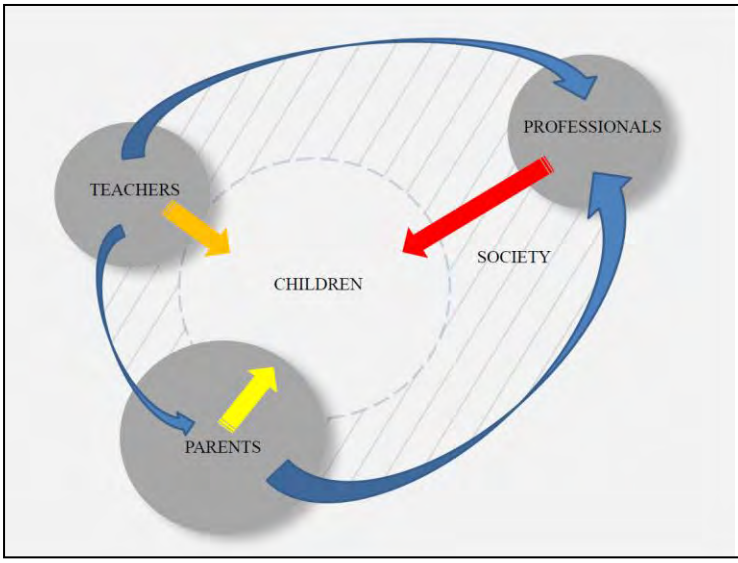


Figure 1.1 (Source: Author's Diagram, 2013) : Illustration showing the assessment process which children experience. The use of blue arrows suggests the links between mediators in assessment and the other arrows suggest their level of understanding real disabilities, with yellow being the lowest and red the highest. The closer a mediator is placed to the child zone, expresses the relationship held between the two.

1.4.2 Key Theory of Phenomenology and Multi-sensory Design

The theory of phenomenology is the interpretive study of human beings through their 'experiences' within and of the world, which liberates MAN and his ENVIRONMENT once again. During the 1900's, German mathematician Edmund Husserl, founder of phenomenology (Seamon; 2000) explains its primary concern for the study of structures of consciousness and the 'phenomena', things

that appear in our experience. His 'transcendental' approach however focused on 'constant' structures of consciousness and essential structures within. However Martin Heidegger, a German philosopher during the early twentieth-century (Seamon; 2000) explained that consciousness is not the focus of phenomenology but rather peripheral to the importance of one's existence. This 'existential' approach made studies more complicated as it focused on one's 'being' in the world which, termed 'lived experience' and in each case is personal and mysterious dependant on human experience.

A child at a young age is not experienced in the visual or intellectual field, such as an adult, however functions heavily around his multiple senses which evolve drastically in the first few years of one's experiences. These structures are the reason a child who cannot even make sense of a verbal sentence can explore and understand his surroundings. The concept of multi-sensory experience therefore explains enriching the environment and learning process, to create a variety of interactions and deviation from weaknesses. Our bodies as perceiving entities and children with disorders not being able to process sensory information necessary to their well-being calls for an intervention in the education system proposing a children's centre and knowledge centre where these issues can be dealt with.

Christian Norberg-Schulz (Seamon; 2000) during the 1980's moved his attention to the issue of phenomenology of 'place' and became one of the first theorists to bring Heidegger's thinking into the architectural field. He explains that the environment influences human beings, and that phenomenology is in fact the 'function of quality'. Maurice Merleau-Ponty, a French philosopher (Seamon; 2000) broadened this view to include the active role of the body in perception, and emphasised the foundational role of perception in understanding as well as 'engaging' with the world.

Evoking meaning and emotion at an intimate scale will create interaction, movement and memory necessary to the learning process and reactions to any of the senses can better be identified in the assessment process. Juhani Pallasmaa (Seamon; 2000) introduces a less predominant visual approach in the experience of architecture with materials and how they could accommodate for an environmental experience calling on all the senses in creating a strengthened architecture. Consisting of these multiple sensory devices, one requires strengthened objects or elements in order to define, perceive and enhance one's experience of such environments, to discover and practice such use of information for further development.

1.4.3 Gestalt Theory of Perception and Form and Materials

The Gestalt Theory of perception describes the extra form-quality or dimension that things possess so that the mind in attempt to search for order and simplification reads 'meaningful' configurations such as proximity, similarity, closure, symmetry and continuation (Cutting; 1989). During the 1920's, Australian philosopher Christian von Ehrenfels, the founder of Gestalt Theory had claimed 'the whole is greater than the sum of its parts', explaining that the simple addition of parts could not make up the 'whole'. Based on the fact that a tune consisted of something other than a sequence of notes, since one could still recognise the tune when played in a different key. However Max Wertheimer (Cutting; 1989) a German psychologist, during the early twentieth century explained that the 'whole' is in fact equal to the sum of parts plus the added form-quality as seen in **figure 1.2**, which determined the way elements themselves were perceived. His contribution to the study formed the law of 'Prägnanz' (goodness of fit/good form) and explained that 'form' forced elements to be seen or viewed in only one way and this meant that we as observers tend to order our experience in a manner that is simple, regular, orderly, and symmetric.

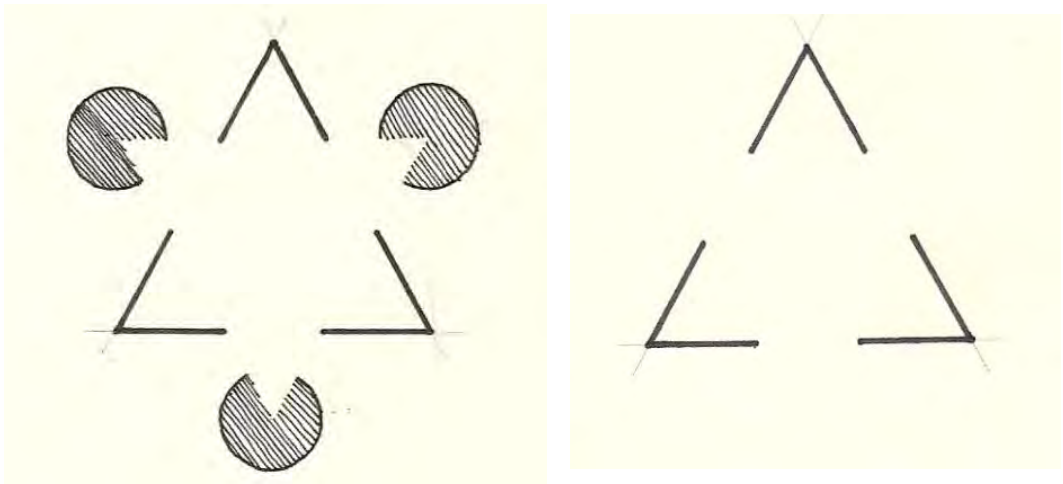


Figure 1.2 (Source: Author's Sketch, 2014) : This figure shows the idea of the 'whole' greater than the sum of its parts by illustrating a clear triangle on top of a solid framed triangle, positioned within three shaded circular objects (total of five shapes). When only the three circular objects are subtracted from the equation; one is left with one uncompleted shape instead of two.

The 'whole' concept is a lot different for children with learning disorders; where their brain systems do not fully integrate the left and right hemispheres, meaning information is broken up and in the case of multi-sensory interpretation, experience one collaboration creating overwhelming and devastating outcomes in the child. The concept of form and materials allows one to structure and organise the environment as well as stimuli needed by these children in order to perceive information as a 'whole'.

It may not be easy to manipulate the brain, however by changing the input to aid in this could be beneficial in the long run of both reading information and training one's brain for future endeavours.

Wolfgang Köhler, following and working with Wertheimer explains the need for physics and natural science in order to explain the neuropsychological processes within Gestalt psychology, emphasising how systems within the perceiver work. During 1923, Walter Adolf Gropius the founder of Bahaus School (School of Crafts and Fine Art - 1919) found himself inspired by the Gestalt theory and principles, creating the movement into the architectural field. Gropius's 'truth and simplicity' logic was due to the need for people to perceive these simplified configurations and helped in identifying order and meaningful configurations at the same time.
In helping these children understand, grasp and learn from their surroundings, we create an architectural design which is self-explanatory, ordered and most of all easing whilst stimulation still takes place. Stimulation is critical to a child's development and learning process, it is therefore possible through choice specific form and materials to achieve easy learning and interpretation whilst still enriching the environment with multiple possibilities. Not forgetting a child with learning disorders is very sensitive; the use of form and materials allows choice for the child to interact or back off, however when integrating with these elements the improvements to learning, development and wellbeing is life changing. Rudolph Arnheim soon after and being able to work with Wertheimer considers the intelligence of the senses and asserted through the Gestalt law of Pränanz how this cognitive act takes place.

1.4.4 Existentialism and Knowledge Centre

Existentialism came about as a reaction to the Age of Reason, as a philosophical movement which focuses on the individual's 'nature of existence', such as freedom and choice to interpret one's integrity, passion, authenticity and commitment. Founded at the beginning of the nineteenth-century by the philosopher Søren Kierkegaard (Guignon; 2004) expressing the faults and issues in mainstream approaches to human phenomena, such as the treating of human beings as member of a species and ignoring who and what we are as individuals. Kierkegaard places the existence of the individual at the centre of his philosophy and critiques the previous objectivist's beliefs and implications of 'truth' in attempt to explain meaning, interest and interpretation in the world in which we live. The German philosopher, Friedrich Nietzsche during this same period, however claimed the idea of 'self' to in fact be a human intervention, where the self is 'created' through the actions one makes, as seen in **figure 1.3**. Explaining a different kind of nihilism and its positive outcome, Nietzsche explains the need to break down supra-human instructions in order to allow humanity to create their own virtues, define their own lives, allowing for well-being and wellness.

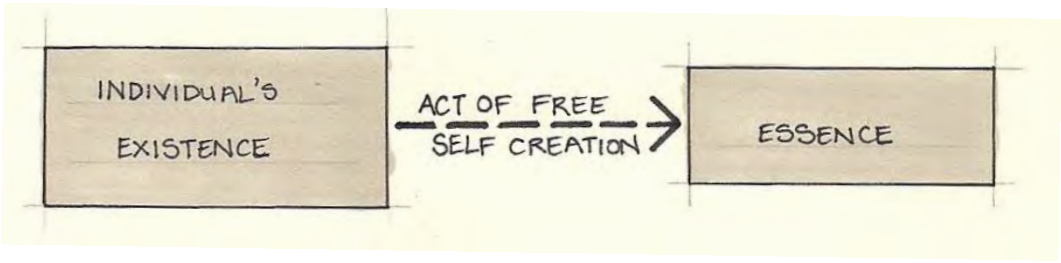


Figure 1.3 (Source: Author's Sketch, 2014) : 'Nature of Existence' This diagram shows that although it is not our choice or of our controlling to exist on this earth; it is through our own act of freedom and self-creation that we determine our character, our quality within the world we live.

Children with learning disorders often have problems with behaviour or the choices they make, the concept of a knowledge centre is to create an environment from which children can learn from and discover themselves in relation to other children, either affected by a learning disorder or not. Both Existentialism and Phenomenology have a very close relationship where the first puts emphasis on individuals in-the-world and their lived experience looking into the child's perception on objects and things, in other words how the world appears and is known in our existence, whereas the latter therefore follows as the rigorous study of consciousness, where perception takes place of other living organisms by their behaviour, activity and emotion to create a groups and understanding.

During the twentieth-century Jean-Paul Sartre introduced and adopted the term 'existentialism' in terms of self-description by looking at the way such things appear in one's experience and claims consciousness to be a 'nothingness' due to things already existing to only translate inwardly. Believing that humans are also self-making beings rather than just focusing on one's 'self', Sartre (Guignon; 2004) explains that beings define their own identities in life through a series of undertakings and that truth is unobtainable without the 'other' in mediation to inform one's existence, defining a world of inter-subjectivity. Christian Norberg-Schulz studies phenomenological relationships and furthers existential theories in regard to architecture and urbanism, focusing in on the theme of 'place'. His concept of 'Genius Loci' materialises in spaces, helping to reveal an environment as a place and further draws on a new urban dimension, where the city is viewed through its production of human experiences, through networks of places concerned with 'humanism' and 'materialisation'.

A child, with an overly active and not fully developed mind of his own, does not understand aesthetic meaning in terms of art or quality but rather relates what he sees to past experiences and creates his own visual meaning with a response to stimulation. These responses in a child with learning difficulties may be completely different to that of a child that functions normally and this approach tends towards the understanding of how one should respond to stimuli through observation and

maturation. More accurately discussed by the Finish Architect Juhani Pallasmaa, who enforces that 'meaning in architecture' depends on its ability to symbolise human existence. Pallasmaa explains that form is not important in itself but rather conveys meaning through images associated with memory, imagination and the unconscious as 'childhood memory' is an important raw material of phenomenological analysis in architecture.

1.5 RESEARCH METHODS AND MATERIALS

1.5.1 Introduction

An educational psychologist was visited and interviewed in the early attempts of this research and issues involving interaction with children were discussed to determine appropriate research methods and materials. Due to the vulnerability, sensitive nature and chances of misunderstanding, children have been left out of direct interaction with this study, and school staff focused on based on findings. Questionnaires were distributed amongst architectural professionals, school staff and others involved in the school environment, based on the case studies selected and to gain a wide variety of outlooks.

A qualitative approach to this research allowed the researcher to understand new ideas imperative to children with learning disorders, the spaces they need and the way in which their experiences can be improved for a knowledge centre in Durban. However an empirical/quantitative study may aid in the future endeavours of this process, such as site selection, severity in the different areas of Durban and the range of disabilities experienced. For this reason some schools were selected and contacted in regards to student numbers, school type and if any, how many students were placed on a waiting list for 2014. The methods of research will also be divided into two parts, one primary and the other secondary due to first and second-hand information.

1.5.2 Primary Methods

The primary qualitative data was collected through questionnaires distributed amongst professionals, principals and school staff that questioned the success and importance of approaches and ways in which they felt such approaches could be improved.

Remembering the difference between learning 'disability' and 'disorder', and this study's approach involving both, reminds us of the two types of environments which need to be studied. The use of case studies were collected through observations and analysis of already existing environments. Remembering during this process however; that professionals in the educational field have been

trained and know all about children of this nature, therefore it was important to do these studies via their guidance and respect their decisions.

1.5.3 Secondary Methods

The secondary data was in the form of a literature review and relevant precedent studies. The literature review was retrieved through various sources but most importantly by the guidance of the psychologist; through books and internet sites as well as journal articles, archives and theses, to create a wider range and outlook. This information will give the reader a reference of how other writers have dealt with similar issues. Precedent studies related the findings to the built environment and gave the reader an understanding on how architects translate these findings into human experience.

1.6 CONCLUSION

The rejection of children via the built environment and assessment techniques create issues of stress and separation, creating worse situations for children and their families. Children with learning disorders and children with learning disabilities all suffer different levels of these issues and sensory design can aid in all of these situations dependent on the level they are set for. By not limiting any child to one method of learning, working to their strengths and allowing exploration; the goal is to enable those previously rejected or confined to the standards of education. This dissertation will contribute towards an architectural design geared to foster learners with disorders and disabilities in order to express their full potential within our society. The following research wishes to prove the hypothesis of this dissertation.

CHAPTER TWO:

LITERATURE REVIEW

THEORIES AND CONCEPTS

CHAPTER 2 – LITERATURE REVIEW

2.1 INTRODUCTION

This chapter shall be a review and investigation into literature pertaining to the main research topic and questions. There shall be several sources of the literature in comparison, such as various relevant books, internet sites, journal articles and theses dealing with approaches to children with learning disabilities and expressing a connection to the built environment, with emphasis on creating an all rounded study. The research aims to bridge a number of disciplines such as; architecture and design to physiological, psychological and neurological aspects, in attempt to inform appropriate indicators and typologies relevant to the chosen architectural theories, for later comparison to appropriately existing examples within precedent and case studies. Focusing on key literature by theorists Juhani Pallasmaa and Rudolf Arnheim, this literature will be investigated amongst other important theorists to create a strong theoretical framework and grounding.

2.2 ARCHITECTURE AND THE SENSES

2.2.1 Introduction

"The 'total child' is an 'action system' which operates to gain freedom and skill in all movements available to him. Important to this 'action system' is a guidance system which serves to steer movements toward their goals. It then, also serves as a sensor system when the goal is reached by appraising the adequacy of the goal-directed movements." (Getman; Kane; Halgren & Gordon, 1968; pp. 2)

Schools of today focus on age norms as the basis of child development where importance is placed on when a child 'should' walk or talk for example. Getman and others (1968) explain that this time-based theory of maturity gives little or no credit to the child for acquiring necessary developments, abilities and skills, and therefore writes on the need of visual-motor-tactile skills, seen in **figure 2.1**, instead of coming of age, before the child is ready to enter the learning/school environment. Anna Jean Ayres, an occupational therapist and educational psychologist dedicated to children with learning disorders (1972) introduces sensory integration within the field, as an integrative therapy that is said to occur through the limbic system to affect such outcomes as behaviour, motivation, olfaction (sense of smell), but most importantly in emotion and long-term memory. Although both authors tackle different sources and outcomes, both are integral due to the fact that multi-sensory integration can benefit the 'normal' child's maturity level and its early, broad stages can aid the overlap found in all

learning disorder syndromes. Getman (1968) further explains that the typical classroom teacher has on many occasions observed that children of maturity excel in both academic and physical programmes; showing the link between the physical and mental structures of the growing child, as seen in **figure 2.2**.

Figure 2.1 (Source: www.spdfoundation.net. Image by Kinnealey & Miller, 1993) : Activities which require total body organisation and movement.

Figure 2.2 (Source: www.spdfoundation.net. Image by Kinnealey & Miller, 1993) : The ability to motor is developed through challenging sensory

2.2.2 Defining the role of development in learning

"As teachers work with children in the classroom, they do so on an abstract, symbolic level. Words, lines of print, numerals and music notes are all abstract symbols. A child's ability to cope with these abstractions depends heavily upon his success in previous experience with concrete, first-hand situations. Such prior experiences are largely unplanned and occur in a happenstance fashion in the home." (Getman; Kane; Halgren & Gordon, 1968; pp.2)

Getman and others (1968) explain the need of the developmental sequence, heavily based on order, interrelation and contribution of one step to another, for the 'total child' to be able to learn on a physiological level. This creates four arts within the physiological field of learning; the art of

movement, orientation, identification and communication, all necessary for the child to reach the learning readiness of the classroom. Ayres agrees with the need of development pertinent to the learning ability and the characteristics of overlapping and order important to this concept, (1972) explaining however that one can aid in these steps by recapping important ontogenetic sequences, controlling sensory input and following the child's adaptive responses to such physiological information.

Getman and others (1968) also explain the need of the important sense of vision, with a clear difference between sight as the reaction of the eye to things and vision achieved only when what we see is given sustenance by past experiences; therefore contributing to the learning process and where children can judge their success and competence in the arts. Ayres (1972) however explains that learning disorders lead to deficit in most activities, seen in **figure 2.3**, but most importantly in the visual field and perception, where the child for example battles to interpret space relation and figure-ground relationships.

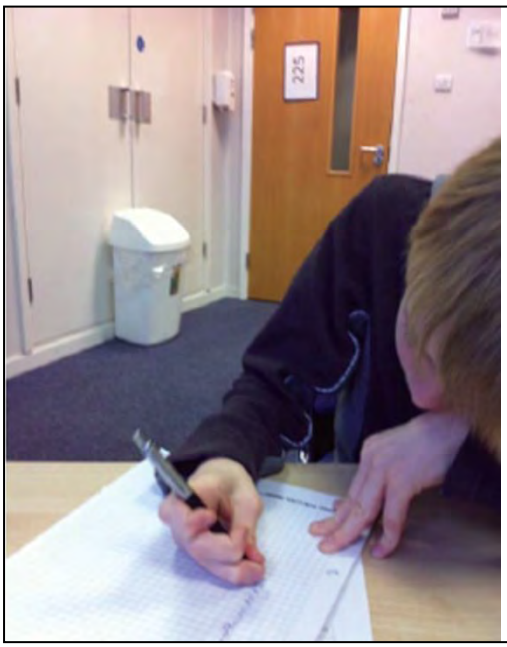


Figure 2.3 (Source: www.ecswe.org. Image by Blyth, 2011) : Showing how learning disorders lead to reflex deficits, such as this case affecting reading and writing.

2.2.3 The control of multi-sensory experiences

"This guidance and appraisal system is known as vision. More than sight, it is the ability to see roughness without feeling, to feel shape without seeing it, to judge distance without walking it, and to interpret attitudes and meanings by gestures and facial expressions." (Getman; Kane; Halgren; Gordon, 1968; pp.2)

The term cognition refers to the method by which sensory information is transformed, reduced, elaborated, stored, recovered and used and motor skills relate to intentional movements made by muscular components, aiding in the development, learning and voluntary processes of the child in order to reach goals. The latter referring to a physiological process shows the earlier stages of the child development, where the foetus already starts learning movements and signals available, seen in **figures 2.4 and 2.5**, and after birth the system has even more reason for movement due to environmental changes resulting in more responses. These encounters and movements then contribute to the former, where the child learns from such experiences, stores information and utilises it in everyday life, making vision a stronger sense when related to past experience and allowing one to read multi-sensory experiences.

Figure 2.4 (left) and 2.5 (right) (Source: www.ecswe.org. Image by Blyth, 2011) : Primitive reflexes are visible in the baby's grasping and rooting reflexes, which later develop in maturity.

Getman and others (1968) explain vision 'in time', to be an acquired skill through practice where the child's first actions for learning and growth development trigger later elaborate *movements* of bones and muscles, as seen by **figure 2.6**; a biochemical process where stimulus is sent through the primitive nervous system and creating encounters where further stimuli enter such a system. This additive information is where learning occurs, allowing us to read a printed story as if we were actually apart of the action and utilising the other senses such as seeing, tasting, smelling, hearing and feeling in gathering information from our surroundings. Ayres agrees that movement is a powerful organiser of sensory input but (1972) further explains that the learning disabled child with signs of disordered muscle tone, also demands an environment consisting of meaningful sensory stimuli and imposing demands on the child. The process of interpreting stimuli usually occurs in the reticular system, which allows the brain to focus on one type of sensory input at a time through the inhibition of others, however Ayres (1972) explains that children with learning disorders contain issues with such a system, allowing too many sensory stimuli to over-arouse and excite the child, interfering with the focus on relevant stimuli and the learning process.

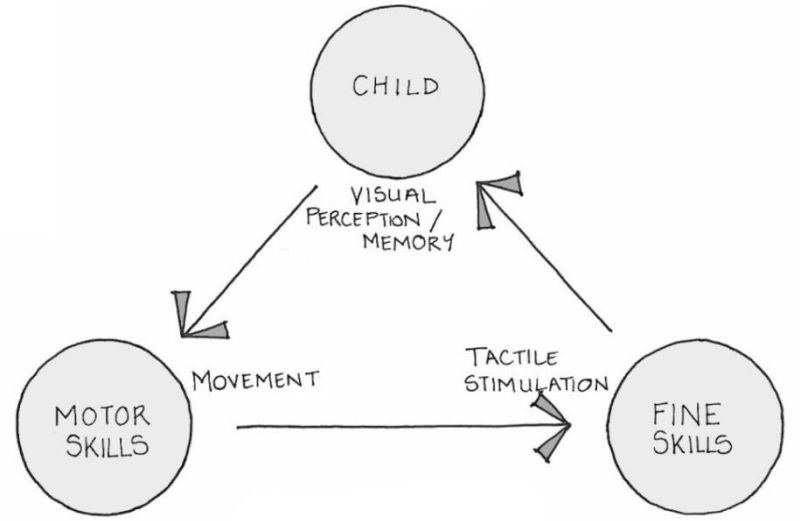


Figure 2.6 (Source: Author's Sketch, 2014) : Child development Graph.

For this reason Ayres focuses on gross and proximal motor patterns opposed to fine and skilled actions, to create a greater possibility and targeting integration at lower brain stem levels, in order to aid in learning and memory operations of such children. One of the systems responsible for this approach is the vestibular system, necessary for movement and balance, allowing the final sense of spatial orientation. This art of movement also utilises proprioception, the sense of relative parts of the body and strength needed for such movement, allowing the child to learn about himself, his body and its possibilities. Lastly the somatosensory system also relates to the body, more specifically the skin which is covered in a number of receptors responsible for the addition of stimuli to our vocabulary.

"Teaching a child 'left' and 'right' as directions or sides of his body by colour or other cues on shoes or hands represent a highly neocortical approach, whereas letting a child experience direction and the sides of his body through the integration of vestibular, somatosensory, and visual stimuli and through normalising the mechanisms of interhemispheral integration exemplifies a focus on lower levels of neural function." (Ayres, 1972; pp.53)

One notices that once the child is able to acquire movement, he not only seeks the need to see objects around him but rather experiences the major urge to have to touch everything and in some cases even places objects in the mouth, as receptors found here are plentiful and highly sensitive. Tactile functions, of or related to the sense of touch, are strongly related with motor planning and the limbic system, a complex set of brain structures located above the brain stem in relation to the spinal cord and responsible for the formation of memory, suggesting an approach necessary to aid in the development of children with learning disorders.

Getman and others (1968) explain that once a child has mastered movement and learnt to put their bodies into goal *orientated* actions, their entire body becomes the supporting and contributing systems, where the child now explores and learns about his surroundings in order to *identify* and develop greater skilled movement. Adding to visual information of the child, these skilled actions allow a variety and comparison of what they see and feel, aiding in visual memory and peripheral development to gain the maximum meaning out of his/her environment. Getman and others (1968) further explain briefly that the tactile system is implemented during the early stages of development and reaches its optimum when eye-hand co-ordination creates a link between motor and visual systems, allowing the later ability of student expression and aiding the child to read and learn. Ayres agrees with this predominant sense of touch as seen through evolution to contribute to the perception of all the other types of sensations and (1972) explains the skins literal boundary between one's self and non-self, allowing one to establish identity through another sense other than visual, aiding the disabled child to order and sort sensory stimuli into spatial and temporal qualities and sequences. Ayres (1972) further explains that proprioception and tactile stimulation is critical to motor action, as it controls reflexes, automatic responses and planned action where sensory integration of an optimum level may be obtained and aid in the most important of sensory perception; visual impulses, seen in **figure 2.7**.

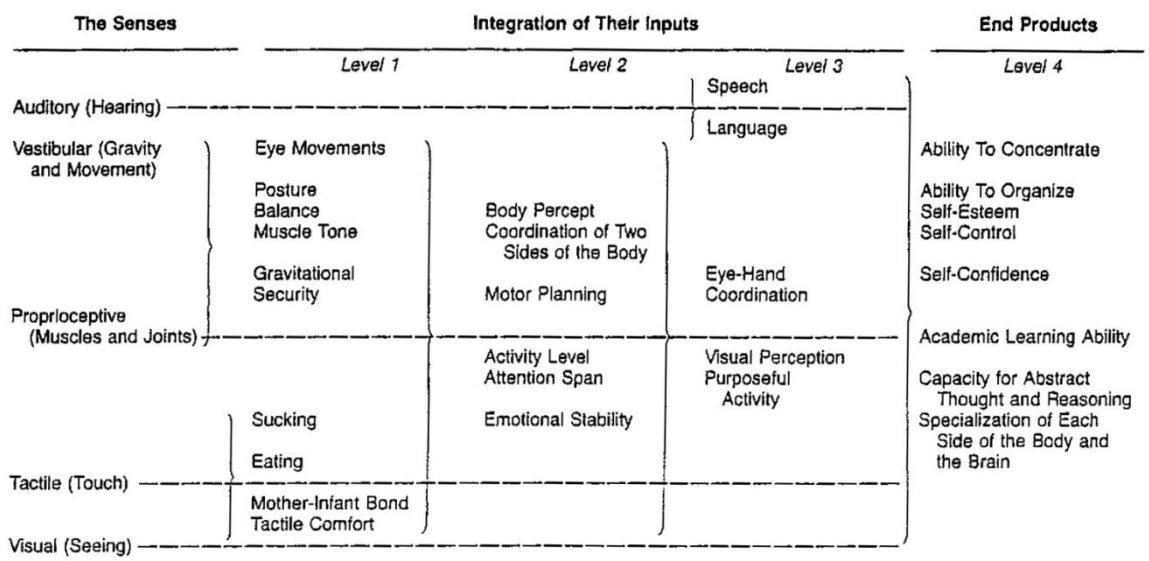


Figure 2.7 (Source: Source: www.spdfoundation.net. Image by Kinnealey & Miller, 1993) : Table illustrating the integration of certain sense, their input and desired end products.

"The ability to recall on previous experiences allows the child a frame of reference for new experiences. This ability to visualise (visual memory) is known to be a skill which can be acquired and developed by proper guidance and training." (Getman; Kane; Halgren; Gordon, 1968; pp.12)

In the learning environment memory is of high importance to achieve subjects or tasks such as reading, spelling, writing and arithmetic where the ability to lean new matter requires one to call on previous information gathered, to highlight the most important pieces of information and to apply such knowledge to future endeavours. Getman and others (1968) explain vision to also be necessary in recalling the memory process of all the sense modalities, to trigger and integrate such experiences in the child and create the ultimate stage of learning readiness, something children have to gain and understand for themselves. Ayres agrees with the need for the skill of memory to develop and that this process occurs within such child, however (1972) further explains that therapy ends at this point for the learning disabled child, it is where the goal of self-fulfilment takes over and the urge for action and growth drives his/her integration and maturation. This 'adaptive response' may vary in a number of ways but most importantly is the action or reaction of the person to the environment, where greater complexity in development and learning occur and the child becomes the master depicting the outcome, instead of the previous situation in which the environment had controlled the situations for the learning disabled child.

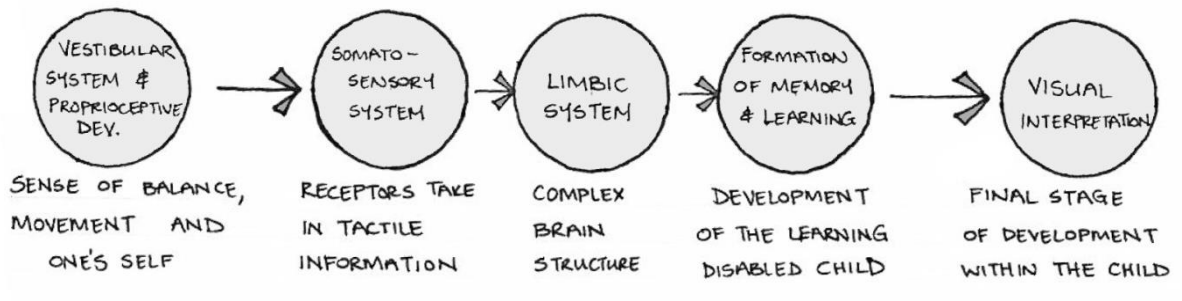


Figure 2.8 (Source: Author's Sketch, 2014) : Process of obtaining visual perception in children with learning disorders.

"The ultimate goal of sensory integrative treatment is being which wants to, can and will direct himself meaningfully and with satisfaction in response to the environmental demands." (Ayres, 1972; pp.257)

2.2.4 Application of Phenomenology

"It is evident that 'life-enhancing' architecture has to address all the senses simultaneously and fuse our image of self with our experience of the world… Architecture articulates the experiences of being-in-the-world and strengthens our sense of reality and self; it does not make us inhabit a world of mere fabrication and fantasy." (Pallasmaa, 2005; pp. 11)

Edmund Husserl (Shirazi; 2009) explains returning to the careful description of 'things themselves' and the meaning of 'intentionality' within phenomenology, to address essential elements themselves and the manner in which they immediately appear in our consciousness. The focus differing from phenomena of representation becomes the phenomena of the things themselves, a 'pure phenomenon' through 'reduction' (known as the 'epoche'), one must suspend all natural sciences and beliefs in order to expel presuppositions; making us see what is absolutely given. Martin Heidegger and Maurice Merleau-Ponty (Shirazi; 2009) question 'reduction' and its possibilities with Heidegger exploring the meaning of 'being' through meditative, consciously wilful and idiosyncratic measures, focusing mainly on poetry, art and architecture. His approach explores the importance of 'being' and even 'being and time' expressing the essential structure of lived experience, as well as temporality and historiality. 'Da-sein' meaning thinking in German, avoids abstract reasoning and aided in a new way of seeing without idealistic or realistic presuppositions; affording phenomenology to 'make manifest the matters as they manifest themselves'.

"I experience myself in the city, and the city exists through my embodied experience. The city and my body supplement and define each other. I dwell in the city and the city dwells in me… Our bodies and movements are in constant interaction with the environment; the world and the self inform and redefine each other constantly." (Pallasmaa, 2005; pp.40)

Heidegger (Shirazi; 2009) discusses the priority of 'place' over space as it is only after the establishment of a place that space is then provided, and in order for place-making to occur fourfold needs to be established; describing the presence and unity of sky and earth as well as mortals and divinities to create a sense of being-in-the-world. Within spaces then Heidegger separates them into three types; *world-space*, where spaces are independent to a space which they belong in, *region*, explaining the 'things' in functional association and 'nearness' with which we engage physically, and lastly *de-distancing and directionality*; acknowledging the essential spatiality of Da-sein (human consciousness) where things are brought within range to its concern. Heidegger (Shirazi; 2009) explains man further as a dwelling being through poetics; exploring poetry through building as a cause of dwelling and of first bringing man to earth, making him belong to it. Christian Norberg-Schulz however (Shirazi; 2009) explores places as the 'concrete manifestation of man's dwelling' and agrees that the importance of identity rests on one's belonging to a place contending that it is in fact the building which gives meaning to such things as earth and sky, seen by **figure 2.9**, and allowing meanings present in the environment to be discovered.

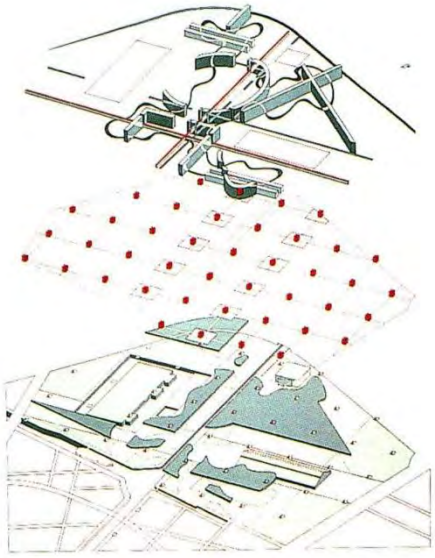


Figure 2.9 (Source: Shirazi, 2009) : Exploded image of the concrete parts; lines, points and surfaces, which make up Parc de La Villette by Bernard Tschumi.

Norberg-Schulz (Shirazi; 2009) also believes that precognition is vital to understanding an environment, Gestalt laws are used in perceiving our environment unconsciously and place as a 'totality of concrete things', is made up of materials, shape and texture in order to give a place character/atmosphere. This qualitative approach wishes to expose the truth of place via architecture with an emphasis on visual and symbolic qualities of man's life in order to form this totality. These relationships to the built environment occur when man understands relations of organisational principles in order to orientate himself, much like in Gestalt theory; such as centres or places (proximity), directions or paths (continuity) and areas or domains (enclosure), seen in **figures 2.10, 2.11 and 2.12**. Norberg-Schulz further explains that centralisation symbolises belonging to a place and on the other hand longitudinal movement; a certain openness to the surrounding world.

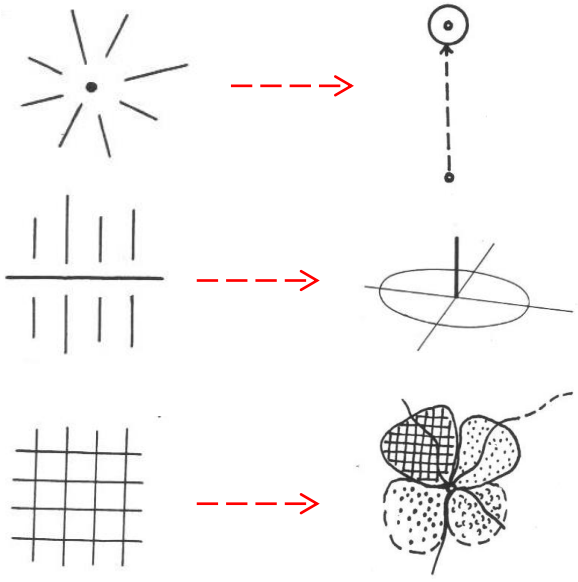


Figure 2.10 (Source: Norberg-Schulz, 1971) : Centre and Place – centres are 'externalised' as points of reference in the environment , usually symbolizing a vertical axis or points where sky and

Figure 2.11 (Source: Norberg-Schulz, 1971) : Direction and Path – are situated in a larger context by means of vertical and horizontal direction, where the axis represents a connection between the three cosmic realms.

Figure 2.12 (Source: Norberg-Schulz, 1971) : Area and Domain – defined as relatively unstructured 'ground' on which more pronounced 'figures' such as places and paths appear, and create a coherent space for man's activities.

"The eyes want to collaborate with the other senses. All the senses, including vision, can be regarded as extensions of the sense of touch – as specialisations of the skin. They define the interface between the skin and the environment – between the opaque interiority of the body and exteriority of the world." (Pallasmaa, 2005; pp. 42)

Norberg-Schulz (Shirazi; 2009) explains that in the process of embodied perception; existential space plays an important role, being the reference point of perception and the necessity of identification, needed for belonging and orientation, needed to journey through places of spirit, acting as primary aspects in man's being-in-the-world. Recognising the need for buildings to belong to spaces; monumentality and regionalism are a way of creating memory and symbols belonging to humanity and time. Norberg-Schulz establishes basic themes of importance to our 'existential' experience, these include earth and sky; in, on and over the ground; within and without; threshold; opening; wall and roof. However, although Norberg-Schulz (Shirazi; 2009) states that movement is vital for experiencing space; he never expresses the interior of a structure and his genius loci focuses on urban and building levels with no consideration of the body of the perceiver of space; rendering it still and motionless. Maurice Merleau-Ponty looks at the world and one's self as inseparable as the world confronts our body and our body is immediately present to us, the separation of our physical and living animate body shows the nature of our sensory and motor capacities of perceiving the world.
Merleau-Ponty (Shirazi; 2009) also responding to Gestalt psychology; draws on a holistic attitude of the body and believes that the main goal of phenomenology is to unite extreme subjectivism and objectivism. Merleau-Ponty (Shirazi; 2009) explains that it is therefore the body and its movement that provides one with the perception of the world, unifying the world and bodily experience. Our body also inhabits space and time bringing us into a spatial world where we discover things due to our orientation and perception, based on existential direction. Our bodies, like the heart of the body, being central and dependant for functioning, are central to our experience and perception of the world in which we live.

"When experiencing a work of art, a curious exchange takes place; the work projects its aura, and we project our own emotions and percepts on the work… There are cities that remain mere distant visual images when remembered in all their vivacity. The memory re-evokes the delightful city with all its sounds smells and variations of light and shade. I can even choose whether to walk on the sunny side or the shaded side of the street in the pleasurable city of my remembrance." (Pallasmaa, 2005; pp.69 & 70)

Merleau-Ponty (Shirazi; 2009) exploring concrete lived experience and embodiment, leads to our being-in-the-world to be thought of as historical and temporal, meaning that when we perceive, we

perceive from a position and perspective previously attained. Merleau-Ponty (Shirazi; 2009) further explains that looking at a thing requires the perception of its interrelated field, we perceive things in context, with its relationship to all the surroundings, as well as how it exists in the world. With this Merleau-Ponty believes that 'phenomenology of perception' is the process not of imposition but rather of pre-reflective communication between the perceiving body and perceived world. However Juhani Pallasmaa (Shirazi; 2009) expresses the multi-sensory quality in experiencing architecture where matter, space and scale are measured in relation to the human figure, where it can be graphically seen in **figure 2.13**, and reviews the eye, ear, nose, skin, tongue, skeleton and muscle separately to explain their involvement.

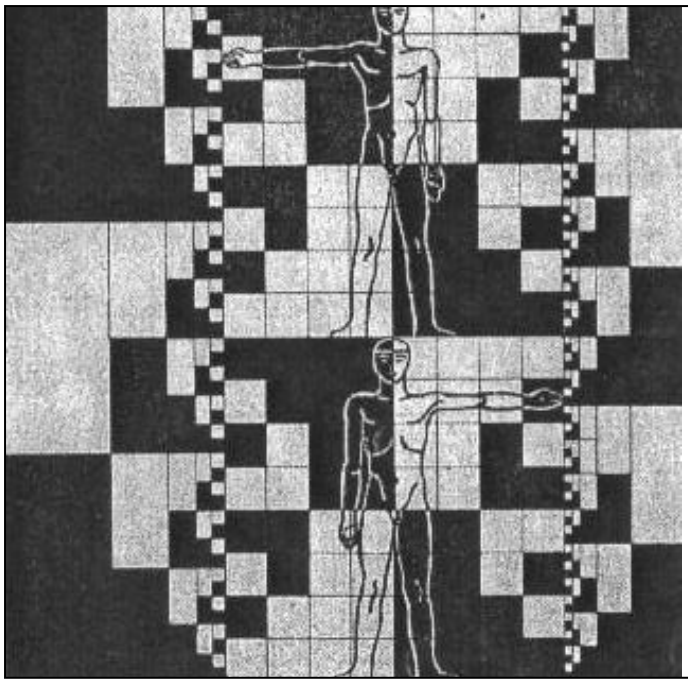


Figure 2.13 (Source: Pallasmaa, 2005) : Architecture and the human figure.

Unlike Merleau-Ponty, Pallasmaa collaborates all the senses as extensions of the sense of touch (better known as hapticity), giving it importance and explaining its sense of nearness, intimacy and affection in relation to the distance and separation of the eye. Showing a strengthened experience of both space and architecture, buildings don't react to vision but return sound, expressed in **figure 2.14**, one remembers smells better than appearance, expressed in **figure 2.15**, and the skin feels and understands what the eye cannot. Pallasmaa (Shirazi; 2009) distinguishes between two types of architecture; one of essence hoping to reinforce man's place on earth, and the other is of form which aims to capture the viewer's attention and approval through voluble language of expression.

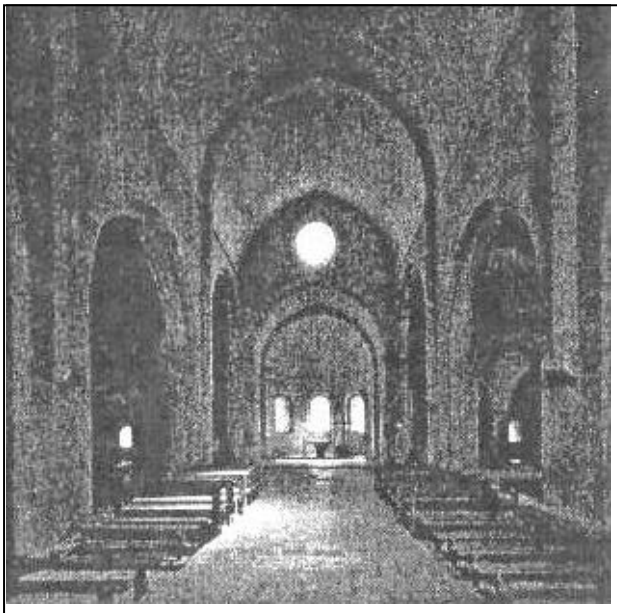


Figure 2.14 (Source: Pallasmaa, 2005) : Architecture of hearing; reinforces and enriches visual experiences.

Figure 2.15 (Source: Pallasmaa, 2005) : Architecture of smell; infusing into the memorable image of the place.

2.2.5 Analysis

Establishing the need to integrate multi-sensory design in architecture for children with learning disorders seems imperative and detrimental. In all circumstances of life and development, the multiple senses seem present and more than ever important, most importantly knowing the fact that we cannot limit our programmed bodies or brains to read only one impulse at a time. Ayres (1972) explains that such multi-sensory interactions are more effective than one's received by only one sense modality and through controlled methods discusses their possibilities in treating and alleviating symptoms of learning disorders. The theory of phenomenology; focusing on human beings and their experiences of phenomena through such bodily senses, is connected and therefore of relevance to the study. Affected by memory, materiality and one's perception, Pallasmaa discusses man's essence and need to reinforce his place on this earth. Getman and others (1968) explain that research in relation to children; shows that guidance, control and appraisal of a child's movement through spaces is necessary and of great intellectual importance in both their development and education.

Within the built environment, consisting of architectural qualities which occur in both form and materials are the physical manifestations which contain physiological and psychological information necessary to impact connections made with the child. Ayres (1972) explains in order for one to create a therapeutic experience one needs to evoke these multiple sensations in the correct ways through the use of stimuli which aid in the calming of the child and the system in understanding complex and

multiple sensations at once. Pallasmaa understands experience in architecture to be that of quality of matter, space and scale as is provided for by the sense of touch, action and movement creating multi-dimensionality and multi-sensory engagement, as the body is more open and prepared for such interactions. Nearness, intimacy and affection are therefore important characteristics to create a further strengthened experience for the physical and active approach where receptors send messages through the skin to one's nervous system, to reach the brain stem where Ayres makes point that sensory integration allows sensory impulses of a much greater complexity.

The question is then, what type of stimuli is required to aid in the learning and development process? Developing the need to establish aspects and properties of multi-sensory stimuli which benefit the disabled child in major problem areas such as learning and developmental growth needed for a chance at a functioning and productive way of living. Norberg-Schulz looks into identity as man's means of belonging to a place, and orientation needed for inner pilgrimage as primary aspects of man's being in the world, and Merleau Ponty focuses on orientation and perception to be necessary in discovering things based on existential direction. Getman and Ayres both explain the necessity of the developmental process in the learning ability of the child and explain vision as similar aspects, to become the driven goal.

Norberg-Sculz in relation to movement explains its vital role for experiencing spaces and goes as far as to suggest meaningfulness through gestalt laws to be a tool in perceiving our environment more easily. Aspects of both cognition and the somatosensory system are common to both Getman and Ayres, where focus is indifferently placed on motor-skills, movement, proprioception and the sense of touch. Getman in relation to cognition focuses on vision and time, where Ayres focuses on gross, proximal motor patterns as organisers of sensory input, and Getman explains these to trigger and alert more elaborate ones to include all of the senses. Merleau Ponty views the body and its movement as important as it provides perception of the world with which one is inseparable. In terms of the somatosensory system, Getman explains the importance of one's co-ordination for the ability of skilled movement to occur and aid in one's visual perception, this also includes eye-hand coordination. Ayres on the other hand explains proprioception to be critical as it allows sensory integration of an optimum level and the important sense of touch as it predominates and contributes to all the other senses, as well as one's identity.

Lastly Merleau-Ponty explains the point of memory and meaning to be that of historical and temporal aspects; where we perceive things in context to create a pre-reflective communication. Concluding together on behavioural memory, Getman and Ayres explain the importance of such to the learning process in order for the child to retain information and build on it. Getman explains this to occur

through the visual sense's ability to recall on what had been learnt through all the senses, in the classroom setting and Ayres explains this need for self-fulfilment; where the child gathers the urge for personal action and growth, to adapt and master his environment.

2.3 CHILDREN IN THEIR ENVIRONMENT

2.3.1 Introduction

"It desperately needs persons who understand that, far from being a spectator sport, architecture is our prime instrument of environmental control; that its current inadequacies can only be corrected by a factual analysis of its performance and not by mere cosmetic manipulation of its appearance." (Fitch, 1984; pp.9)

In today's society little thought is given to such permanent structures and by focusing on one's needs and well-being, the stresses of life should be alleviated so that the effort of the human structure can therefore be placed on tasks and activities which are the essence of human activity, growth and development. James Marston Fitch, a director of history preservation and a professor who began teaching in 1954; focuses his attention on the aesthetic process through architectural means and (1984) explains the sensitive inhabitation of buildings where architecture acting in favour of humankind controls the link between us and the natural environment surrounding us, poorly shown in **figure 2.16**. P. Bruce Uhrmacher, a professor of education involved in aesthetic education for over fifteen years, (2009) explains the ability through aesthetic experiences to enhance teaching methods and to further enhance student engagement in the classroom, necessary for positive academic outcomes and persistence. Although one author focuses on architecture and the other on art as an assistant to teachers, the broadness of ideas and activities allows a connection to be made between the two fields in discussion. Fitch (1984) further explains this interposition to allow for successful opportunities to create great architecture, in which material allows one to intervene physiological and psychological aspects of the highest level within the inhabitant.

Figure 2.16 (Source: Shirazi, 2009) : The visual monotony evident in many places, such as Moscow.

2.3.2 Connection between art and the aesthetic experience

"Architectural aesthetics necessarily differs from that of painting and sculpture, of music, dance and theatre in many fundamental respects. Unlike the work of art, architecture is always basically functional and utilitarian, whatever its artistic pretensions." (Fitch, 1984; pp.6)

Fitch (1984) explains within aesthetics the failure to relate to 'experiential reality', where semiotics (signs and symbols) utilise vision as the unique channel of sensory perception, and passive exposure suggesting that humanity exists totally separately from buildings. However architecture is submerged in the natural environment, just like humanity, and Fitch (1984) explains that this cannot be felt, perceived or experienced in anything less than 'multi-dimensionality', where responses are derived from our body's total response and perception of environmental conditions. Uhrmacher agrees on the need for aesthetically engaging experiences however in relation to the learning environment, where general perception describes a once curriculum based environment where education was based on 'doing' and going through the necessary correct motions, a one-directional/ goal orientated approach with only one means of getting there.

Fitch (1984) affirms that within architecture we are submerged in the experience, such experience is poly-directional and random in both time and space, art on the other hand is of a more uni-linear exposure, a one-way, irreversible sequence of events. Uhrmacher (2009) relates his ideas and themes to that of art, discussing Dewey's idea of interaction between the person and the environment, creating a dualism of mind and body as the 'whole' person comes into contact with and grasps the qualities of such a world and relates all findings to the three-dimensional environment with which we can foster growth and create such educative experiences.

2.3.3 Connecting holistically with one's environment

"But our aesthetic experience with architecture is one of submergence rather than passive and contemplative exposure, as in the case of art. We inhabit the work of architecture; we merely perceive a work of art." (Fitch, 1984; pp.6)

In one's experience with architecture being that of submergence, to become one with the environment, one clearly thinks of connection and means by which this connection took place, such as communicative, even though this does not have to be linked to the sense of hearing. Fitch (1984) explains that buildings do in fact 'communicate' with their inhabitants in different distinct modes, with the most literal being their enclosed volumes which communicate through acoustical responses

to the sounds produced in them. There are three ways in which a building communicates with its users; according to Fitch (1984) these include manipulation of volume, shape and surfaces necessary to create acoustical property of maximum fidelity; the manipulation of space and materials which can alter such sounds, **seen in figure 2.17**; and the use of signs, either visual or auditory due to technical advances, which are cognitively transmitted, seen in **figure 2.18**. However the use of semiotics (signs and symbols) is said to not deal with four-dimensional sensuous qualities and is in fact then not a quality associated with being submerged within a building.

Figure 2.17 (Source: Shirazi, 2009) : Image showing chaos created by signs of visual interaction.

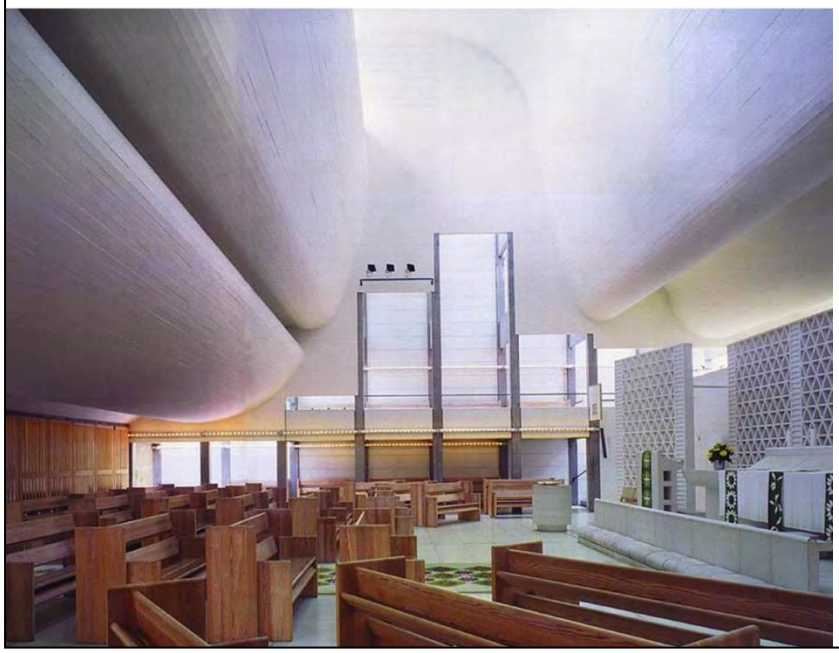


Figure 2.18 (Source: Shirazi, 2009) : Image showing the manipulation of four-dimensional space, to include the senses.

"The cultural function of this surface is to furnish the sensuous basis by which work pleases, stimulates, informs, exhorts its viewers." (Fitch, 1984; pp.8)

Fitch (1984) looks and explains this situation from a totally opposite standpoint where the critic with a background in art history places focus on the visually accessible surface, the only thing that matters in art, and ignores it from the person engagement point of view. Aesthetics in both form and materials

are crucial to one's engagement, however by thinking of their importance to one's being but not acknowledging this could be detrimental as one may place such advancements out of one's reach or not know what contribution they have had. Fitch (1984) further explains that when documenting such buildings, nothing seems to occur on the inside, just like art sculptures for example, such as the forces which hold it up or complex physical forces, where a great separation of artistic practice and aesthetic theory is clearly evident. The participation of the inhabitant is also as much important in engaging learning situations as the form and materials in which they come into contact with, and their state of mind is particularly important, yet buildings are constantly seen as pieces of art, in picturesque photographs with empty forms and inhabited spaces. Fitch (1984) closes with the architect, the master of design, and how well he reconciles the demands of both 'form and function' for the needs of the client and restraining where necessary to reach the goal of interactive experiences.

2.3.4 Quality obtained through Gestalt Theory of Perception

"Since outer order often represents inner or functional order, orderly form must not be evaluated by itself, that is, apart from its relations to the organisation it signifies… A lack of correspondence between outer and inner order produces a lash of orders, which is to say that it introduces an element of disorder." (Arnheim, 1971; pp.3)

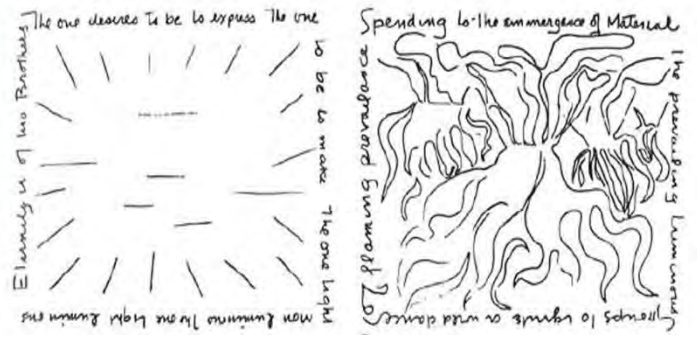


Figure 2.19 (Source: http://iris.nyit.edu. Image by Norberg Schulz, 1979) : Illustration showing the relationship between inner and outer order in the notion of order and form.

Exploring our experience of complex structures and what is involved in our perception of these, Christian von Ehrenfels (von der Heydt & others; 2012) explains our experience to be structured due to 'Gestalt qualities' in certain experiences and is added to our experience of sensory modalities. Recognising first-order qualities is then determined by elementary sensation; such as spatial shapes, melodies, chords and complex tastes, second-order qualities consisting of a combination of the elementary sensations and the third-order qualities, and so forth. Ehrenfels (von der Heydt & others; 2012) further explains the need to separate elementary acts and objects within consciousness, making Gestalt quality an additional unitary object existing alongside unitary elements, together in combination but still distinguishable. Max Wertheimer (von der Heydt & others; 2012) explains the

perception of a structure, with one or more corresponding sensory data to be directly and immediately perceived as complex Gestalten, structured wholes rather than sensations, where only some parts contain a certain analogy to the putative discrete and independent data of sense.

Such demonstrations show that orderly form will come about as the visible result of physical forces establishing, under field conditions, the most balanced configurations attainable… The preceding examples have shown that forces constituting a physical field have no alternative. They cannot cease to rearrange themselves until they block each other's movement by attaining a state of balance." (Arnheim, 1971; pp.7)

Wertheimer also looked into a physiological model which produces "a unitary continuous whole-process" (Wertheimer, 1912/1961; cited in von der Heydt & others; 2012), where he explains our perception of 'pure simultaneity' - forms or shapes, and our perception of 'pure succession' - rhythm and melody. Looking into conscious experience in terms of the elements we naturally perceive, Wertheimer (von der Heydt & others; 2012) explains that in given experience, the structure itself varies in degrees with definitely structured wholes and whole-processes, with whole properties and laws, as well as characteristic whole-tendencies and whole determinations of parts allowing our perception not of a collection of disjointed sensations, but rather of a particular 'organisation' of spontaneously combined and segregated objects, as seen in **figure 2.20**. Making the simplest and most encompassing structure most permitted.

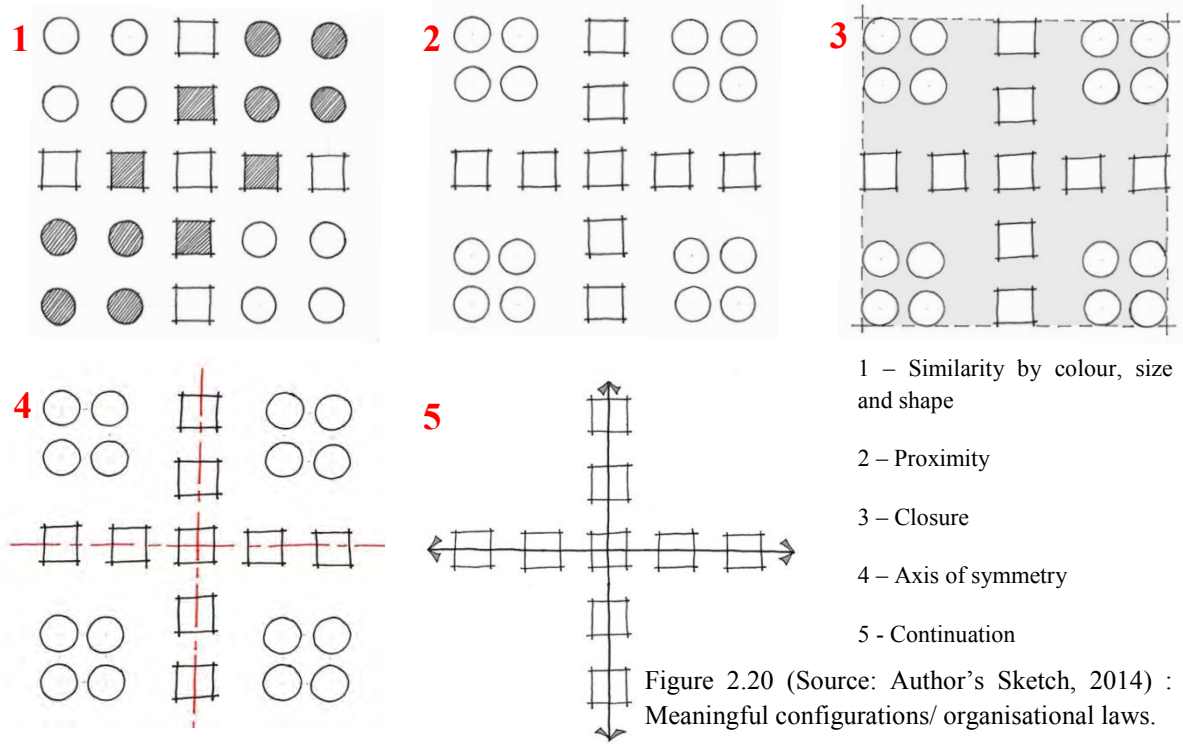


Figure 2.20 (Source: Author's Sketch, 2014) : Meaningful configurations/ organisational laws.

"The orderliness inherent in the homogeneity of a sufficiently large random distribution is easily overlooked... It follows that the entropy principle defines order simply as an improbable arrangement of elements, regardless of whether the macro-shape of this arrangement is beautifully structured or most arbitrarily deformed, and it calls disorder the dissolution of such an improbable arrangement." (Arnheim, 1971; pp.13)

Köhler (von der Heydt & others; 2012) explains that the visual system is a self-organising 'physical system' where functional instead of geometrical similarity is the method of perceiving objects and that cortical integration (responsible for consciousness and perceptual awareness) relates to one's ability of perceiving organised patterns, the connections between experienced and physical Gestalten, seen in **figures 2.21 and 2.23**. Walter Gropius (Gropius; 1962) explains taking the creative artist and reintegrating him into the world of realities, the unity of art and production where the importance of learning the special language of shape in order to visibly express one's self through optical facts such as proportion, optical illusion and colours; so that it can guide the hand and provide a basis where it can work harmoniously with the viewer/inhabitant. The style and collaboration within the Bauhaus School lead to a design based on principles of 'simplicity and truthfulness' in accordance with intrinsic laws, as a result of clear reflection and innumerable processes of thought, as well as technical, economic and 'form giving' work. Gropius (Gropius; 1962) further explains that sensations do not come from objects but rather from us, concluding that perception is split into both physical and intellectual knowledge where intellect is subject to illusions.

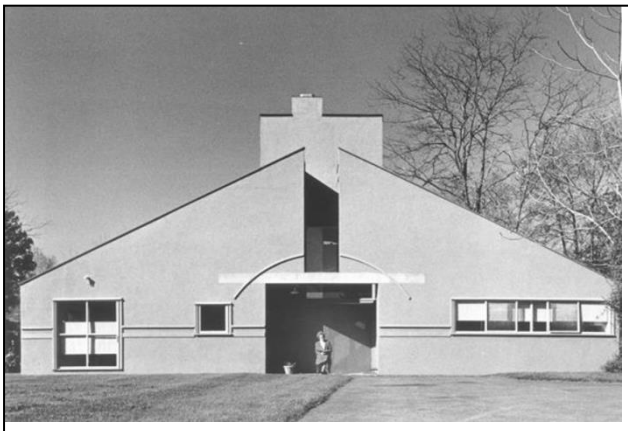


Figure 2.21 (left) and 2.22 (right) (Source: Shirazi, 2009) : Illustrating the use of special language within architecture; houses by Robert Venturi and Le Corbusier illustrate the use of form, shape and rhythm to achieve order.

"Orderliness comes in degrees; order comes in levels. A structure can be more or less orderly at any level of complexity. The level of ordered complexity is the level of order… Order, I shall suggest, is a necessary although not a sufficient condition of aesthetic excellence." (Arnheim, 1971; pp.43)

Gropius (Gropius; 1962) explains that 'artistic creation' is formed by the tension between subconscious and conscious aspects of our experience, between both reality and illusion. However one needs to remove intellectual frustration in order to restore the unprejudiced receptivity of one's childhood. Gropius (Gropius; 1962) further explains that if design is to speak a specific language to achieve expression of these subconscious sensations, it must contain primary codes of scale, form and colour, so that messages can occur through the senses, allowing man to connect through the use of the senses in perceiving the physical environment. Gropius (Gropius; 1962) therefore explains physiological acts such as the notion of 'space-time' relations and the 'motion in space', through 'transformation' as the essence of life; engaging our mental and emotional faculties of perception in order to make us more receptive and active.

Arnheim (Arnheim; 1971) explains that the concept of structure within perception must be viewed dynamically where complex themes are readable by forces such as visual balancing of sizes, distances, directions, curvatures and volumes, seen in **figure 2.11**. 'Entropy' (explains the number of arrangements possible) should be considered where tension is reduced not by degrading energy but rather by organising it into simple, balanced structures. Arnheim (Arnheim, 1971) explains that order rather leads to impoverishment and non-structure; although simplicity is positive in perception, the human existence calls for fullness reliant on the richness of structural themes and creative persons have a cognitive preference for complexity, drawing a maximum amount of energy and creating stimulation through the nervous system.

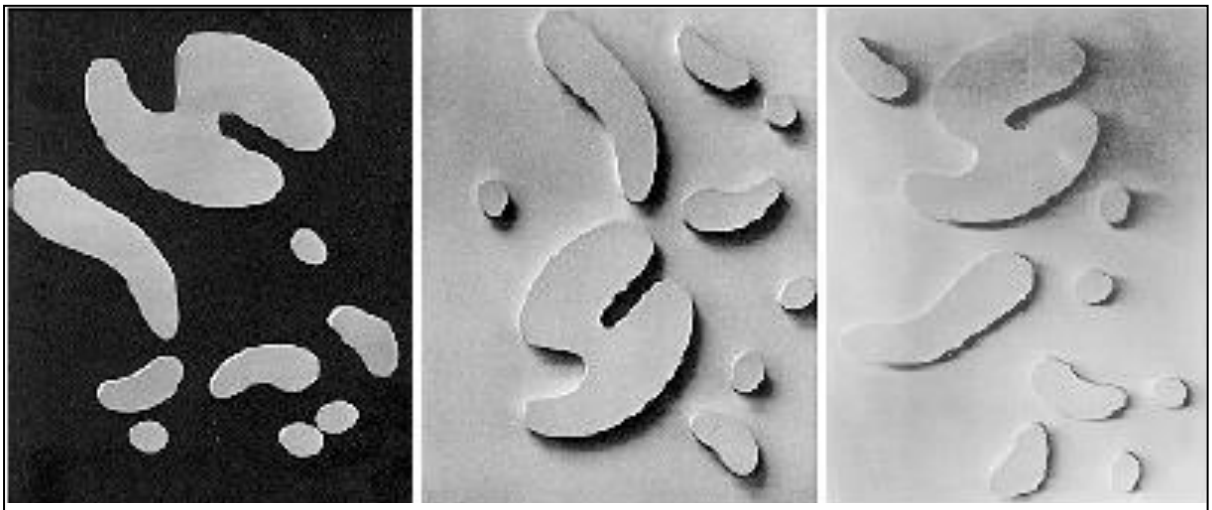


Figure 2.23 (Source: Arnheim, 1971) : Visual ordering of the same forms and area space.

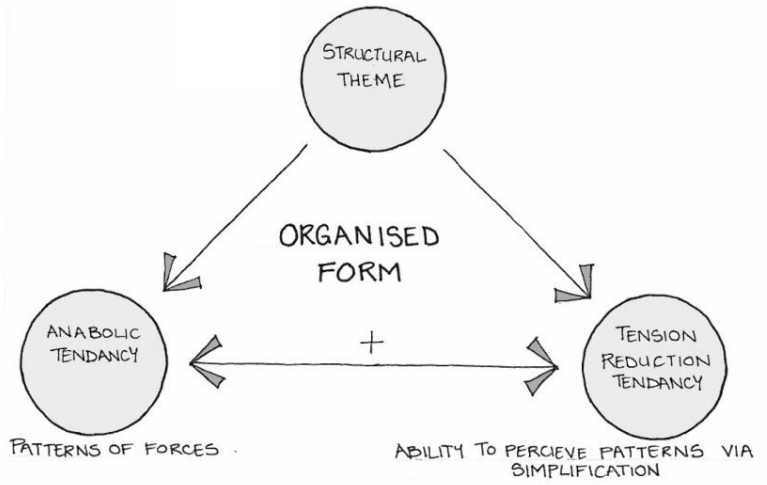


Figure 2.24 (Source: Author's Sketch, 2014) : Arnheim's description of organised form.

2.3.5 Analysis

Imperative to multi-sensory design are those physical elements within the built environment which have both physiological and psychological affects and connections of the highest level with children. Fitch (1984) explains that in order to modify our judgemental process, conditions such as external and internal forces are of importance; the internal being our physical condition and psychic state, whilst the external are those elements described as volume, shape and surfaces found in the natural environment which contribute to our internal state. According to Ayres (1972) children with learning disorders have characteristics of both learning disorders, such as reading writing and speech, as well as integrative dysfunction where difficulty is posed in processing sensory information, and through specific sensory stimulation treatment of the learning disorders is possible.

The Gestalt theory, a theory of perception explains an extra quality or dimension that things possess, in the viewer such form-quality allows the mind to search for order and therefore create meaningful encounters which seem interrelated with the concept of form and materials as the things which are important in creating the necessary sensory experiences for therapy and treatment in children with learning disorders. Arnheim discusses anabolic and tension reduction tendencies necessary in creating organisation, rather than the approach of degrading energy; as stimulation is required through the nervous system, and the fact that humans require richness and creative persons, such as children with learning disorders, require complexity in their surroundings/environment. Children with learning disorders are very active beings, especially accompanied by 'ADHD' (Attention Deficit and Hyperactivity Disorder). Uhrmacher discusses aesthetic experiences allowing for student engagement, not only through cognitive engagement but through the holistic approach, where powerful experiences

which provoke imagination, create a sense of unfolding events and encourage reflections within one's emotions, to create an integrative as well as enriching approach.

Our focus on multi-sensory design as our body's total response allows for more avenues within perception, merging us in the experience of multi-dimensional environments. According to Arnheim and his ideas of enriching as well as simplifying through balanced structures, Uhrmacher's focus on aesthetically engaging experiences in creating meaning, memory, creativity and innovation, looks at the components which make up structures such as form and materials necessary to create and poses these characteristics. However due to sensitivity of children, positive possibilities need further discussion so as to avoid guessing or observing outcomes which could be detrimental to them, so how does the built environment have an effect on children; the way they interact and understand their immediate environment?

Von Ehrenfels discusses the importance of inner and outer perception, and their combination, Wertheimer explains the importance of structured wholes rather than disconnected sensations, and Köhler reflects on lines of flow to be free-sensations in the system as a whole. Uhrmacher explains that the quality of the environment in fact creates interaction between person and such environment, where the creation of dualism occurs of both the body and mind as a whole and experience of maximum possible outcomes, where cognitive engagement utilises past experience to modify present experience in the act of learning.

Gropius further endeavours that this special language of shape creates sensations which come from within us and past experiences, making it both physical and intellectual knowledge, and both conscious and sub-conscious experiences explaining those of reality and illusion. The way children interact with the environment is determined by two characteristics of such an environment, as their ability to create aesthetic communication as well as engaged experiences. Within aesthetic communication, Uhrmacher explains the necessity of connections; in connecting intellectual and sensory aspects where the four modes of emotion, intellect, communicative and sensorial experiences occur. Fitch takes this a little further to explain the concept of submergence, not merging, but the ability of buildings to communicate with its user through volumes, shapes and surfaces. Wertheimer shares that in the whole-process 'pure simultaneity' occurs where forms and shapes are seen as one in the same and Köhler explains the visual system to be a self-organising system of a functional quality, where one takes in forms through organised perceptions of patterns.

Gropius explains space-time and motion in space help to engage the mental and emotional components of perception as they make the participant more receptive and active. Engaged experience

is the other characteristic necessary where Uhrmacher explains the whole being is important, from mentality and the use of sense organs to create an active experience, known as engagement. Fitch explores problems of active engagement, and suggests form and function are necessary in the participation of the inhabitant and ultimately their interactive experience. Lastly both Gropius and Arnheim explain that the concept of simplification and truthfulness creates clear reflection where one can perceive patterns, and tension is reduced, allowing orderliness to be obtained. The way in which children understand their immediate environment is discussed through perceptual knowledge where Uhrmacher explores perceptivity, risk taking and imagination, explaining that the child creates his own experience and engages in his environment through a fanciful way, immediate understanding or may need interactive work.

2.4 IDENTIFYING UNIQUENESS WITHIN

2.4.1 Introduction

"As noted by Bender and Wall (1994), serious intra and interpersonal problems, including loneliness, depression, suicide and delinquency, are common among individuals with learning disabilities. These problems exacerbate those presented by the learning disability itself and may lead to serious negative outcomes in adulthood." (Weller, Watteyne, Herbert & Crelly, 1994 cited in Morrison & Cosden, 1997; pp. 43)

Addressing the broader outcome, other than academic performance, one notices that a learning disabled child contains behavioural problems of a disruptive, weird or even undisciplined nature, creating a realisation as to how difficult it must be for such children to make friends, have relationships and maintain them in the attempt to lead a semi-normal life. Dr Gale Morrison, a professor and acting dean, as well as Merith Cosden, a professor and licensed psychologist; review literature in relation to such stressors in life and their relations to child development, where they (1997) explain emotional, societal adjustments and status to be affected and leading to one's ability to function effectively in society, seen in **figure 2.25**. Judith Weiner, a professor in human development and applied psychology, explores such literature in relation to peer relationships/friendships and (2004) explains their pivotal role in the behavioural adjustment of such children in comparison to children without disabilities, as their experience of emotional and societal interaction is considered undisturbed, and of a healthy nature.

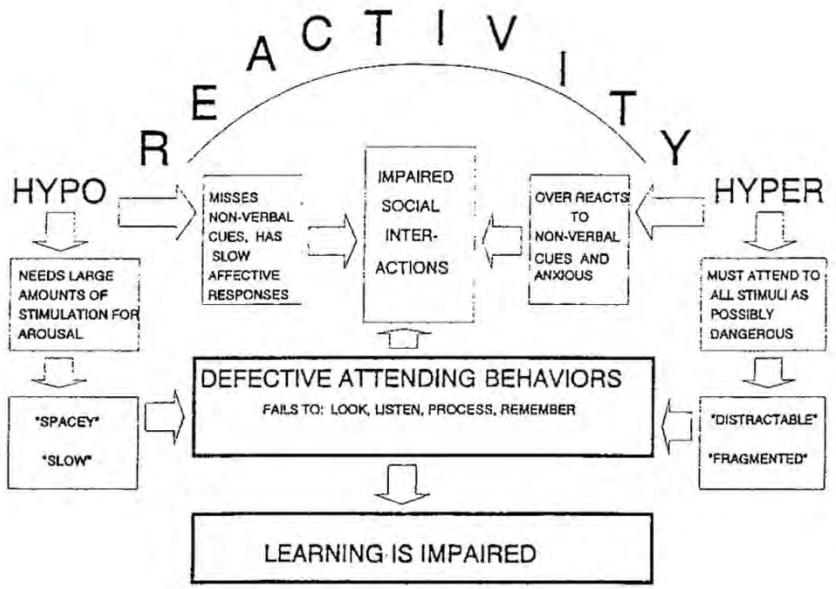


Figure 2.25 (Source: www.spdfoundation.net. Image by Kinnealey & Miller, 1993) : The effects of both hypo- and hyperactivity, within the social-emotional domain of learning.

These two authors findings come together to collaborate a common understanding of stressors however one focuses on the negative outcome of such and the other on positive relationships necessary to treat them. Morrison and Cosden (1997) further explain, based on early work of Garmezy, Masten and Tellegen (1984), that 'risk factors' of long term exposure are associated with school failure, school dropout and substance abuse, whereas 'resiliency' creates a chance for children to adapt and create positive encounters, leading to self-efficiency and self-esteem.

2.4.2 The different outcomes afforded by risk and resiliency

"The presence of a learning disability, in itself, a risk factor; however, there are wide variations in the emotional and social adaption of individuals with learning disabilities. Thus, we must consider the impact of personal and environmental risk on the exacerbation of difficulties for those with learning disabilities." (Morrison & Cosden, 1997; pp.23)

Garmezy (1983, cited in Morrison & Cosden, 1997) explains 'risk' factors to be those negative conditions associated with the increase of the likelihood of a child developing emotional or behavioural disorder by threatening normal development, and 'resilience' to be a process of successful adaption despite these threatening circumstances; the ability to spring back from those factors that interrupt development. Morrison and Cosden (1997) explain that a personal risk is that of an internal nature to the individual; which effect behaviour, and environmental risks to be those of an external nature; structure of family, peer and social environments. Wiener agrees that the child with learning disorders can benefit from less risk, and (2004) explains the two possible risk models, as seen

in **figure 2.26**; one diagram of a direct link between learning disabilities and relationship problems, and the other a multiple-risk model showing that relationship difficulties and both internalising and externalising behavioural problems are more likely to occur with the addition of risk factors. Weiner (2004) also explains that children with learning disabilities are associated with psychological and adaptive behaviour problems, causing difficulty in peer relationships, and with added multiple-risk factors such as 'ADHD' and educational mismatch, problems of self-control, peer rated disruptiveness and aggression only worsen the situation.

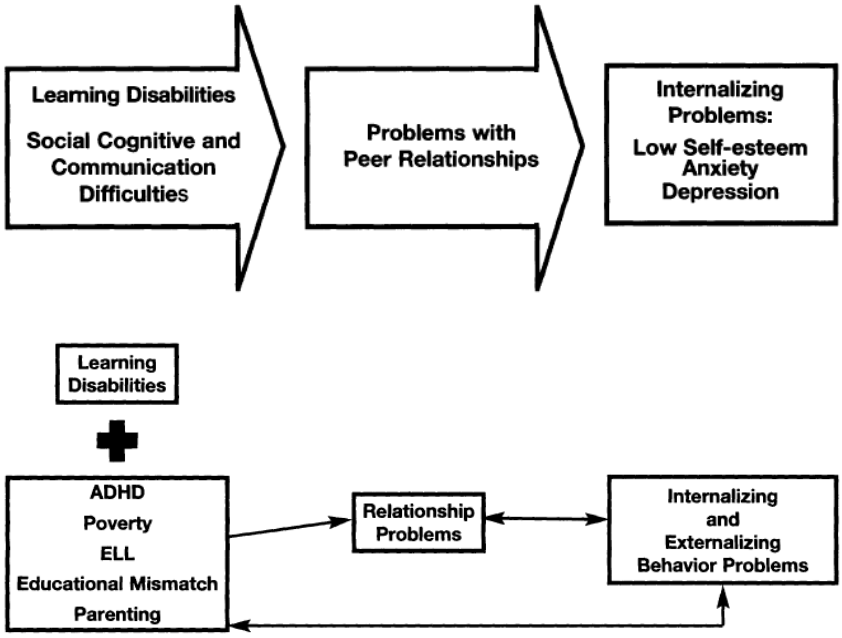


Figure 2.26 (Source: Wiener, 2004) : Risk Models.

A – Single-risk model

B – Multiple-risk model

Feagans, Merriwether and Haldane; Keogh and Weisner; Silver; Wilchesky and Reynolds (cited in Morrison and Cosden, 1997), explain the term 'ecocultural fit', where the individual benefits greatly from protective factors created in one's environment, consisting of his/her family and other people, and further that these may ameliorate problems often associated with learning disabilities. Wiener (2004) further explains teachers with pathognomic beliefs, to create more risks for students by the non-use of pre-referral interventions.

2.4.3 The resilient approach afforded by child relationships

"Specifically, verbal skills, self-awareness, and an environment that offers both practical and emotional support have emerged as factors that can either reduce risk by their presence, or increase risk through their absence." (Morrison and Cosden, 1997; pp.54)

Morrison and Cosden (1997) explain a major risk factor in children with learning disabilities to be that of emotional adjustment, where the common outcome is that of behavioural manifestation in children with learning disabilities where it is likely to affect their social relationships. Morrison and Cosden (1997) explain that learning disabilities involving the right hemispheric dysfunction are linked directly to depression and nonverbal learning disabilities which naturally place children at greater risk for both anxiety and depression. Sulivan (1953, cited in Wiener, 2004) explains friendship as a close, intimate, mutual, dyadic relationship necessary for self-worth, and important factors lie within the number of friends, the stability of relationships and their quality. Boivin, Hymel and Bukowski; Rigby and Crick (cited in Wiener, 2004) on the other extreme explain peer victimisation of a chronic type to increase risk for adjustment problems such as anxiety, loneliness, depression, social withdrawal, low self-esteem, suicidal tendencies, dislike and avoidance of school, as well as poor academic performance.

"...greater awareness results in actions that affect the environment in which individuals with learning disabilities find themselves. Thus, part of the potency of knowledge as a protective factor is that it results in actions that can create a better environmental 'fit' for the individual." (Morrison & Cosden, 1997; pp.56)

This created low self-esteem, leads to substance abuse in children with learning disabilities, where Fox and Forbing (1992 cited in Morrsion & Cosden, 1997) explain overlapping symptoms, such that symptoms of memory loss, withdrawal, concentration loss, motor/physical extremes, poor co-ordination, poor academic performance, inappropriate social skills, low self-esteem, attention seeking behaviours, negative attitude and delayed maturation now overwhelm the child in double jeopardy. Morrison and Cosden (1997) however explain that self-awareness, serving as a protective factor, allows individuals to create proactive compensatory strategies, this involves one's knowledge, understanding and acceptance of one's disability in order to reduce vulnerability and is only really accomplishable in the mature/growing stature of the child into an adult, for personal satisfaction, vocational success and college completion.

Rubin, Bukowski and Parker (1998 cited in Wiener, 2004) explain the discrete behaviour of social skills to be necessary in achieving success, however affected by the inability of social cognition, children with learning disorders suffer from ineffective; social communication skills, portraying the initiative role effectively; pro-social behaviour, cooperation and leadership skills, and emotion regulation skills. Wiener (2004) further explains that positive relationships in fact enhance one's adjustment, making them protective factors which promote resilience, with children, parents or even mentors only leading to positive outcomes and that focus should be placed on a child's non-academic

strength due to their intellectual, athletic and personal strength characteristics, as these environments are where children with learning disabilities find compatible friends.

"Protective and risk factors for families include the personal characteristics of the child(ren) and parents, the structural characteristics of the family, and the external support available to the family. To some extent, these factors may have reciprocal effects on one another. For example, child characteristics may affect family structure, while family structure may influence the child's personality development." (Freud, Bradley & Caldwell, 1979; Green, 1990; Kaslow & Cooper, 1978; Michaels & Lewandowski, 1990 cited in Morrison & Cosden, 1997; pp.48)

Vigilante (1983 cited in Morrison & Cosden, 1997) explains that each family varies in hierarchy, cohesion and flexibility, however change is inevitable to each family life cycle and that the most important characteristics of a healthy family is the family's ability to adapt to such change particularly necessary during periods of developmental change in the child with learning disabilities, for example a cohesive and supportive family structure may have an effect on the severity of the child's academic and behaviour problems. Tollison, Palmer and Stowe (1987 cited in Morrison & Cosden, 1997) however show that parents need to interact more with schools and teachers, by explaining that the parent's acceptance of the child's academic limitations as well as acknowledging their strengths allow one to lower expectations and may result in lowering anxiety and stress, allowing higher overall student achievement. However Morrison and Cosden (1997) explain that too much can also create risk instead of protection where family characteristics such as patterns of enmeshment, over protection and rigidity are evident.

Table 1: Characteristics of children with and without learning disabilities

	Children with learning disabilities	Children without learning disabilities
The Children		
Age (average)	10.1	10.2
Friendships		
Find it 'harder than average' to make friends***	33%	9%
Find it 'harder than average' to keep friends***	25%	5%
No friends***	14%	1%
Only one friend***	13%	4%
Does 'a lot' of things together with friend***	56%	76%
If worried cannot talk to friends***	43%	20%
'Many' or 'all' of child's friends get into trouble***	9%	2%
Their Families		
Supported by single parent***	30%	23%
Living in income poverty[a]***	47%	30%
'Unhealthy' family functioning***	27%	18%
Informant has no educational qualification***	38%	20%
Nobody in household is in employment***	30%	14%
Average number of siblings	1.4	1.3
Mother's general health is less than 'good'***	20%	6%
Mother is likely to have an emotional disorder[b]***	33%	24%

Figure 2.27 (Source: www.larcaster.ac.uk. Emerson & Hatton, 2007) : Statistics compared between learning disabled children and children without learning disabilities, in relation to friendships and family structure.

Stanovich and Jordon (1998 cited in Wiener, 2004) explain that more interaction with students of an exceptional or status comes from a higher quality of academic interaction between students and teachers; where the interventionist beliefs to education explain that learning problems are a result of such interactions in the school environment and choose to 'fit' a different school program for children with learning disabilities into the normal curriculum, as well as include parents in the problem solving team. Such children according to Jordon and Stanovich (2001 cited in Wiener, 2004) are said to experience a more positive perception of both their academic abilities and peer relationships and social and economic supports and further benefit them, seen in **figure 2.28**, such as instruction in English as a second language and offering psycho-educational programs for parents.

"According to Greene (1996), 'goodness-of-fit' is defined as the notion that a fundamental aspect of interactions between children and adults is the degree of compatibility between the capacities, motivations, and style of behaving of a child and the expectations and demands of an adult." (Wiener, 2004; pp.28)

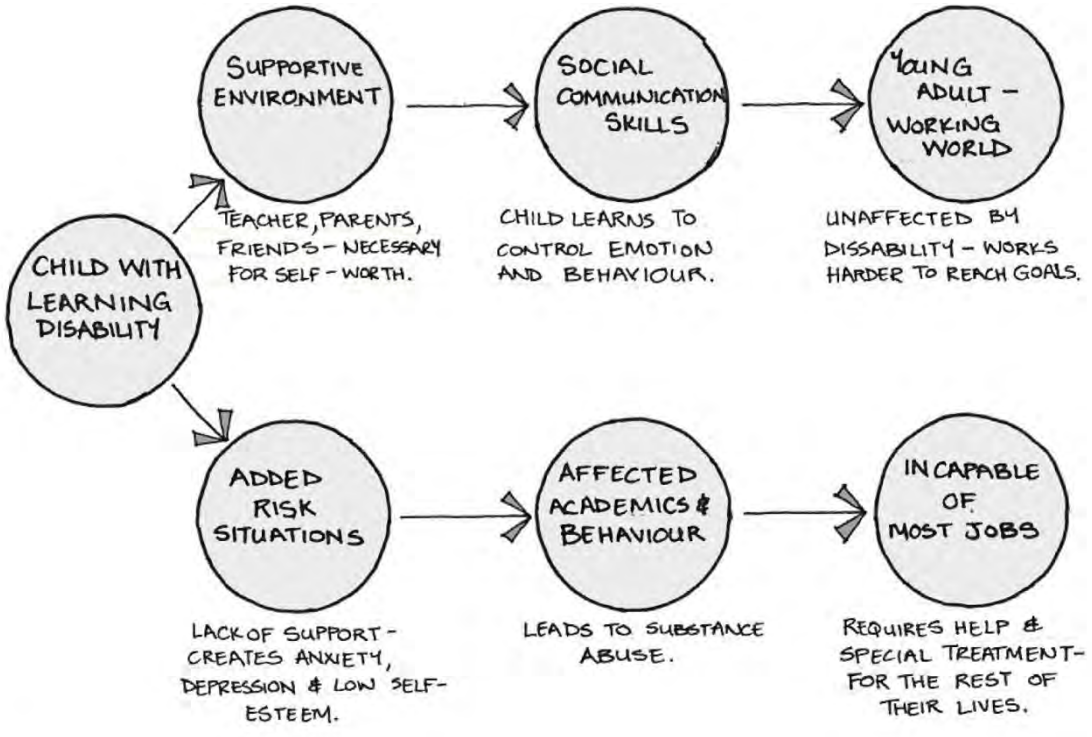


Figure 2.28 (Source: Author's Sketch, 2014) : Assessing possible outcomes of children with learning disabilities.

2.4.4 The survival role of existentialism

"The capacity to imagine, to liberate oneself from the limits of matter, place and time, must be regarded as the most human of all our qualities. Creative capacity as well as ethical judgement call for imagination… In my view, the sensory and embodied mode of thinking is particularly in all artistic phenomena and creative work." (Pallasmaa, 2009; pp.17)

Søren Kierkegaard believed that philosophy needed to awaken the individual so that he could direct and experience life or force him to make judgements instead of avoiding conditions of existence altogether. Focusing on three themes such as existence, alienation and transcendence, Kierkegaard (McDonald; 2005) explains that one's 'self' does not already have an identity but must go through an abrupt reversal of priorities in order to realise uniqueness. Within existence, three spheres occur, namely the aesthetic, ethical and religious, which attempt to explain the creation of a new authentic self, Kierkegaard (McDonald; 2005) further explains that despair/alienation is experienced in the aesthetic phase occurs at the unconscious level, moving to the ethical phase when one's feeling of despair begins to appear in consciousness until the derangement of the senses and lastly enters the phase of religion/transcendence, where the four moods of melancholy, irony, anxiety and despair arise out of crisis moments to allow for a higher consciousness and self-awareness. When one chooses themselves as a 'subjective existing being' they come to judge themselves from a new perspective, however the importance is that they choose to be responsible to an ethical code.

"Given the identifiable complexity of the hand, its actions and its relationship to the rest of the body as well as the brain, even simple hand tools are in essence body tools… In the same way that the boundary between the hammer and the hand disappears in the act of hammering, complicated tools such as musical instruments merge with the user's body: a great musician plays himself rather than a separate instrument. In drawing and painting, the pencil and the brush become inseparable extensions of the hand and the mind." (Pallasmaa, 2009; pp.50)

Nietzsche (McDonald; 2005) furthers explains authenticity and its notions, focusing on time where it is identified by turning in on oneself, so that one can recover oneness and wholeness, leading to the discovery of one's 'true self'. Nietzsche describes the concept of 'will to power' as many souls belonging to many individual men in the world, each with their own beliefs and power who can govern the whole universe through just his existence. The will of the human is said to have no obstacles or therefore limits, Nietzsche explains the sense of emptiness which grows and destroys man, as he discards even more values, beliefs, convictions and conceptions, he is left with existence confronted by nothingness. Jean-Paul Sartre believes that 'existence precedes essence', explaining

that one is brought into being by such choices that they make and not by determined character, authenticity is therefore seen as a construction within consciousness predicted by actions and awareness of existence. Sartre (McDonald; 2005) explains consciousness to be an act, of intentional directedness towards objects and the external content where it is projected internally. In humans this is unique because we are also conscious of ourselves and we have the ability to control immediate experiences as we are aware of our behaviour and choices.

"Pleasurable objects and buildings mediate an experience of the process by which the object or structure was made; in a way, they invite the viewer/user to touch the hand of the maker… The architectural quality is manifested in the fullness and unquestioned dignity of the experience. A resonance and interaction takes place between space and the experiencing person; I set myself in the space and the space settles in me." (Pallasmaa, 2009; pp.104)

Norberg-Schulz (Norberg-Schulz; 1971) explains that existential space in fact contains a stable system of perceptual images of the environment; the relationship between man and his environment expresses the need to understand space in terms of human existence rather than just a dimension of perception and thought, as seen in **figure 2.29 and 2.30**. Norberg-Schulz (Norberg-Schulz; 1971) further explains that existential space cannot be fully grasped as man's needs alone but rather of his interaction with the environment, therefore his understanding and acceptance is important as well as the 'character' of the place which if strong enough can determine the basic properties of the environmental images placed on people. The concept of 'Genius Loci', therefor explores that different places have different characters and can make people feel like they experience and belong to the same place. There are two aspects necessary in the structure of space; 'abstract aspects' comprising of the general schemata such as topological or geometrical, and 'concrete aspects' referring to our perception of environmental elements such as landscape, townscape, buildings and physical things.

Figure 2.29 (left) and 2.30 (right) (Source: Pallasmaa, 2009) : Comparing spaces of different character.

"An architectural work is not experienced as a series of isolated retinal pictures; it is touched and lived in its full and integral material, embodied and spiritual essence… It offers pleasurable shapes and surfaces moulded for the touch of the eye, but it also incorporates and integrates physical and mental structures, giving our existential experience of being a strengthened coherence and significance." (Pallasmaa, 2009; pp.137 & 138)

Norberg-Schulz (Norberg-Schulz; 1971) explains the concept of the 'centre of the world', delimitating that man's personal world contains its centre which is his 'home', relating to his childhood and being the first point of reference for one's existence, where we slowly penetrate its boundaries and acquire other positions as 'thinking beings in space'. Discussing levels of existential space, Norberg Schulz further expresses a hierarchy of levels determined by the given environment and man's constitution, (Norberg-Schulz; 1971) explaining the lowest level to be determined by the extending actions of man's hand and the highest levels as the urban level which is determined by social interaction and the landscape level consisting of man's interaction with the natural environment, where the higher levels are concretised by the lower.

Juhani Pallasmaa (Pallasmaa; 2009) explains that humans tend to live in their bodies in the same manner that we live in our houses, however we do not live in our bodies but are in fact 'embodied constitutions', suggesting a primary experience where we exist in the world through our bodies. The unification of mind and body is essential and Pallasmaa once again enforces the importance of the senses which connect us to the world, however this time focuses on the 'thinking hand' in relation to existentialism. Pallasmaa (Pallasmaa; 2009) explains that knowledge and skills live in our senses and muscles visible in the hand, as seen in **figures 2.31 and 2.32**, more precisely in the knowing and intelligent hands of the person and that imagination and creativity exist not only in our minds but our entire body. Pallasmaa focuses on the hand for its precision and ability to have its own understanding, will and desires, as well as the origin and expression of pleasure and emotion and through these possible creative acts the boundary between self and world softens to allow the fusion of world and self.

Figure 2.31 (Source: Pallasmaa, 2009) : The child's hand of eagerness and tactile images.

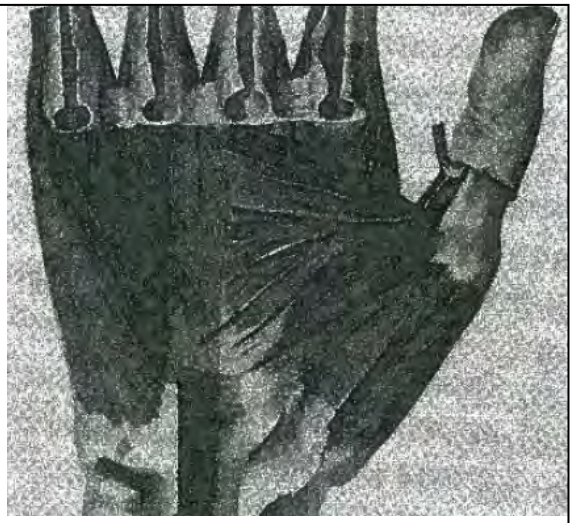


Figure 2.32 (Source: Pallasmaa, 2009) : Muscular make-up of the hand.

2.4.5 Analysis

Interrelated with form and materials and multi-sensory design, interactive knowledge also pertains to environments however this type consists of psychological aspects in terms of non-permanent structures; such as people and their relationship to the individual, creating unique experiences. This is critical to the wellbeing of the child, where he/she relies on external support from others to maintain a somewhat 'normal life' and where his opinion on things often become influenced by those people around him. Ayres (1972) explains that a child by seeing how a stimulus should affect them may employ adaptive techniques in doing tasks with much more difficulty and benefiting his developmental growth through experiencing such stimulus in a proper way. Morrison and Cosden explain however that these neurologically based deficits interfere with the child's social functioning, therefore making it difficult for them to make friends or have good relationships, leading to high levels of anxiety and depression, worsening their symptoms.

The theory of existentialism focuses on individual existence, freedom and choice, and the concrete 'nature of existence', where human beings practice integrity, passion, authenticity and commitment in life. Wiener explains that within children with learning disabilities, many have issues with emotional regulation skills and that these such children are said to also suffer with 'ADHD', creating behavioural problems and therefore leading to very little chance of compatibility as other children fear, dislike or ignore those with such characteristics. Pallasmaa explains persons to be embodied constitutions where knowledge and skills lead to precision and ability, where pleasures and emotion originate from and is therefore the boundary between self and world. A child's emotion is imperative

to the way he feels, behaves and interacts, explaining the way we feel to depict how we behave or react and this affects how others interact with us in any such environment.

Ayres (1972) explains that the therapist cannot force organisation upon the child's brain, they can only provide encouragement and the environment necessary for the child, where the child can learn under his own direction, labelled the optimum level of therapy. However focus placed in the field of architecture; elicits the need for the built environment to achieve therapeutic situations through multi-sensory design of form and materials, having the ability to create encounters for relations to occur, and the creation of places of character within schools, homes and even playgrounds to further this. Pallasmaa discusses the body as our home where senses connect us to the world through not only the tactile hand but the hand of thinking and knowledge, Morrison and Cosden explain resilient situations within such built environments to allow the chance to adapt, positive encounters, self-efficiency and self-esteem to occur, and Wiener explaining a child's behavioural adjustment reliant on peer relationships.

Investigating the question of why the importance of form and materials of a given environment elevate, educate and empower children in their discovery and existence of themselves, by creating spaces they need, want and engage with? One needs to explore the full outcome and possibilities created by doing this and how detrimental this process can be in turning around current situations for children with learning disorders. Kierkegaard speaks about existence and alienation, where the need to awaken the individual through direct and experiencing life helps one to realise their identity, a highly-conscious state. Morrison and Cosden within environments explore external risk conditions, those of negative affect, and explain that they threaten the child's normal development; whilst external resilience uplifts the status of the child, and often cases prove external support is needed. Wiener also explores the many risk factors that children with learning disorders have to deal with both internally and externally, however proposes a solution of peer relationships to encourage their adaptive behaviour.

Nietzsche speaks about selfhood where mind and will are powerful determinants; this impermanent and becoming nature creates our patterns of behaviour, and describes authenticity to be oneness and wholeness where one discovers one's true-self. Satre further explains our conscious state to be in control and aware of our behaviour and choices where our self-identity is established by encounters and negotiating existence in relation to others. The first type of relationship necessary is that of children and peers; where Morrison and Cosden explain a common outcome of anxiety and depression in children with learning disabilities, and where self-report factors provide positive outcomes. Wiener explains that peer relationships is infact needed for such self-worth, therefore their

quality and mutuality is of importance. Norberg-Schulz explores man and his environment; his interaction, understanding and acceptance, important to the character of place and his/her feeling of belonging. The other type of relationships required, are those of parent and teacher relationships; where Morrison and Cosden explain family environments and their need to change/adapt and interactions with school/teachers is of great importance allowing parents to understand situations. Wiener explains the need for teachers and students to interact through the interventionist approach and inclusion of parents in mainstream schools.

Pallasmaa explains that our bodies are in fact our houses where embodied experience, knowledge and skills create the type of boundary between self and world. In conclusion self-esteem and self-awareness are what spaces need to create for children, where they want and engage with such environments as it makes them feel better. Morrison and Cosden explain negative self-image to lead to delinquent behaviour and knowledge, where understanding and acceptance of one's disability can reduce their vulnerability. Wiener on the other hand explains high-quality friendships to lead to high self-esteem and these positive relationships enhance one's adjustment capabilities for their performance in school.

2.5 CONCLUSION

Problems arising in assessing the child with learning disorders and spaces of support lead to the assessment of multi-sensory design within the built environment, particularly on it's make up of form and materials, in order to propose a knowledgeable environment for such children and those who impact their lives the most.

Multi-sensory environments therefore look into the importance of all the senses involved in the learning disordered child, in order to create experiences of full potential and enriching qualities to enable their further growth. Such environments also enable the particularly gifted and disordered students to maximise on strengths and make up for their weaknesses. The focus on the built environment's form and materials also allows the designer to employ strategies to encourage the learning disordered child to easily understand his surroundings and not be intimidated or scared to the extent that he shuts off all interactions. The focus then moving into the realm of others is a very touchy subject for such children as their lives revolve around difference and therefore bullied situations. By creating a catalyst to inform and educate the community, such children are given a better chance to interact, understand their own difficulties and given the ability to compensate for them.

The theory of phenomenology brings in key aspects such as movement, the inseparable nature of man and his environment, as well as meaning and memory, in order to create environments of multi-sensory quality. All discussing important stages; movement describes the act of making one conscious of his interactions and ability, man and his environment discussing the importance of interaction, in order to achieve situations in which the learning disordered child can develop meaning and retain information necessary to their learning ability. Being the key theory and linking all three subject matter together by means of a common subject; perception, our perception of the built environment and our perception of others. This is clearly noticeable by the overlap evident in sections such as gestalt laws mentioned in phenomenology, existential experience expressed in gestalt theory of perception and phenomenology referred to and built on for the existential theory. Such allows the consecutive study of children with learning disorders by investigating aspects of multi-sensory design, composition attainable to them and spaces of support to accomplish beneficial approaches.

Gestalt theory of perception thereafter discusses strategies of inner-outer perception, past and new experiences, functional systems and order. Most relating to architecture theses discuss that one's body (actions) and mind (intelligence) are connected through interaction, in order to build on pass retained knowledge or the development of totally new experiences, where the self-organising system of the learning disordered child mostly identifies with visual systems of functional and ordered qualities. Within existentialism, such spaces or places create different types of encounters in which importance is placed on; existence/one's identity, the power of mind and will, and sense of belonging as we constitute embodied experience. Aiding in social encounters through character or atmosphere of space, such spaces/places need to restore or develop the child's identity of himself where he may notice differences to others, stir emotions to encourage his involvement and will to learn so that he can feel like he belongs to a world which previously neglected, bullied and/or misunderstood his abilities. The knowledge and skills developed from such embodied situations, for both the learning disordered child and those without disorders, aids in an interactive knowledge where each party learns to understand, accept, interact and benefit from the opposing party.

The study of precedent and case studies will further the information gathered into the actual use of such concepts and theories within the built environment. Such studies will be assessed in terms of positive and negative aspects in order to fully investigate all concepts and theories in four examples of deep analysis. These designs also attempt to ease the reader's transition from theory and literature review into the study and observation of spaces involving children with learning disorders and disabilities.

CHAPTER THREE:

PRECEDENT STUDIES

CHAPTER 3 – PRECEDENT STUDIES

3.1 INTRODUCTION

This chapter will review and investigate existing examples of buildings pertaining to the research done in the two previous chapters, but mostly in regard to literature review. The thinking behind the choice of two precedent studies is to understand the theories of phenomenology, Gestalt theory and existentialism in their practical application; where their relation to the concepts of multi-sensory, form and materials and interactive knowledge should be evident. This section will also aid in acknowledging import spaces needed for the proposal project and therefor aid later in formalising an accommodation schedule. International examples have been chosen in order to gain a diverse understanding of the issues at hand.

These precedent studies were chosen based on their relationship and views in regard to the literature review. To express well known architects such as Louis I. Kahn and Steven Holl, who both have strong beliefs and styles pertaining to the theories and concepts discussed. Although not pertaining to young children, such designs attempt to express the best quality and possibilities in the built realm.

3.2 THE SALK INSTITUTE (1959-1965), LOUIS I. KAHN, LA JOLLA (CALIFORNIA)

3.2.1 Summarised Background

The client Jonas Salk, a physician and microbiologist, known for the development of the vaccine against paralytic polio; commissioned a new scientific research facility in 1959, with funding from the National Foundation for Infantile Paralysis in the hope and need to develop a leading institution for Molecular Biology and Genetics; Neurosciences and Plant Biology. Salk offered this commission to architect Louis I. Kahn after recommendation, meeting, talking and hearing of his proposal for a new medical research building for the University of Pennsylvania. This commission came with two very particular requests from Salk; first he required a site roughly 100 000sq feet and second he “would like to invite Picasso to the laboratory” (Salk cited in Stoller, 1999; pp.2), much describing the scientific and artistic approach to this design, where Salk’s desire was to base this scientific institute on broad, synthesising, humanist principles and to merge both intuition and reason.

Kahn, an architect well known for his brutalist methods, honesty for what it is and does, accepted this project as he felt a connection to the client through shared vision and ambition, even commenting that Salk was *“the most impressive intellectual [he had] ever had as a client”* (Kahn cited in Stoller,

1999; pp.2). A complex of buildings, seen in **figure 3.1**, however was unfortunately abandoned due to funding and only the main building and purpose of this project, the Salk Institute laboratories were constructed and adapted by Kahn meet the important needs of a meeting place.

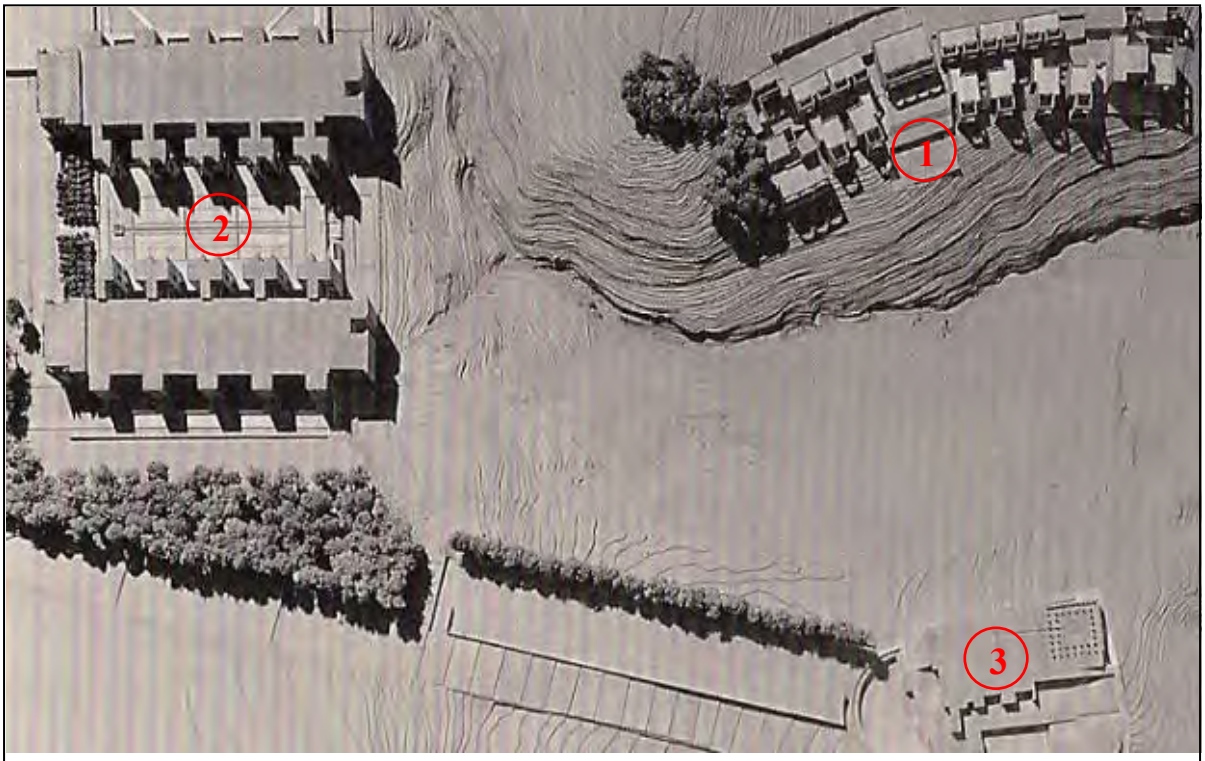


Figure 3.1 (Source: Stoller, 1999) : Site plan of the model (NTS).

(1) The residential building (2) The institute (3) The meeting house

The chosen site, a vivid twenty-seven acre coastal site which overlooks the pacific ocean horizon, houses two identical six-story laboratory buildings, seen in **figure 3.2**, astride the heart and focal point of the design; an open-ended courtyard with a pulse supplied by running water in a thin long stream, running due west along the courtyard centreline toward two pools of water, ending with the eye connected to the view of the ocean. Kahn created a design of spatial complexity where a dense puzzle of bridges and stairs to link the different levels of different functions, where it was said to amplify the perception of distance between labour and contemplation and visitors on the other hand found themselves enmeshed in the logic of the building (Kahn cited in Stoller, 1999). The building design consists of three levels of laboratories (served space) and three corresponding levels of mechanical floors (servant spaces), intertwined to create servant floors on top of served floors below, as seen in **figure 3.3**, and one set was also placed below grade to help with the scale felt in the courtyard by the human inhabitant.

Figure 3.2 (Source: Stoller, 1999) : Location and context.

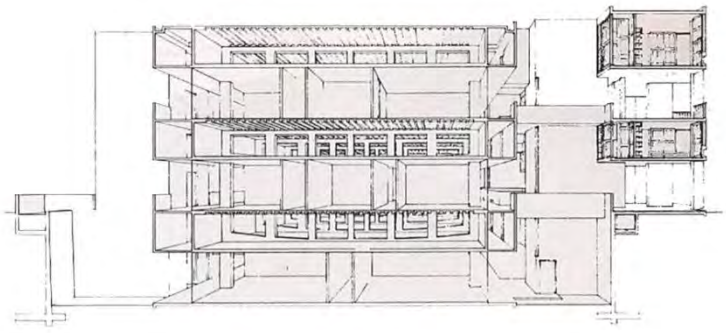


Figure 3.3 (Source: Giurgola, 1994) : A section showing the structural composition (NTS).

These laboratory spaces are strided by five free-standing towers on the inner courtyard walls; creating arcade entrances to the courtyard at ground level and housing private studies and balconies, whereas exterior towers house services such as toilets and fire escape stairs for the laboratories. In the internal courtyard Kahn decided to call on the help of Luis Barragán who after visiting the site commented *"I would not put a tree or blade of grass in this space. This should be a plaza of stone…If you make this a plaza, you will gain a façade – a façade to the sky"* (Barragan cited in Stoller 1999; pp.9). This space of the unmeasurable encourages the bringing together of the two laboratory wings through free circulation to inspire both use and activity, as indicated in **figure 3.4**.

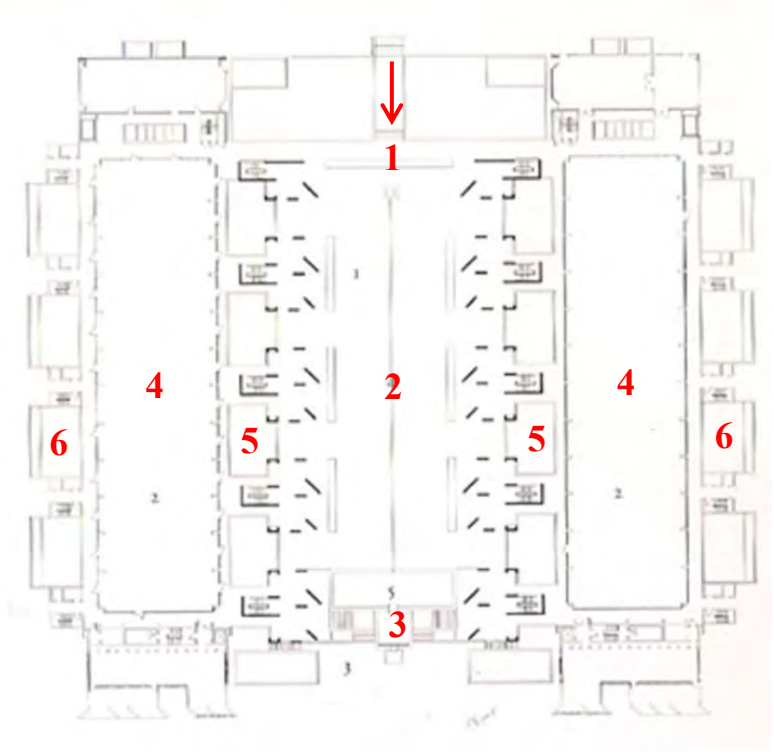


Figure 3.4 (Source: Stoller, 1999) : Ground Floor Plan (NTS):

1. Is the main entrance

2. The long central courtyard

3. Lower pools of water and seating areas

4. Column-free laboratories

Which are serviced by:

5. Individual study areas

6. Toilets and fire escape stairs

2.2.2 Justification for Precedent

"I love new beginnings, marvel at beginnings, I think beginning is that which confirms continuation. I revere learning because it is a fundamental inspiration. It isn't just something we do, it is born into us – the will to learn, the desire to learn is just one of the most, the greatest inspirations." (Kahn, 1972; pp.41)

Kahn on the topic of learning (Kahn, 1972) explains that no system, not even education systems, can ever capture the real meaning of learning, and with focus on availability and interaction the architect must abandon all general spaces of learning and must begin all over again in its description, concept and design. Giurgola (1994) explains Kahn's search for the deepest origins and profound values in order to achieve true essence in architecture through four characteristics of *Silence and Light* – is where art has its origin in silence which has the ability to express something and light is the original source of all laws of nature; *Man* – man's 'will to expression' explains art as his only valid language and through communication we reveal human essence, where aspirations are transformed to expression giving man reason for being and his life meaning; *Sense of Place* – the creation of spaces into places by the combination of human needs and a natural site, the location for the existence of human activities and manifestation of the human spirit; and *Human Institutions* – based on human

effort, transcending time and circumstances of the moment, atemporal and inevitable but most of all above circumstantial necessities.

Within Kahn's architecture, two constants are found and Giurgola (1994) explains these to be that of *light as an element in construction*, where natural light determines the nature of space and Kahn's technique is that of an integral part of his architecture; and the *relationship between the different architectural elements*, where the importance of the analysis of the relationships between constituent elements is necessary in the composition of space. Stoller (1999) explains that when entering the serene, open-air central courtyard one embodies Kahn's unique typology and experiences essential forms and other historical antecedents, where he orientates the viewer spiritually through methods of measurable (building) and immeasurable (courtyard) places. Open to the sky, enclosed by two facades of the building and open at either ends, Kahn (cited in Stoller, 1999) explains this to create a situation where light affects both the sensitivity of the building, seen in **figure 3.5,** and the courtyard itself where many moods are created, and this atmosphere will create a plaza never static, always changing in its ability to create anticipation in its viewer. Kahn further expresses the correspondence between the flesh of the wall (materials) and the flesh of the body (skin), most noticed through and beside the long primary outdoor walkways, seen in **figure 3.5**, and in the porous spaces between studies and labs, **figure 3.6**.

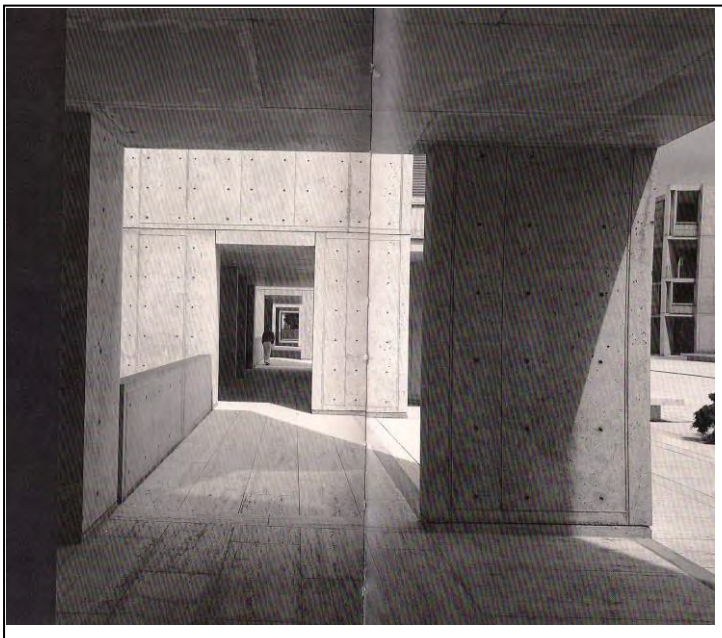


Figure 3.5 (Source: Stoller, 1999) : Long primary outdoor walkway.

Figure 3.6 (Source: Stoller, 1999) : Porous space between study and labs.

Two constant elements found in Kahn's work (Giurgola, 1994) is explained as *composition and integrity*, where Kahn lists four criteria in order to determine the beauty of an object, such as integrity, its perfection, its symmetry and proportions and its clarity, all imply a totality with an inability to separate any from the whole without upsetting the equilibrium; and *respect for the materials*, the care with which one must treat his materials to create a better relationship between human being and nature, and the use of formal language to respect such laws of nature. Stoller (1999) explains Kahn's use of interlocking volumes; both in form evident in **figure 3.7**, and material as his principle of knowing how the building was made, in such cases formwork was filled with a cheap and durable plywood panels for the identification of study areas, a material which allows both light into spaces during the day and it lights up like beacons if used at night, seen in **figure 3.8**. When situated in the courtyard, Kathleen James (cited in Stoller, 1999) explains the materially direct and austere environment one experiences when surrounded by such composition and construction; involving materials of concrete, brick and wood, where Kahn aims to orientate us both intellectually and literally. If that isn't enough Kahn adds volcanic ash to the concrete to create a material and colour hardly experienced and Stoller (1999) further explains his attention to detail such as connections, control joints, bleed lines and tie rod holes, all plunged with lead as if each had a message for the occupant, seen in **figure 3.9**. In construction Kahn never leaves anything to chance, especially under the watchful eye of Salk, however what he did leave to chance explains Stoller (1999) is the voids and tiny pockets created on the surface of the concrete when poured and set, as its natural character is revealed, however once again polished by Kahn's detailing methods; seen by v-shaped protrusions expressing method of construction and placement of regulating lines.

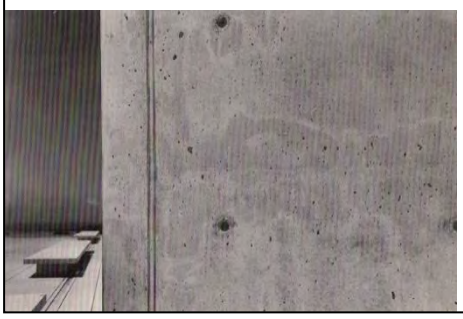


Figure 3.7 (top-left) (Source: Stoller, 1999) : Functional form.

Figure 3.8 (top-right) (Source: Stoller, 1999) : Study rooms.

Figure 3.9 (bottom-left) (Source: Stoller, 1999) : Imperfect concrete.

This constant in Kahn's work (Giurgola, 1994) is described by space; where the plan is a composition of elements creating a self-contained unit which is independent of the overall form, and whilst human activity takes place in space, a place for the meeting of two people and a space intended for a large number of people is of different composition. Kahn (1972) focuses on and explains the need to avail opportunities for both interaction and expression which comes from a city's plan or character such as schools, described as any place which satisfies the human desire to learn; streets, places of meeting; and squares, places which bring together all the places (Giurgola, 1994). Kahn's design of the central courtyard/nave is quite wide in character linking its character to that of a square which Stoller (1999) explains its dimensions up into the sky unlimited and the function of the narrow, long water stream directing the viewer's gaze into a distant belt of ocean to further create infinite space, seen in **figure 3.10**. Kahn (cited in Stoller, 1999) explains further that its bare quality instead of a garden is necessary because if the space either soothes or heals the occupant, it also has the ability to unsettle and affect one's well-being, on the other hand the mix of measurable and immeasurable knowledge , noticeable in **figure 3.11**, creates a composition which creates dualistic rendering of the question of one's life.

Figure 3.10 (Source: http://iris.nyit.edu. Image by Norberg-Schulz, 1979) : Central courtyard square.

Figure 3.11 (Source: Stoller, 1999) : Measurable vs immeasurable.

3.2.3 My Analysis

Originally identified by his use of geometrical shapes; circles, squares and triangles, and his use of different material; predominately concrete, brick and wood, a look deeper into Kahn's philosophy has shown how pertinent he is, with this design, to my study with aspects linking to all my theories of phenomenology, Gestalt theory and existentialism and in relation to his views on learning. Although this design does not focus on children or schools, Kahn's insights on learning and all the theories used are proved useful for children; especially those with learning disabilities and disorders, in the above chapter, and therefore make this building of relevance.

Kahn's goal to orientate the viewer spiritually; through the creation of an atmosphere and the use of one's body in understanding, explains his multi-sensory approach to his design. Aspects of light and relationships between architectural elements create a physical intervention in terms of the design and construction, but also a psychological intervention on the effect it has on those experiencing it, especially those who work or study there. Being one of the world's leading institutions only expresses the design's validity in the learning and development process, with its carefully thought out planning and materials. Kahn's other focus revolves around form and materials in constituting such spaces; where the use of interlocking forms and detailing choose to educate the viewer, and material choice and environment aims to orientate us both literally and intellectually. This treatment of form and materials is related to laws of nature where qualities such as composition and integrity, as well as respect for materials are important as they affect the inhabitant physiologically and psychologically, helping them to interact and understand their environment better. Lastly, Kahn focuses on opportunities given to the surrounding areas and inhabitants by means of expression of one's self, where the designer has the ability to promote such happenings and make them accessible. This character of space has the ability to change circumstances, to create necessary and better encounters, to ultimately change a previously negative outcome into a positive one where one is elevated and expressive in his environment.

Kahn closely links multi-sensory design and form and materials as both have a psychological effect, form and materials are the means to create such multi-sensory elements, and our many senses create a better understanding of that which surrounds us. Therefore looking into such concepts one has the ability to design spaces best equipped for learning, knowledge and interaction. However designed during the 1960's, over fifty years ago, one questions if any new developments or technologies have broadened this research and created more success in its outcomes. Brought about by Kahn's lack of; colour, organic forms (beside circles) and heavily detailed characteristics often found in schools or playgrounds, brings this study to a second precedent of slightly different character but similar philosophical views. The intention is not to prove any concepts or principles too old or null and void, but rather to study more principles which can add to our knowledge and therefore future designs.

3.3 SIMMONS HALL (1999-2002), STEVEN HOLL, MASSACHUSETTS (USA)

3.3.1 Summarised Background

MIT (Massachusetts Institute for Technology) the campus being the client; originally a Beaux-Arts scheme, explains Amelar, (2003), had seriously lost definition since the high standard was set by Alvar Aalto, his Baker House dormitory and Eero Saarinen's Kresge Auditorium and chapel in the 1950's. Their proposal of a restrictive site for the architect was situated at the boundary of the campus; a narrow strip bounded by both railroad tracks to the north and a street bordering some fields to the south as seen in **figure 3.12**, with the hope that a new dormitory designed by Steven Holl would uplift the campus glory and enhance the campus's interior and exterior communal spaces by knitting together its current disparate parts. Holl also confronted by an age to move away from male and computer domination, to a new coed residential age set his awareness in the possible isolation which existed and would further exist among students, unless intervened.

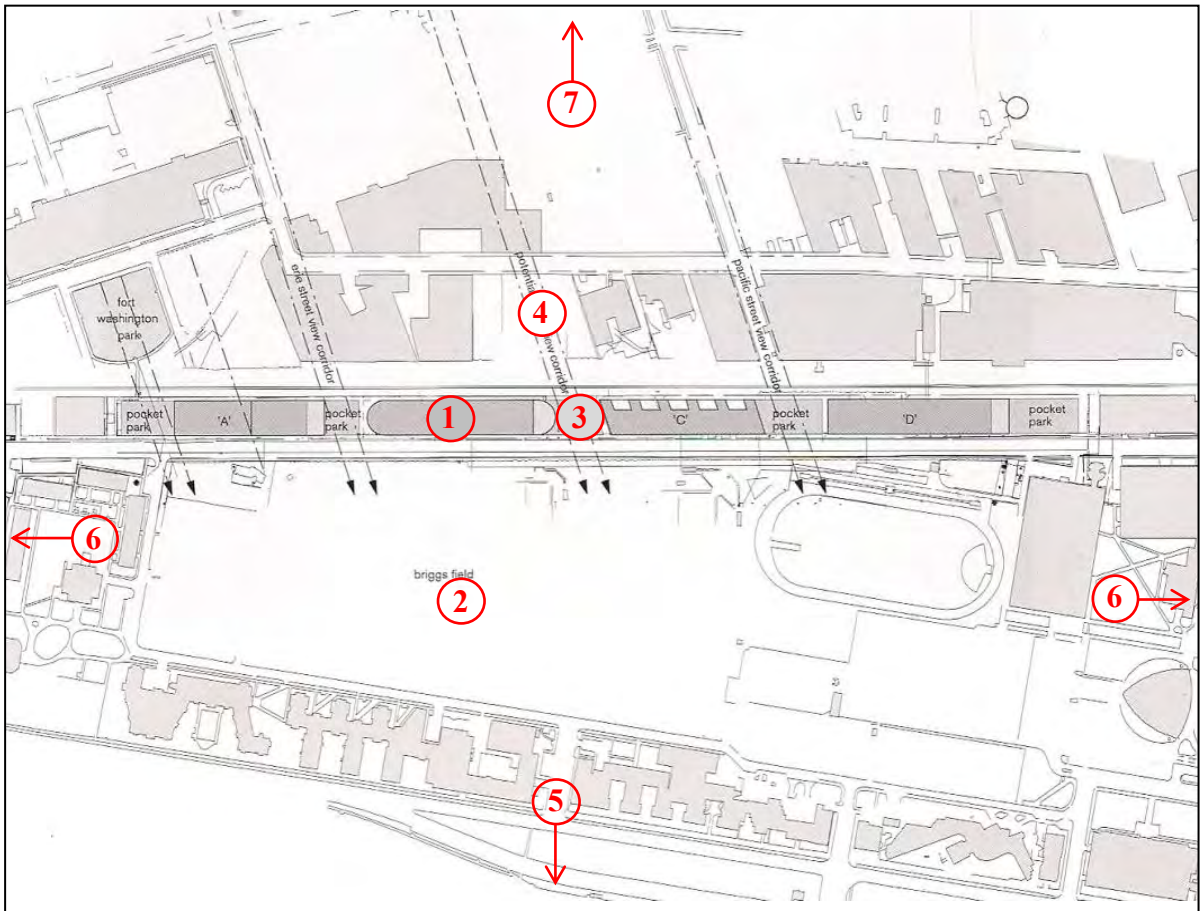


Figure 3.12 (Source: Frampton, 2003) : Site Plan (NTS).
1-Simmons Hall 2- Biggs Field 3- Potential pocket park 4- Potential street view corridor
5- Charles River 6- campus 7- City

Amelar (2003) explains Holl's assertion that the master plan needed in fact greater openness, both literally and perceptually, and then proposed a 'porous building morphology' which contained permeable rather than barrier like buildings, containing ideal qualities of transparency, porosity and permeability seen in **figure 3.13**. The aim of engaging is carried out not only from the academic community, but to those surrounding, non-MIT student neighbours by his proposal of not turning its back on anyone, showing similar faces to both university and city, and where originally student life was hoped to flow from interiors onto terraces to further this integration. Within the structure, Holl further creates elements to further student interaction as the exterior hopes to offer elevations of surreal scales to those in view of it, and in contrast large openings and amoebic shaped windows used to diminish is perceived scale, for those viewing mostly from a distance. Lastly Holl includes the students in the design process, where a student body could comment on their feelings and ideas so that the last form of engagement would be that between students and the final building.

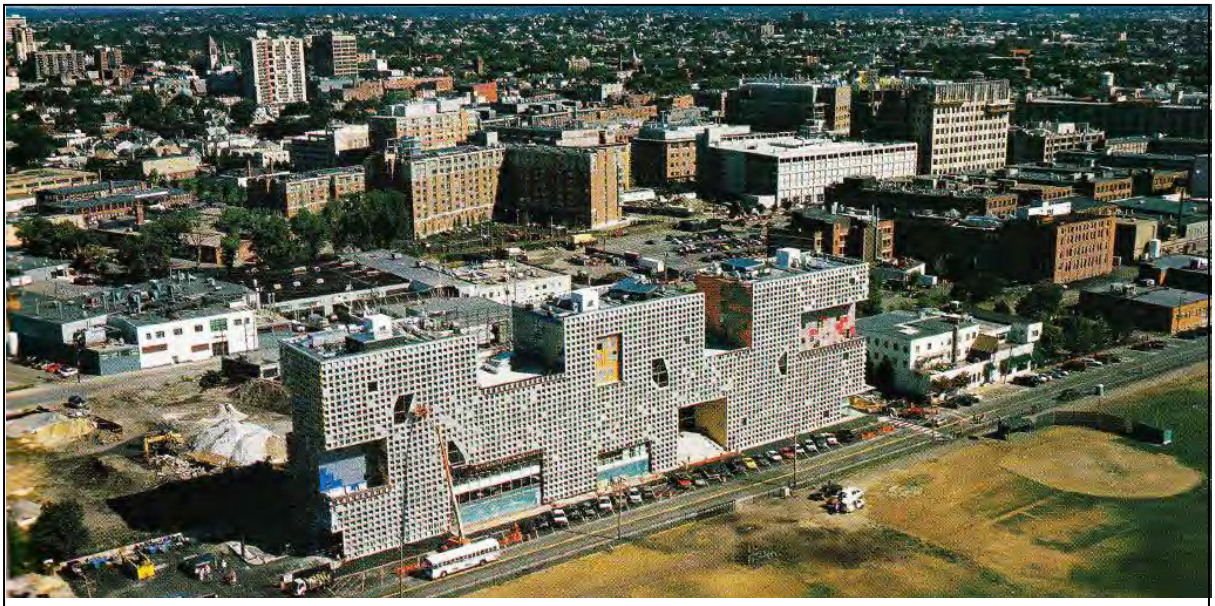


Figure 3.13 (Source: Amelar, 2003) : Location and context.

The four or five individual buildings are designed to respect existing view corridors from the residential city and Charles River view to the south edge of the fields. Amelar (2003) explains the exoskeleton structure to be a gridded shell seen in **figure 3.14**, a thick precast, high-strength system allowing for maximum flexibility and interaction, by providing a bearing wall that allows for such regular patterned holes/windows, also major structural openings and cantilevers, as well as uninterrupted spaces as long spans exist without deep beams.

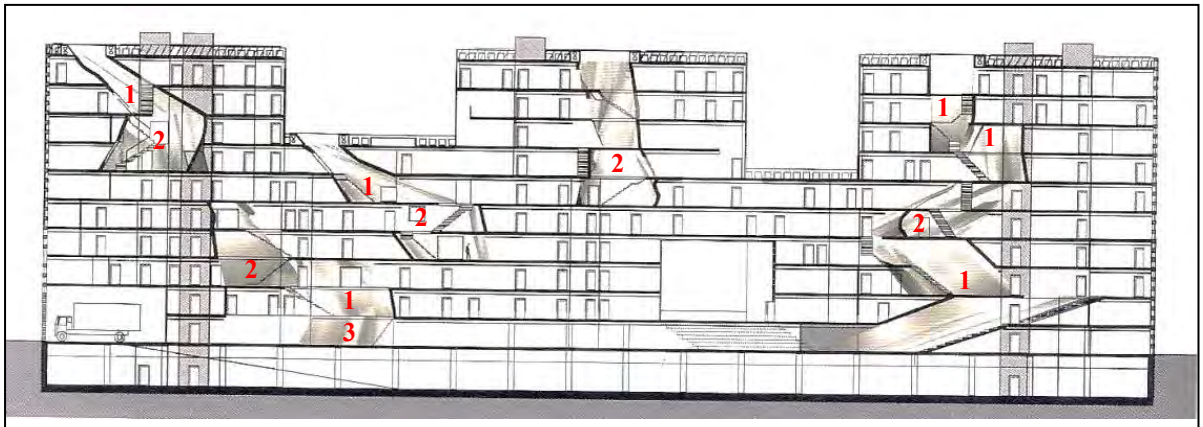


Figure 3.15 (Source: Frampton, 2003) : Longitudinal section (NTS).
1- Study 2- Group lounge 3- Dining Hall

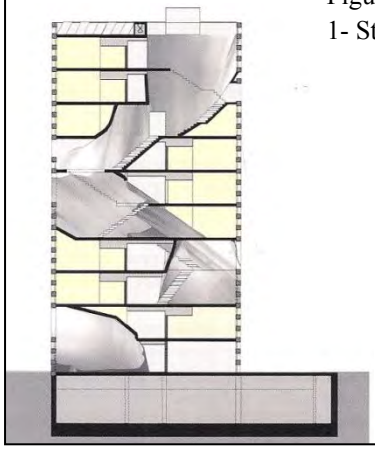


Figure 3.14 (Source: Frampton, 2003) : Cross-section (NTS).

Internally, sculpturally fluid spaces, contrasting the regular patter of exterior and rooms, designed from inky sponge prints offer an intimate scale and lounges for students by connecting residential houses vertically with dorms, Holl refers to these spaces as the building's 'lungs' (Amelar, 2003) as they also contain practical properties of vertical ventilation and the deep penetration of light and air into the deep floors within, seen in **figure 3.15**. Following Holl's intent at flexibility and an interactive environment, dorm rooms contain movable pale wood furniture with which children can express themselves, creating a delightfully playful sensibility and corridors are three meters wide, to create street-like urban experiences, of a more public place of meeting. Linking the campus to the city, Holl (Amelar, 2003) describes the dorms as a 'slice of the city' whereby spaces such as a nigh-café, 125- seat theatre, multipurpose space, dining hall, photo-lab, lounges, studies, meditation areas and exercise rooms, **seen in figures 3,16 and 3.17** create communal functions, gathering students from other dorms or on campus. Some of these spaces, although not accessible, are made visible to the city by being placed on street level where for example the dining hall is treated like a street front restaurant with an awning and outdoor seating.

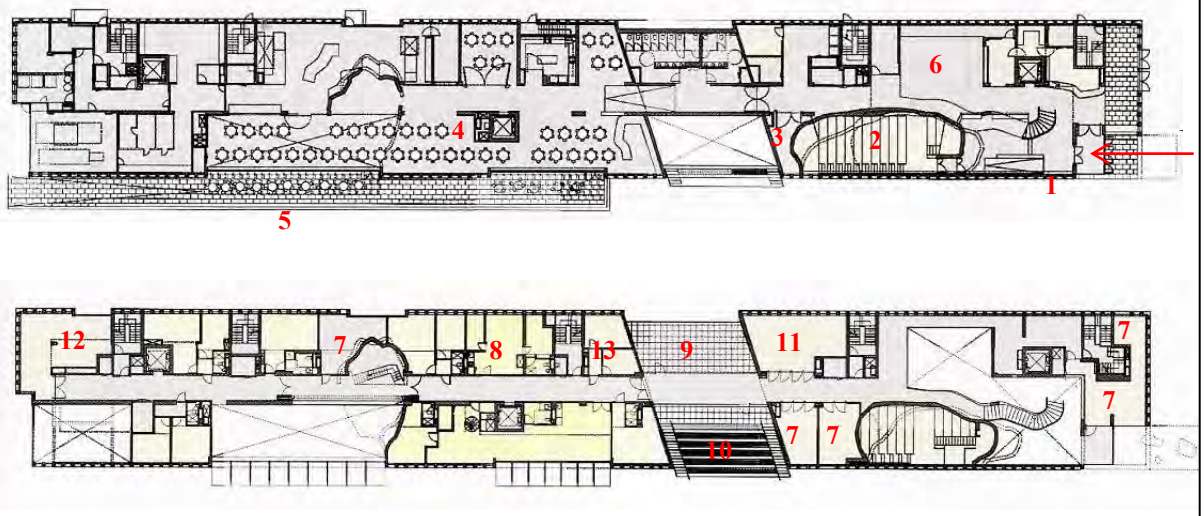


Figure 3.16 (above) (Source: Frampton, 2003) : Ground floor plan (NTS).
1- Lobby 2- Multiuse/auditorium 3- Meditation room 4- Dining Hall 5- Outdoor dining 6- Group Lounge

Figure 3.17 (bellow) (Source: Frampton, 2003) : Second floor plan (NTS).
7 – Study rooms 8- Graduate Resident 9- Terrace 10- Raised stands 11- Computer lab 12- Game room 13- Music room

3.3.2 Justification for Precedent

"Painting and sculpture are forms of art you can turn your back on; but architecture surrounds you, in the same way as music surrounds you. Music is about time and architecture is also about time. You move through a sequence of spaces as you move also through a musical sequence…Once you have experienced the primary sequence of spaces, you notice how it overlaps with the reverse sequence as you walk through the building in the opposite direction." (Holl cited in Amsterdam, 2010; pp.5-7)

A painter as much as an architect; Frampton (2003) explains Holl's the ability to not be bound by the actual constraints of the project, and to therefore benefit from a free conceptual equisse. Holl (cited in Amsterdam, 2010) however explains that his design approach should in fact reflect the site, concepts required are not derived solely on site or architectural requirements, and that his musical or literary ideas must be relevant to the site, client and program, tying all three together. Specialising in dynamic spatial conception, technological ingenuity and sculptural form (Frampton, 2003), two fundamental and continuing principles, as further explained by Frampton (2003) are those of the integration of the building to the site, although Holl appraises one to challenge the morphology of the site; and form's need to integrate with a phenomenological presence, where Holl grounds his work in more than one sense.

Holl like Merleau-Ponty, explains Frampton (2003), creates a double awareness of architecture as functional pragmatism of spaces inspired by computers and archaic forms of power or institutional presence, as characters that cannot solely be acquired. Due to this Holl (cited in Frampton, 2003) explains his first theme of 'anchoring'; an architecture bound to situation and experience of such a place where the site is taken into consideration as a physical and metaphysical foundation, his other theme of 'intertwining'; feeding off issues of the previous theme and shifts its emphasis toward a more phenomenological approach where it is reliant on our scientific-cognitive modes, and where Holl explains the *"metaphysics of light is part of interweaving essences with everyday materials, forms, and space"* (Frampton,2003; pp.16). In this design, Holl also includes organic cave-like student spaces, seen in **figure 3.18** which utilize natural light from the glazed ceiling directly into spaces, creating an atmosphere of enlightenment, a whimsical feeling whilst intending student interaction, in contrast to the rigid square light rays, seen in **figure 3.19** which enter the rest of the building at lower angles and perforated/porous light in other spaces seen in **figure 3.20**.

Figure 3.18 (top-left) (Source: Amelar, 2003) : Light from above.

Figure 3.19 (top-right) (Source: Frampton, 2003) : Light from the sides.

Figure 3.20 (Source: Amelar, 2003) : Light through perforated materials.

Frampton (2003) explains that Holl's architecture is also determined by the intrinsic natures of materials as well as fenestration caused surface effects (light), to give a particular presence and rhythm to such built volume, seen by two principles, the first of anchoring; that all work is experienced phenomenologically with regards to material, light, climate and time, and secondly architecture based on linear, planar and volumetric elements from the scale of microphotography of crystals to architectonic archetypes. Guided by an idea/concept independent to each project Amsterdam (2010) explains Holl's use of heuristic devices, which drive the design but do not define it, giving the building a character where Holl expresses that the *"idea is not the architecture: the architecture is the real space, the material and the light"* (cited in Amsterdam, 2010; pp.8). The exterior form, seen in **figure 3.21** of the building encases a massive creature with the playful use of huge rectilinear openings which correspond to main entrances, view corridors and main outdoor terraces explains Frampton (2003), amoebic openings with flashes of primary colours, seen in **figure 3.22** shows window heads and jambs present a stress diagram of the structural members (Amelar, 2003). This play of form explains Amelar (2003) is also visible in organic holes present in the entry canopy against the grids of regular rhythm as seen in **figure 3.23**, in the materials such as the cast-concrete exoskeleton clad in matte sanded-aluminium so that its chameleon properties change in appearance according to light and sky conditions, and internally where Holl uses colour cleverly to reveal hues in constantly varying degrees to give the deep three-dimensional character of the walls self-transforming qualities.

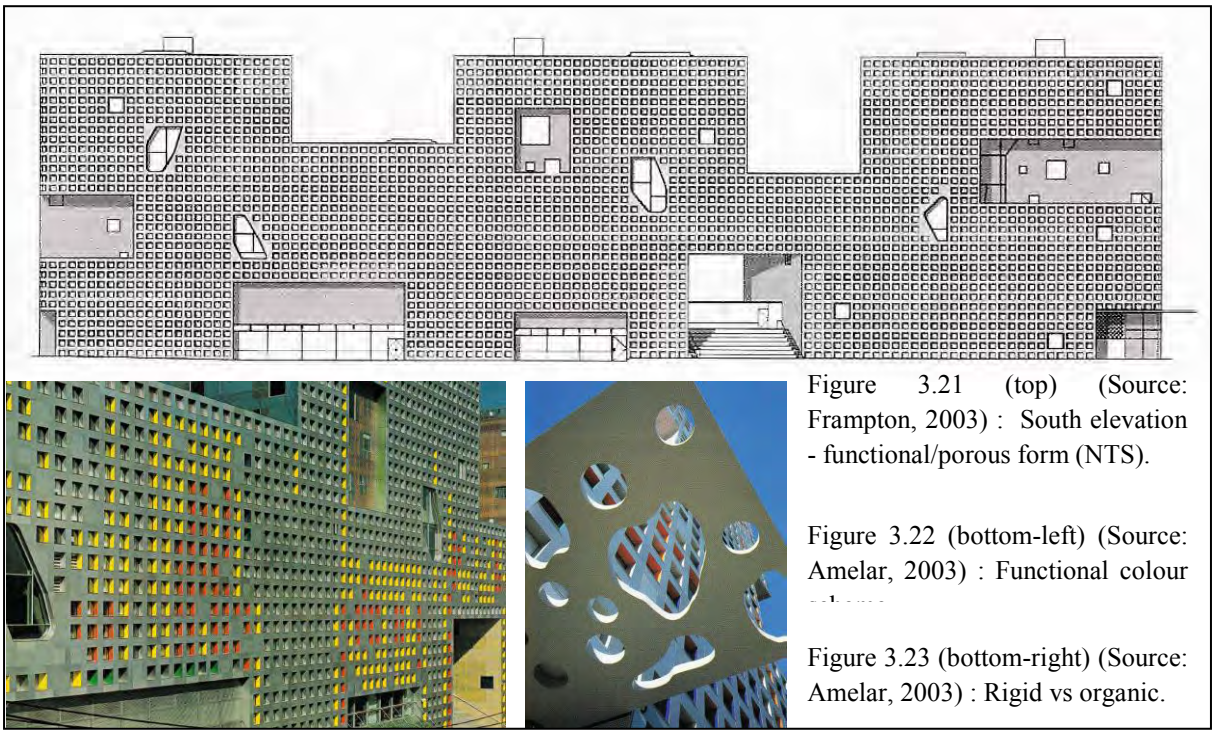


Figure 3.21 (top) (Source: Frampton, 2003) : South elevation - functional/porous form (NTS).

Figure 3.22 (bottom-left) (Source: Amelar, 2003) : Functional colour

Figure 3.23 (bottom-right) (Source: Amelar, 2003) : Rigid vs organic.

Holl (cited in Frampton, 2003) synthesises two themes required in civic buildings, to be that of; open-ended contrapuntal (having two or more independent but harmonically related melodic parts sounding together) urban form, and an equally contrapuntal attitude which he adopts for internal promenade architecturale. Unlike previous project's inability to be built due to budget, poor circulation and structural impracticabilities; the building under study explains Amelar (2003) creates a view-retaining porosity where three tower-like projections, 'crowning crenellations' remain mythical even though the building still reads as one block, a large opening at the base also shelters seats facing the field, to offer a transvers portal or visual passage. Internally Amelar (2003) further explains the movement through cave-like student lounges or studies, seen in **figure 3.23**, to enhance spatial dynamism and to also increase opportunities for students to see and be seen.

Figure 3.23 (Source: Amelar, 2003) : Student interaction.

3.3.3 My Analysis

First recognising Holl's use of colours both internally and externally, and organic, free-flowing forms and openings, has led to an architect similarly concerned about the experience of his buildings however working in a new age of technological devices, so that he acknowledges such benefits to aid in our experience. Holl heavily believes in the idea of a concept, and in this case although to biology also relies on the influence of music in architecture where his focus on site integration, concept and structural form. This precedent located on a school campus is closely related to learning and knowledge, however targeted at young adults instead of young children, where explained in the first chapter that it is more beneficial to target young children as their development is most likely to be

altered or benefited, and being a residential building instead of a learning environment is acknowledged however Holl's goal in this dormitory is to educate young adults on interaction resulting in a newly coed environment. Located between city and campus furthers it relevance to this study, as research done in the above chapter suggests the inclusion of parents and children without learning disorders in the somewhat school environment made up of teachers and children with learning disorders, the merging of presently separate environments.

Holl's use of multi-sensory elements is clearly visible with his aspects of anchoring and intertwining; where he uses light as the main factor to showcase materials, form and space in one's situation and experience. The physical factors being those contributing to the built environment and psychological being the effect it has on our scientific-cognitive modes. Holl takes to a new tectonic form of detailing and poetic design, where he still believes in the intrinsic laws of materials and functional form, but does not solely rely on them. As the buildings goal to interact with students, create interaction between themselves and interaction between student and city, Holl employs a concept of porosity from the early stages of design in order to create its relation to the site and surroundings, it's form and materials, both visible and sensory, internally and externally.

On interactive knowledge and one's existence, Holl focuses on buildings situated in between spaces such as campus and city and their ability to create interaction between the two environments on a more macro-scale. Holl work further describes the civic building (a prominent land area within a community constructed to be its focal point or centre) as a space having two or more independent but harmonically related melodic parts sounding together (campus-city) and Le Corbusier's idea of arrangement by the use of an axis to regulate architecture internally. The form of Holl's design externally wishes to integrate such separate environments and internal forms of organic shape and differing materials wish to integrate the students within one environment, but with students from other dormitories, by creating communal spaces which students need, want and engage with. Holl links multi-sensory design and form and materials in the hope of elevating and educating children in changing current situations.

3.4 CONCLUSION

Although Kahn and Holl address all three concepts and theories, both have different beliefs, approaches and intensities. Whilst Holl's career has seemingly been based on trial and error and Kahn's on set laws within experience and perception, every architect deals from time to time with unexpected results. Both architects however became well-known due to their ability to accept, tackle and transform previous outcomes in order to perfect and create spaces of outmost excellence.

Both focusing on light characteristics, material and form, as well as space characteristics, one notices a much more playful and more suited approach to younger children developed by Holl. His play on different types of light, the brave use of abstract/organic form and attention to details of a tectonic note, are elements which should be introduced into the learning environment. Kahn however focuses more on a central place of meeting, a square, and Holl on activities split up and distributed all around. One therefore questions what is more suitable for the child, activities of a single or mixed nature, and in what proximity? Having to integrate parents, teachers, and children, one possibly considers a mix of these two situations, as Holl's approach provides more activity and attraction and Kahn's approach more of a focused and enforcing nature. One has to be careful not to replicate the situations currently visible in educational environments.

The theories of phenomenology, gestalt and existentialism focus on one's perceptions of spaces, therefore it is important to implement those spaces best suited for our perception and consequently our feeling of such spaces. Both Kahn and Holl are truthful to such theories in their own respects however their implementation in these large brutalist buildings shows the true affect that such theories have on our perception. These spaces would have an otherwise unbearable, inhabitable and detrimental outcome to one's well-being. This is why the author believes such buildings are detrimental to the study of young children who are easily affected by small discrepancies. Both architects clearly understand and perceive the built environment as sensory environments in which they can manipulate outcomes and better current situations, however the next chapter will look into environments more suited for the learning disabled child, in attempt to make comparisons and get a broad spectrum on the concepts and theories used.

CHAPTER FOUR:

CASE STUDIES

CHAPTER 4 – CASE STUDIES

4.1 INTRODUCTION

This chapter will review and investigate first-hand local and provincial builldings pertaining to the research done in chapters one and two and in relation to information found in chapter three, with additional information acquired through both questionaires and interviews. The thinking behind such choices of case studies is to investigate school environmnets for both children with learning disorders and children with learning disabilities, and to compare such findings with each other as well as to those found in the above chapter. This section will also, like the above chapter, aid in the acknowledgement of important spaces needed for such children, in order to formalise a complete accomodation schedule. Provincial examples have been chosen to investigate local schooling conditions, as the proposal calls for the intervention in Durban, and so that easy access to such first-hand information is aquired.

Focusing more on ideals now for children, case studies are chosen to investigate them in connection to their schooling environments. Such comparisons allow local well known architects such as East Coast Architects and a firm which no longer exists, namely Hallen Theron and Partners to be compared to global examples of note. Observations will aid in identifying character/atmosphere, behaviour and relationships whilst assessing the environmental characteristics, facilities and current conditions.

4.2 GOLDEN HOURS FOR THE SEVERLY COGNITIVELY CHALLENEGED (1975 - 1984), HALLEN THERON AND PARTNERS, DURBAN (SA)

4.2.1 Summarised Background

During 1953, a small private school functioned with only six students and one teacher however this changed during 1974 where a new era in education for the mentally handicapped was marked by the announcement of the Children's Training Act. During 1975 a governing body was established, receiving a loan and additional subsidies from the Department of National Education, and the growing school moved several times before acquiring a permanent site at Riverside, Durban North seen in **figure 4.1**, where the brief was handed to architects at Hallen Theron and Partners. The brief required a schooling environment accommodating 150 mentally handicapped students between the ages of 5-18, a hostel to accommodate children that travel far, as this school accepts children only based on the severity of their learning disability and not locality like normal schools, and all necessary facilities to achieve a successful school of this kind.

Figure 4.1 (Source: Google Earth; 2014) : Site Locality (NTS). 1 – Site 2 – Family market 3- Retirement Village 4- Residential 5 – Mentally Disabled Lodge 6 – Pick n Pay Hypermarket 7 - Sea

Targeting a strong enclosure and security as major themes, Hallen Theron and Partners focus on a 'place of safety' with appropriate scale and geometry to form a pleasing and successful teaching environment. Addressing children of such a range of ages, the architects make possible a variety of teaching experiences and play spaces to suit their different needs where one notices a variety of small courtyards which all open onto a large central courtyard to better the orientation of the child and the supervision of them by teachers. This more horizontal u-shape layout also employs methods of landscaping to further create a sense of enclosure and the large courtyard entirely grassed to create a space of freedom however is monitored from three sides. Also being located in and surrounded by residential buildings, the architecture dictates a similar single storey solution seen in **figure 4.2** with simple residential type pitched roofs.

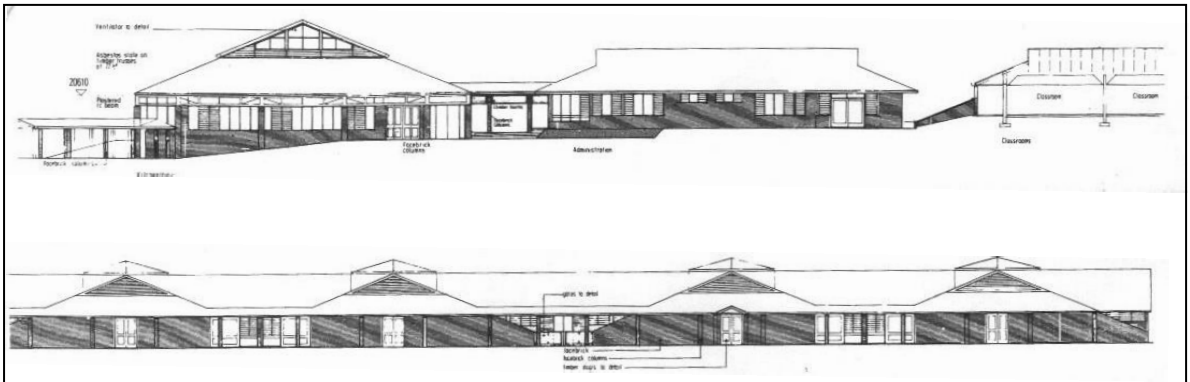


Figure 4.2 (Source: Anonymous; 1988) : North (above) and West Elevation (Below) (NTS).

The 27 000 meter squared site, has a gentle fall of approximately six meters from west to east and retains and incorporates as many large indigenous trees into the design. Located close to the sea however not obtaining a view, the site is bounded by suburban trees and streets on the north, west and south facades, and a high density residential row house development, utilised as a retirement village to the east. Access to the site is obtained from the south, seen in **figure 4.3** where you are greeted by the admin building, and from which the teaching wing and residential accommodation extend northwards along the west-east boundaries respectively.

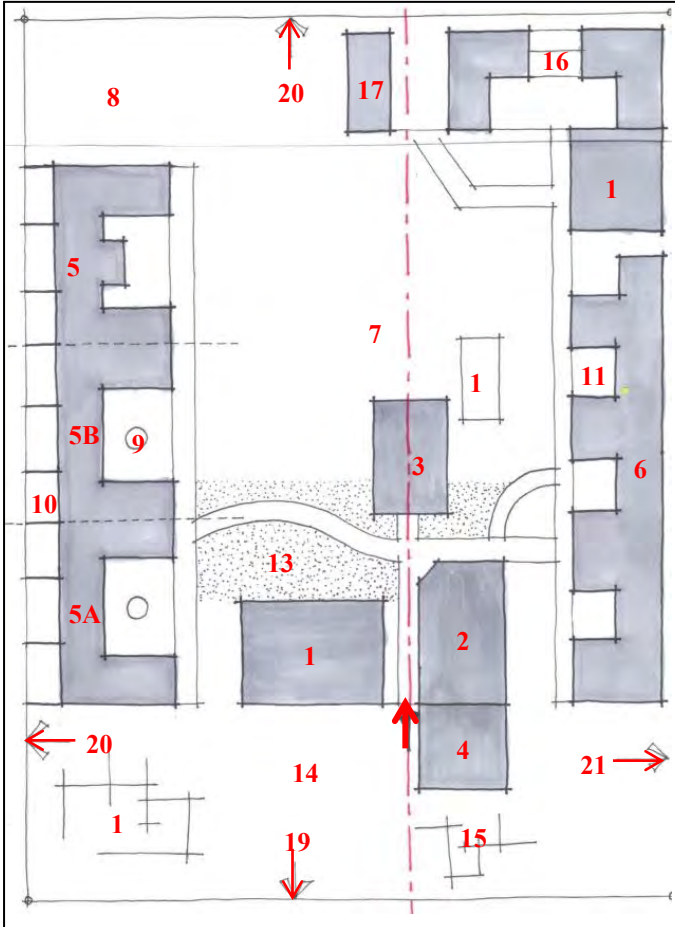


Figure 4.3 (Source: Author's Sketch, 2014) : Site Plan (NTS).
1 – Admin Offices
2 – Dining Hall
3 – School Hall
4 – School Busses
5 – Teaching Wing
5A – Junior School
5B – Middle School
5C – High School
6 – Hostel
7 – Main Central Courtyard
8 – Tarred Play area
9 – Individual school courtyards
10 – Classroom release spaces
11 –Housing courtyards
12 – Swimming pool
13 – Planted gardens
14 – Parking lot
15 – Jungle gym areas
16 – Principal and nurse homes
17 – Parking Garage
18 – Staff Residence
19 – Quiet Street
20 – Busy Streets
21 – Retirement Home

The school officially opened on the 25 May 1984, now teaching 163 students contained in small classes of about 7-13 children for added attention where the teacher understands and appreciates each child as an individual. Containing a hostel for students between the ages of 3 and 18, the site also contains housing for the principal and school nurse who dedicate their lives to these children. The schooling environment is broken up into three different levels, such as junior, middle and senior; however children attend classes not by age but by their ability. The junior school aims to target coping strategies and the ability to adapt and change, the middle school contains individual programme levels where children move at their own pace, and high school focuses on readying the children with skills and work experience to prepare them for the outside world. Within the structure, each level has their own interactive courtyard, where each classroom has its own private play area or release space and all have access to the main central large courtyard. Some classrooms are planned in normal classroom stacked desk arrangements and others in communal discussion layouts, however all are equipped with sleeping facilities and utilities because children grow tiresome or agitated very easily. New additions to the school can be seen by the interruption of the central courtyard by a school hall and swimming pool which was previously lacking.

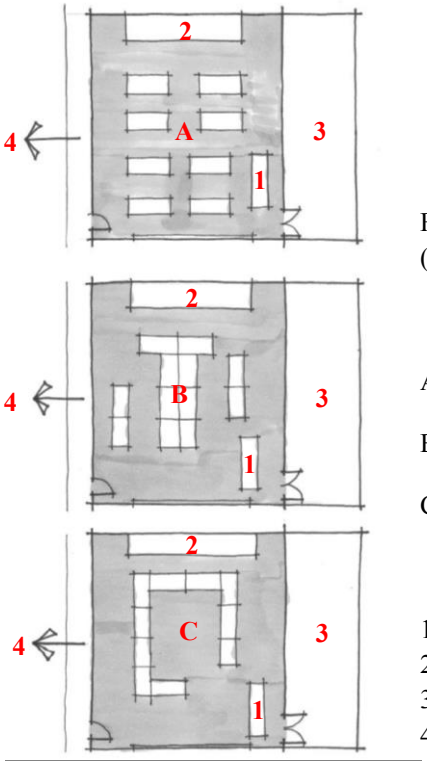


Figure 4.4 (Source: Author's Sketch, 2014) : Classroom Layouts (NTS).

A – Typical classroom layout

B – Central classroom layout

C – Group dynamic classroom layout

1 – Teachers desk
2 – Sleeping facilities
3 – Release spaces
4 – Communal courtyards

4.2.2 Justification for Case Study

This building design, although not recognised as much due to the little publicised work done on it, has much related to the concepts and theories discussed in the above literature review. Looking further into this; the building incorporates a large courtyard and many smaller ones, as well as open but covered outdoor walkways, seen in **figure 4.5** in order to incorporate the sky and earth into one's experience. Connecting the earth, natural world to the built environment, pathways and courtyards of partial paving/partial nature, is the first sense of empowered identity. A glass mural is also noticed as one enters the school, consisting of child drawings, showing the importance of this belonging needed by such children. This atmosphere also includes a *centre* of the mostly enclosed and monitored central courtyard, main *paths* leading from the entrance to the academic and residential facilities (running east-west), secondary paths (running north-south) to integrate the separation of units and all inclusive of the school *domain*, run by the admin block. This genius loci goes a little further than site boundaries, containing to the north a mentally disabled lodge (housing adults with mental disabilities) and market area (used for school fund-raising) that functions on weekends, to the east - a Pick n Pay Hypermarket and retirement village (for job training), all affording further support for such children.

The main courtyard is open and easily accessible however operates as a system to allow children to orientate themselves, and is observed from three facades to maintain security. All exterior walls are covered in face-brick which creates a tight community of belonging and further the inclusion and relationship to the context, as well as this haptic material guiding the movement of children with the involvement of touch unifying them and the building. Roof-lights visible in the residential component, dining hall and some class rooms, are provide to ensure the experience of changing light conditions, time of day and appropriately lit interior spaces as seen in **figure 4.6**. The incorporation of nature can also be found in the 'reflection of water' pattern painted on the ceiling of the school hall , seen in **figure 4.7**, and larger spaces such as the school hall, dining hall and residential halls propose the use of other senses such as hearing, with acoustical qualities, reverberating and accentuating sounds.

Figure 4.5 (Source: Author's Photograph, 2013) : Exterior walkways/paths enclosed by nature.

Figure 4.6 (Source: Author's Photograph, 2013) : Natural lighting visible in the dining hall.

Figure 4.7 (Source: Author's Photograph, 2013) : Symbolic nature painted on the ceiling of the school hall.

This interaction between mind and body is further developed by the use of an intimate scale, consisting of only one storey buildings on a more horizontal layout, the proportion allows for an intimate interaction with students whilst promoting movement. The low pitch roofs therefore continue the security and safety theme, hugging the inhabitants with large roof overhangs and the more literal rounded concept of the organically shaped primary pathway to the teaching faculty, chamfered edges of square columns and circular seating. The school plan proposes a balanced environment set up with almost equal mirror image about the axis, where columns propose values of rhythm seen in **figure 4.8**, and further values of texture and colour are prominent. Windows and door frames of stained timber obtain opening sections of bright painted colours to give identity to the different parts of the building, and roof ventilators of varying size and colour are made visible to the centre court to further unify elements in the roof-scape.

Colours may also be found tying into the playground by means of planting boxes, low fences and seating arranged in secondary paths. The building communicates with its users by further added detail of functions, where the roof for example as the key element to the design; contains specially designed fibre glass gutters to give the building a clean crisp edge and asbestos slate makes possible clean, sharp detailing. This organisation of such a complex structure as the school includes first order quality patterns such as basic shapes seen in **figure 4.10**, visible to the eye and helps in the understanding children have of such spaces or systems. This special language further aids in proportioning larger areas, creating simplicity as a structural theme.

Figure 4.8 (top –left) (Source: Author's Photograph, 2013) : Secondary pathway in the teaching faculty.

Figure 4.9 (top-right) (Source: Author's Photograph, 2013) : Primary school private courtyard.

Figure 4.10 (bottom-left) (Source: Author's Photograph, 2013) : Visible roof supports above pathways.

A child's knowledge and understanding is important, however knowledge of their disability and understanding it is key to helping them refrain from vulnerable situations. Each class is focused on a similar group of students, grouped by the difficulty to learn and attention needed. The classes present in the high school focus their attention on developing skills in the workplace by introducing such children to the working environments of Pick n Pay Hypermarket and a school orphanage where such children develop social and job skills. Within the school, ideas of multiple courtyards integrate students to work on social encounters and the school shows the strong relationship intended between mentors/teachers and students; a school market situated opposite the school on weekends encourages parents to also get involved in supporting such environments.

An authentic child of this nature is usually difficult to handle, however he must learn will to power, where the school contributes by being a very open plan and children learn by going to the wrong place or avoiding another, being found by other teachers who explain the situation at hand to the child. The

admin block is very open with doors on two facades and a staff room overlooking the teaching faculty, main pathway and central courtyard. Making them aware of their behaviour and choices, the child also has choices of separateness or relatedness where he can play in a small courtyard or the larger, central one seen in **figure 4.11**, creating a character of the place directed toward the needs of such children. When in the classroom, and a child requires alone time, release spaces seen in **figure 4.12** allow for de-stressing whilst under the observation of the teacher who also has to watch the rest of the class.

Figure 4.11 (Source: Author's Photograph, 2013) : Main central courtyard.

Figure 4.12 (Source: Author's Photograph, 2013) : Release spaces for classrooms.

4.2.3 Observations

Focusing on the needs of children, this case study located in Durban, targets the worst cases of learning disorders where the most important themes of security and safety are clearly visible to the visitor. Showing linkages to all three of my concepts and theories, this design affirms my positive direction, however personal observations have demonstrated room for greater growth and the need for accommodation of more students of this nature in Durban, to allow us the chance to rectify the negatives and to try and target a greater amount of students at the same time. In relation to the precedent studies conveyed, this building is of a much more intimate scale relating to the children, however the great demand and need for other facilities calls for a larger intervention but one must maintain a scale not seen to be intimidating by such students and low enough to still employ aspects of integrating man, nature and building.

Halen Theron and partners show a clear use of the theory of phenomenology where aspects of incorporating sky and earth, connecting man to nature, empowering identity, use of genius loci and man's orientation are seen. However the concept of multi-sensory design seems to be lacking with the

use of haptic brick material, smooth plaster interiors, promoting movement, use of material and systems which allow daylight in and basic spaces of acoustic properties. These physical and psychological interventions aid in the learning and development process by being present. However children are very active and creative beings who require a variety of such interventions to expand fully on the goal of learning through one's senses. A range of contrasting materials from haptic to tectonic qualities, from hard to soft surfaces; one's of visual, acoustic, tactile qualities and where possible the addition of the sense of taste and smell to enrich such experiences further. Children in such a school all suffer differing symptoms and things which affect them, for this reason a wider variety of the inclusion of multi-sensory elements will only benefit their growth allowing a child to choose interactions which please his instincts and not forced to experience one type or even ignore the only system which may help him/her.

The use of Gestalt theory for the planning and structures is evident by principles of intimate scale, horizontal layout leading to intimate interaction and movement, functional design and proportioning. Form and materials contribute through aspects of organic forms, rhythm, texture and colour, detail and simplicity, as well as the use of first order qualities/shapes. This environment therefore promotes the child to interact with the built environment and surrounding nature on a more intimate level, whilst appealing to basic understanding principles and simplicity to make complex situations more readable and less intimidating. The initial design proposed a building layout of balance, rhythm and simplicity, with a large central courtyard symbolic of the meeting of earth and sky and according to Norberg-Schulz (1971), the sense of belonging to such a place. However new additions to the school, such as the school hall and swimming pool have created confusion of this space, interrupted its simplicity and possibly have detracted from the goal of belonging. The central courtyard is no longer the centre or focal point on arrival and is not as accessible from all facades. Other observations include organic elements which support the theme of security and safety, but seem unjustifiable with no built forms carrying the same character, maybe create a place children can feel safe or escape to. Degradation of certain areas of the school for example some courtyards and release spaces is evident; where empty planting holes scream for nature, broken equipment no longer helps children expel added energy and no use of colour to brighten up and lift their moods.

Principles of social encounters; will to power, understanding one's self and the choice of separateness and relatedness, are existentialist in nature. Supporting and pertaining to the interactive knowledge of children, it is furthered by classes of similar difficulties, developing skills of importance, individual identity, and the inclusion of parents and teachers/mentors in the schooling environment. Educating and elevating children by the use of specific materials and forms, as well as spaces of inclusion and importance is detrimental to act as supporting facilities just as parents and teachers act as supports.

However the inclusion of parents in this school is at special events or at markets on weekends where only some attend, located off school premises, and after a discussion with the school nurse, parents often don't realise how much added time and attention is actually needed by such children. For this reason, one questions the acceptance of learning disorders by parents and certain teachers and assistants, who need to become proactive in the children's health and development.

Having assessed the multi-sensory qualities of this severe school in Durban, looking further into the use of specific forms and materials, as well as existence and knowledge, one still sees the need for a new centre dedicated to children and knowledge in the greater Durban area. Before this can be done, one needs to look into a design which, unlike this case study; utilises many aspects of multi-sensory design, retains simplicity in its planning and hence experience, creates positive spaces of relatedness and separateness, as well as spaces utilising and incorporating parents, teachers, students and community on one beneficial site. Looking for a school which maximises on its use, interaction and beneficial qualities; this second case study does not intend on making the first one seem like a bad design, as it does conform to the theories and concepts of this study, however aims to fill in the gaps and expose how these differences can further benefit the study.

4.3 SEVEN FOUNTAINS PRIMARY SCHOOL (2005 - 2007), EAST COAST ARCHITECTS, KOKSTAD (SA)

4.3.1 Summarised Background

During January 2004, approximately 460 primary-school children were evicted and lost their space of learning and teaching just outside of Kokstad, a farm-school which hosted learners from the Shayamoya Township. Also being located in an impoverished community of high unemployment rates of approximately 4 500 RDP houses, a town of no commercial or recreational facilities and harsh climate conditions added to the difficulty experienced by such children and facilitators. This desperate situation required urgency on the behalf of the Department of Education and Municipality. By 2005 the enrolment of students had climbed to 627 learners and the brief was to design a new KwaZulu-Natal Department of education 'standard' type primary school, accommodating 21 classrooms, three multi-purpose classrooms, a computer room, a media-resource centre, an admin block, offices, kitchen, tuck-shop, store rooms and ablutions for 1000 students (approximately 40 per class); however current enrolment exceeds this number to 1125 students showing its fulfilment in this community. East Coast Architects (Kinsler, 2006) explain that they were encouraged to design a secure, safe and sustainable environment. The sustainable concept set meant employing of innovative strategies towards community empowerment in both the design and construction process such as; social benefits, community empowerment and the workshop programme. The main goal was to use the building as a pedagogic tool for both children and the locals as a catalyst for skills development seen in **figure 4.13**.

Figure 4.13 (Source: Author's Photograph, 2014) : Building and Surrounding context.

Within a community suffering a crisis of ownership, the site is situated at the heart of the housing area of Shayamoya Township, seen in **figure 4.14**, cut by an east-west and north-south pedestrian route and where a community square is found at its meeting point. These circulation routes are maintained in a proposal that constituted 25 percent of the building area on a 28 000 meter squared site. One describes the building to sit happily in the terrain of a social landscape, where buildings grow out of the site to amplify and intensify its qualities.

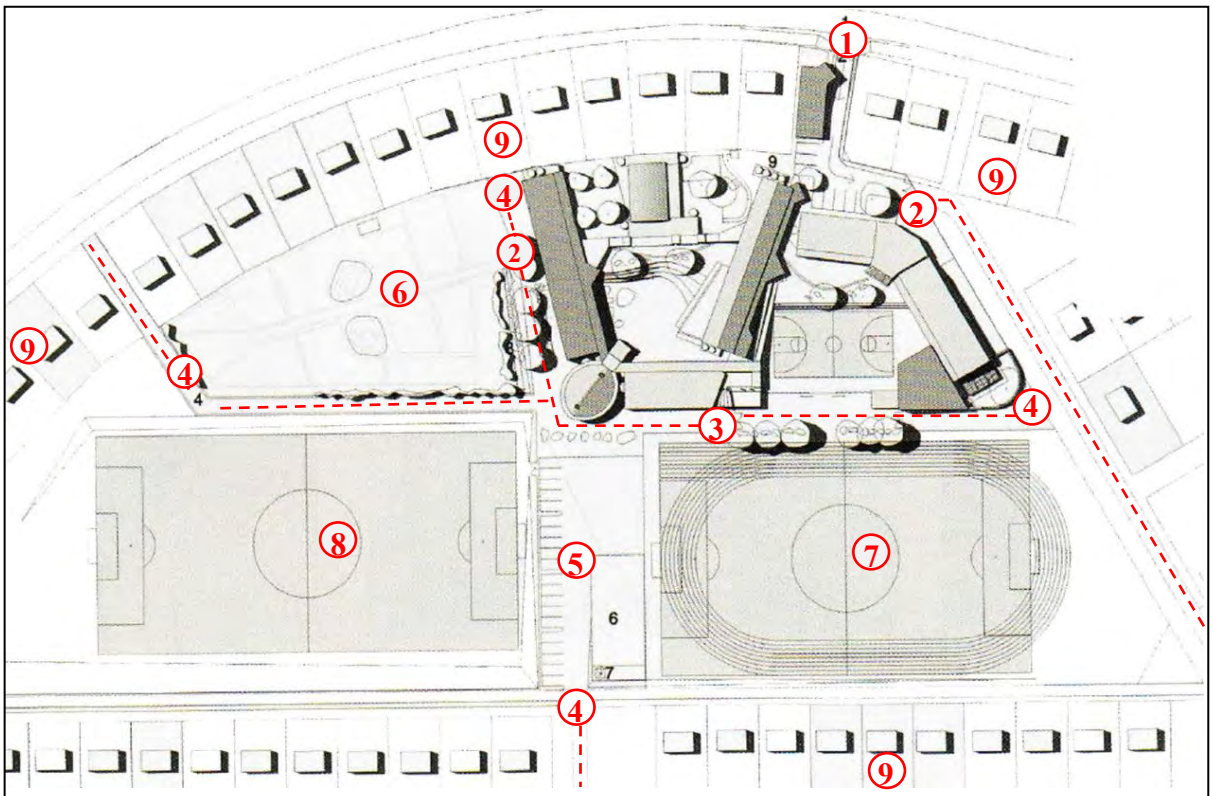


Figure 4.14 (Source: Raman, 2009) : Locality and Site Plan (NTS).
1 – Main vehicle and pedestrian entrance 2 – Pedestrian entrance 3 – Community entrance
4 – Pedestrian Lanes 5 – Public Parking 6 – Permaculture Gardens 7 – School Field
8 – Community Field 9 – Single family RDP houses

The building orientates itself to the north for solar orientation and prevailing winds, early informants of the design which also aid in the configuration of the building forms and massing on site. Other considerations taken into account include topography, important views and geotechnical conditions. The positioning of accommodation is also determined by activity, occupation and required thermal comfort of each individual, due to climate conditions. The building is intended to draw families into the school environment, consisting of both traditional and contemporary construction, seen in **figures 4.15 and 4.16**, and is maintained by the hierarchy and accessibility of spaces which function effectively.

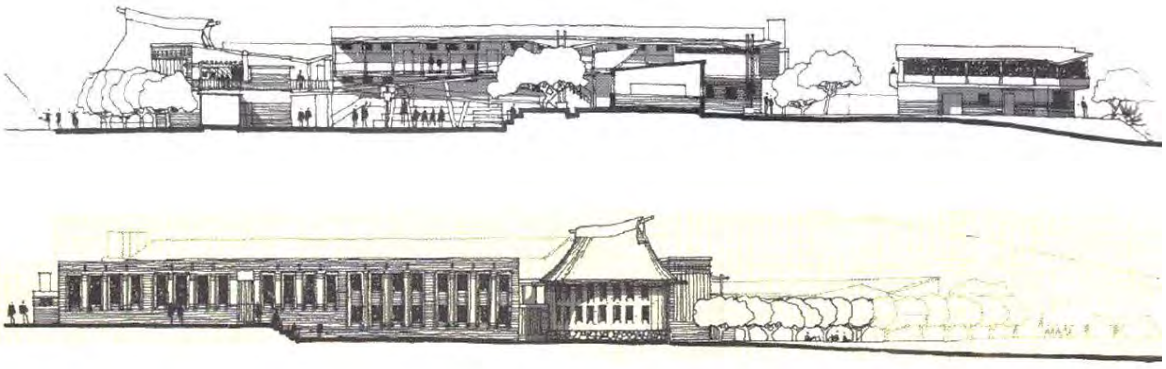


Figure 4.15 (above) (Source: Kinsler, 2006) : Building and Site section (NTS).

Figure 4.16 (below) (Source: Kinsler, 2006) : North Elevation (NTS).

Due to the workshop programme in determining directly from the source, what the community need and want, children discussed their fears of bullying which determined separate courtyards of hierarchy in order to separate children of different age groups, seen in **figure 4.17**. This obviously also depicted the classrooms which surround such spaces, where four distinct courtyards house, Grade R, grades one and two, grades three and four and one for grades five to seven. Although children may move up into other courtyards to integrate further with their elders, the elder children may not enter a lower courtyard in order to maintain security and safety of the vulnerable. Consisting of only two storeys, the interior contains classrooms which host variations however one special type that contains a mezzanine level to aid in shading the sun from the black board, heating up the students directly and maximises on space, of which is limited due to the school hosting such a large group of students, seen in **figure 4.19**.

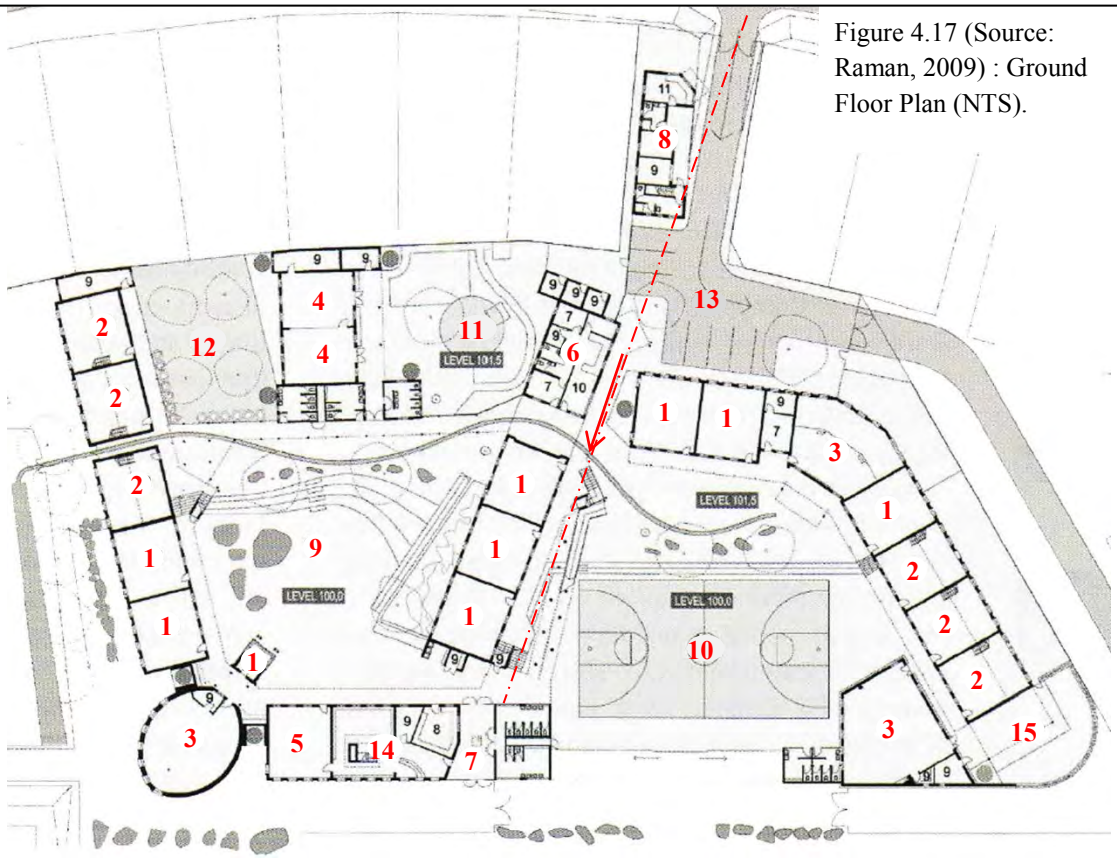


Figure 4.17 (Source: Raman, 2009) : Ground Floor Plan (NTS).

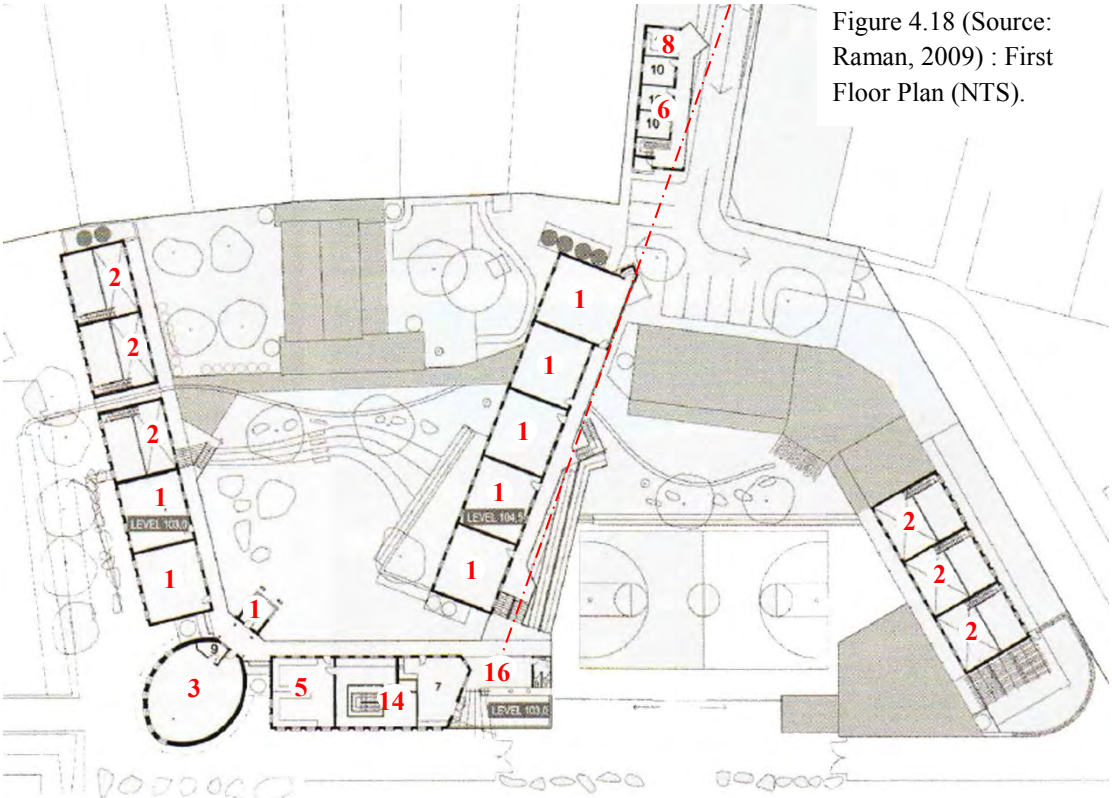
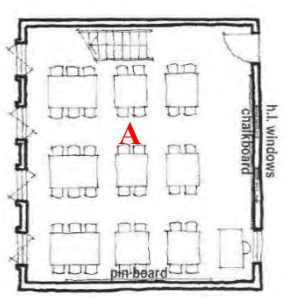
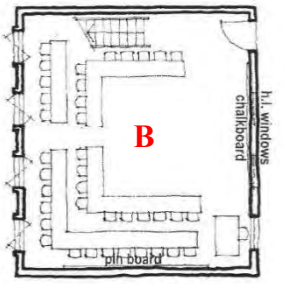


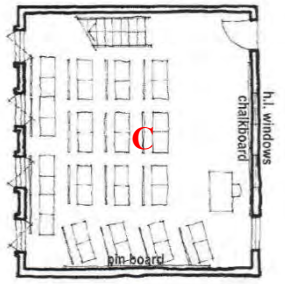
Figure 4.18 (Source: Raman, 2009) : First Floor Plan (NTS).

1 – General classrooms 2- Mezzanine classrooms 3 – Multi-purpose classrooms 4 – Preschool classrooms 5 – Computer laboratory 6 – Admin and offices 7 – Community access 8 – Security 9 – Courtyard (Grades 2-4) 10 – Courtyard (Grades 5-7) 11 – Courtyard (Grade R) 12 – Courtyard (Grade 1) 13 – Parking area 14 – Library/Media Centre 15 – Outdoor Classroom

Classrooms are also designed to be flexible, where teachers use their discretion to create an environment best suited for their specific class and children, seen in **figure 4.20**. Multi-purpose classrooms, seen in **figures 4.17 and 4.18**, are larger in size, non-rectangular and seating resembled more of an outdoor bench arrangement where a step separated two levels. Teacher's desks in each classroom are also located to one side, but this seems to be for reasons of facilitating more students per classroom.







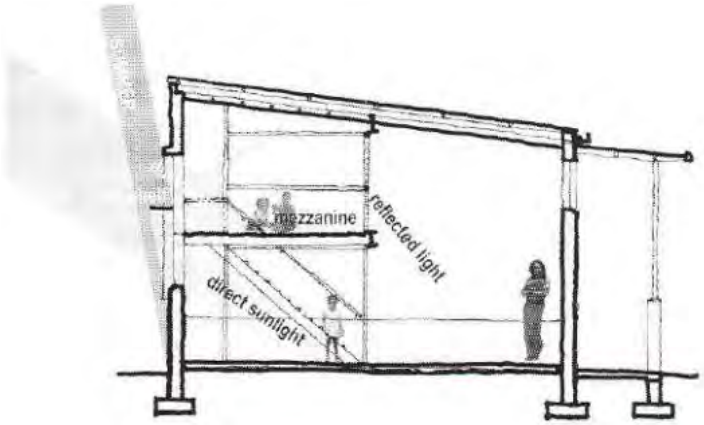


Figure 4.19 (above) (Source: Kinsler, 2006) : Classroom Section (NTS).

Figure 4.20 (left) (Source: Kinsler, 2006) : Variations of flexible classrooms (NTS).

A – Longitudinal Layout promoting teacher movement

B – Discussion Type Layout promoting central teaching

C – Typical Classroom Layout.

4.3.2 Justification for Case Study

Careful consideration is given to natural lighting, seen in **figure 4.21**; such as window positions, sizes and containing devices used as for the dual effect of shading and light shelves, and within classrooms the positioning of chalkboards to reduce glare and need for artificial lighting. Walkways on ground floor are mostly covered by above floors with small pieces open to the sky, to acknowledge the change in building and function, on the first floor they are subsequently covered by the roof but all remain open on the sides linking them to the four courtyards which are open to the sky, seen in **figure 4.23**. This connection of man and nature is furthered by the integration of gardens in the school, such

in the case of **figure 4.22**, where vegetable and fruit gardens are maintained for the further education of students and supplementation of the kitchen. School murals, generated by the students themselves are seen as a key method of communication between building and viewer/inhabitant, where images are transferred onto plaster, clay or other elements to bring a sense of identity and belonging to such a space and building, also seen in **figure 4.21**.

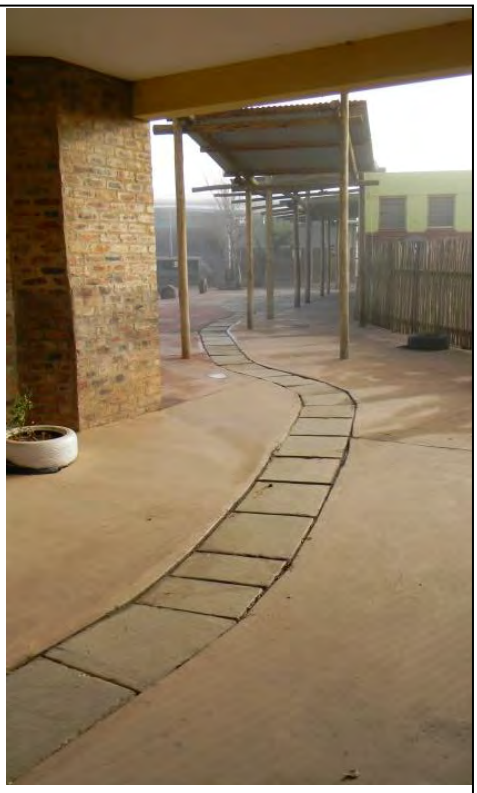


Figure 4.21 (top-left) (Source: Author's Photograph, 2013) : Window detail and painted murals.

Figure 4.22 (bottom-left) (Source: Author's Photograph, 2013) : Garden areas located between man and built environment..

Figure 4.23 (right) (Source: Author's Photograph, 2013) : Open walkways and pedestrian path.

In this case the axis starts at the main entrance and heads toward the community entrance, splitting the site into two domains with the younger students on one side and the elders on the other. The *centre* would have to be considered as the only courtyard fully visible to the axis, the courtyard for grades 5-7 which is also open in view to the community field and is the place school assemblies take place. An organic pedestrian path runs through the site horizontally seen in **figure 4.23**, where one experiences all four courtyards and student/teacher paths run along the inside of the u-shaped buildings. The presence of the courtyards makes it easier for children to always identify and orientate themselves, and with the help of ramps the movement of children is made easy as many are malnourished or weak, seen in **figure 4.24**. Consisting of building techniques and materials much like its surrounding

buildings, allows the design to belong and tie into the much needing community. The use of many surfaces such as brick, plaster, timber, concrete, stone, steel and roof sheeting afford a haptic experience where children in close proximity to such material are connected by the hand to the built environment.

Figure 4.24 (top-left) (Source: Author's Photograph, 2013) : Main ramp system.

Figure 4.25 (bottom-left) (Source: Author's Photograph, 2013) : Variety of form, textures and colours utilised.

Figure 4.26 (right) (Source: Author's Photograph, 2013) : Functional Detailing.

Two other key sustainable strategies include; *community empowerment and the workshop programme* – where workshops took place to better understand the needs and current conditions, and questionnaires went out to the community to better understand their skills; the other is of *building materials and construction process* - where the skills obtained determined the choice of building materials and construction systems, to create a 'proudly Kokstad' environment with reduced embodied energy. With the goal of employing locally based builders, many of the parents of the students, local materials and sub-contractors were involved. With focus placed on raw building products such as sundried adobe bricks, stone-dolomite boulders excavated from the site, thatch locally harvested, gum poles and clay bricks; one also benefits from accessible labour in close proximity. When looking at the building plan, proportion is visible from the similar sizes of the two separate buildings, courtyards of similar and differing sizes and by an intimate scale consisting of

only one or two storeys in certain areas. Although the plan does not seem to pose balance at first glance, the proportioned sizes help with this, and rhythm is noticed in steel and timber columns experienced in student/teacher paths surrounding the courtyards. The use of texture is more predominant in this design, where materials are mostly constructed by hand; however colours of natural or manufactured material add to the experience that one has.

The interaction between person and environment is furthered by the building's ability to communicate through the use of forms, construction systems and materials, both on an intimate and teaching level. This design incorporates an oval building used as a multi-purpose classroom, a 'round' double-storey rondavel and other polygonal shapes to experiment with teaching and learning spaces, relating to one's village/home and the use of a mud surface to evoke ancestor honouring. Material used was also meant to assist in the training on how the building works and how occupants can control their own comfort conditions in their homes. This functional quality is carried through a somewhat complex system, where teachers understand it due to their involvement and demonstrative models are located around the school to explain how methods work to both learners and visitors. By using a majority of simple rectangular forms, involving less of an organic or abstract quality, one simplifies the organised environment for better understanding. This special language of shape is accomplished by detailed arrangements set in metal work, murals, landscaping, support junctions and connections which all seem to be a part of a structural theme ensuring the building communicates how it works and how it was made.

The last of the key sustainable factors is that of *social benefits* – where a long-term type of sustainability sets out to engage with the multi-dimensionality of the community and the need for them to interact with this school. Three consistencies included the learners, teachers and parents who are afforded community access to such school facilities. Those not attending the school, obtain access for the school field by bookings, library and computer room access afterhours through a simple gate system however the community field contains unlimited access, seen in **figure 4.27**. Continuing the theme of safety and security; community success affords further surveillance and supervision of those belonging to this environment, and of those just visiting it. Affording social encounters of richness and quality, one gains respect and knowledge for those who enter or use this environment and this ultimately affects the feelings and emotions of children.

Much like any high school, teachers/mentors specialise in certain subjects, however in this case teachers move around to different students and classrooms as this is easier by less numbers creating less of a disturbance and a space that learners can permanently call their own. Parents may use facilities to further their own knowledge and take part in sporting activities which take place on the

fields, affording more chance for parents to interact and accept the situations of children. The child is also afforded the will to power by choosing after school activities or interests to partake in instead of becoming bored or lonesome at their homes and during school hours are afforded the opportunity of separateness and relatedness by integrating with children of a similar age or his/her elders, seen by **figure 4.28**. The character of such a place allows a lot of choice to such children in order to guide their own futures by the activities they partake in, however their freedom in moving from class to class may be restricted, in other aspects it is encouraged and supported.

Figure 4.27 (Source: Author's Photograph, 2013) : Main courtyard overlooking community field and view.

Figure 4.28 (Source: Author's Photograph, 2013) : Secondary courtyard; more safe and secure.

4.3.3 Observations

Noticing the differences in this design, mostly in sustainability, complexity, variety of multi-sensory devices used and interaction with the community; affords another look into a design which answers the needs of learning disabled children. Focusing on more the disability than disorder, created by poverty and not enough resources, such facility also houses children that are weak, battle to learn and may interpret their surroundings differently. Linking to the three theories and concepts, this design proposes a larger but non-intimidating structure due to severe numbers and in order to appeal to the community as well as pushes the envelope in discovering and experimenting with new typologies.

Aspects of natural lighting and building orientation help in relating this building to the community and therefore also aid in the learning and development process by empowering one's whole family. Open walkways allow the connection to be made between earth and sky in internal courtyards, where man and nature is also connected by the use of gardens. The use of murals made by students to create identity and belonging, the school is separated into four age groups determined by grade, the use of an axis however not so clearly identified, the main courtyard is open at one facade to link the community area and views, and the use of a double u-shaped building instead of one. The inclusion of a

pedestrian route through the site to incorporate the public into the school, the architecture and facilities create a belonging of such property to the community and unlike Golden Hours, the use of many ramps incorporated into the design throughout.

The choice of form, materials and construction methods chosen primarily aimed at empowering the community, by using a variety of surfaces, textures and colours to empower its youth. By utilising raw materials this supported the less energy approach and haptic experience created by materials mostly refined by the hand. Such design implements characteristics that affect how children perceive and understand their immediate environment; such as the use of proportion, balance, functional forms and construction methods, as well as organisation. However this design employs a more complex environment, made up of varying courtyards and sizes, double storey and single storey buildings in certain areas mix of regular and organic forms and incorporates more texture and details, to enrich the experience had by children.

The social benefits incorporated in this design are of a much more integrative and inclusive nature where the designers aimed to create long-term sustainability and an environment which can benefit and be benefited from by the surrounding community. The inclusion of learners, teachers and parents in this design wishes to increase surveillance, supervision, knowledge and understanding between the two environments. Creating social encounters after school or on weekends, interaction and acceptance is allowed and children given will to power and choice of separateness or relatedness. It does not just physically belong to the surrounding community through visual aspects, but rather belongs to the community in a literal sense where the community can utilise facilities and fulfilling spaces encourage and support children's needs, wants and spaces of encouragement.

4.4 CONCLUSION

Within case studies, one recognises the similarities however judges Seven Fountains to be more effective, appropriate and uplifting. So one questions why such characteristics have not been achieved at this level in learning disordered schools, such as Golden Hours? Maybe it is because people think these children too vulnerable; require less attention and therefore environments which do the same. However findings within the literature review have proved the opposite.

In relation to the precedent studies conducted; these buildings are of a much smaller/intimate scale, employ theories and concepts at different intensities and accommodate maximum capacity at all times, due to demand. The case study sites however of similar sizes shows a drastic change in student numbers, revealing different approaches to the learning disabled, where treated similarly in the

literature review. For this reason it is believed possible to target more students, a larger facility and still accomplish the goal at hand. Theories are also less identifiable due to their smaller scale intervention and intimate approach, and such would benefit the experience and perception of children further. On the other hand concepts are more viable and connected to the inhabitant allowing a sub-conscious experience to occur.

Such buildings function differently with the busy, active and encouraging environment found at Seven Fountains to a quieter, serene and less enforcing environment at Golden Hours. When looking at social encounters one discovered that learning disordered children do require a different approach to current education systems, especially a less demanding one however it also established that an environment that does this too much is also unbeneficial for the child. For this reason it is still imperative to keep a certain characteristic about school environments, where the child is challenged and pushed to encourage learning. Both schools contribute to their community with Golden Hours targeting a broad community and Seven Fountains an inclusive one. However Seven Fountains seems to contribute fully and heartedly to its community. This creates a perception of the school as supportive, positive and inviting whilst Golden Hours does the opposite in creating animosity, a feeling of discomfort ad distance to the 'vulnerable'.

In the previous chapter we concluded that **"architects clearly understand the built environment as sensory environments in which they can manipulate outcomes and better current situations"**, this chapter addressed the need for such in schools targeted at children with learning disabilities. Findings prove that these sensory environments are already evident in schools, maybe not to the extent needed in schools for those struggling to learn, and combined with research found in the literature review, they are pertinent to the outcomes we desire. This study will contribute toward aspects lacking, approaches deemed successful and unsuccessful, and the importance of some characteristics over others, toward a corrective approach. The next chapter will analyse the perspectives of others in relation to the author's and compare such data.

CHAPTER FIVE:

QUESTIONNAIRES AND FINDINGS

CHAPTER 5 – QUESTIONNAIRES AND FINDINGS

5.1 INTRODUCTION

First-hand information was obtained through an early interview with a highly educated and experienced educational psychologist to avoid sensitive issues. Questionnaires handed out to architects, to better understand their intentions on designs under observation and assessment, and a variety of staff serving the schools, in order to get a wide range of points and views on their functionality. These questionnaires of a common but extensive nature allowed the easy comparison between participants of different knowledge, backgrounds and involvement, namely architects, principals, teachers and assistants as well as other staff more involved in the running of the schools.

The prior interview done for ethical reasons, brought up issues that the child is sensitive to certain conducted ways of interviewing, with many variables such as age, sensitivity, testing techniques and unknown purpose of assessment. Children in pre-school and primary school (focus of this study) however will also not benefit in regards to questionnaires and this study; due to inconsistencies related to understanding, in some cases the inability to read and write, and even if the most predominant questionnaires of multiple choice in this situations is used, they depict guessing strategies and therefore invaluable information. This proved children too difficult for others beside the educational psychologist to gain information, when the interview further portrayed children with learning disabilities to gain negative emotional consequences from their involvement although one is sensitised to their problems.

The questionnaires for architects, principals and staff therefore consisted of 20 questions, broken up into five sections to better relate to the information gathered in the literature review and to those studied and observed in precedent and case studies. The three middle sections contained questions directly relating to concepts and theories, whilst others obtained a more general and personal opinion. The analysis and discussion of such findings will only highlight the most significant responses in direct relation to this study.

5.2 ANALYSIS OF THEORIES

The layout of the questionnaires further follows that of the literature review in order to follow the procession of the key matter of perception. Such order remains; the perception of children and their actions within environments, the perception of objects or characteristics of the building that aid in their involvement and finally the perception of themselves and others in environments that implement

the previous. Questionnaires were also distributed as evenly as possible between Golden Hours School for the cognitively challenged and Seven fountains Primary School for the underprivileged.

5.2.1 Phenomenology

Within phenomenology, questions six to nine investigated issues of movement, the relationship of man, nature and meaning and memory in relation to the child of both environments. Revolving around the character of students, senses dominantly used and encounters necessary for development and responses to stimuli; such wishes to gain insight other than that read in books or other material but rather by those who monitor such children on a daily basis.

When questioning architects on the aspects of multi-sensory design which aid the learning and development process; Andre Duvenage of Golden Hours interprets encounters away from school environments, where Steven Kinsler and Derek van Heerden of Seven Fountains depict encounters of social engagement, safety and security as well as comfort and nurture as necessary. Van Heerden however does speak about stimulation within the built environment, such as the use of colour and texture, where newly appointed principal John Matyeni of Seven Fountains enforces the approach and interaction with others. For Rowan Hornby, acting principal of Golden Hours, the major approach is geared towards early intervention and focus on the ‘whole child’, in order to prevent further difficulties. Individual programmes, attention, as well as positive encounters, also appear common by teachers and assistants as necessary, however those at Golden Hours stipulated them to be between educators, assistants and other learners, where Seven Fountains included the support of the community and other individuals, amongst further encounters of play, language, motivation and sport. This will be further elaborated on under existentialism due to its relation.

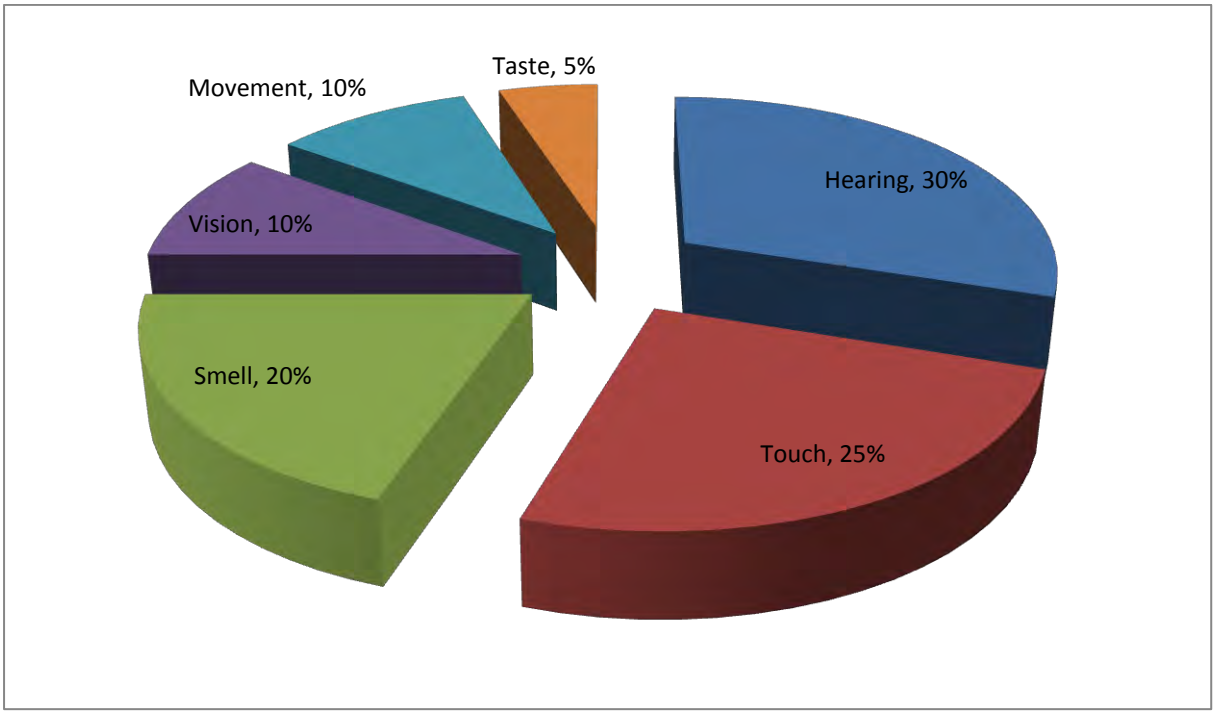


Figure 5.1 (Source: Author's Diagram, 2014) : Pie graph showing the majority of senses currently observed in learning environments.

The focus is then placed on what senses generally already occur in such environments affording the use of multi-sensory design, seen by question seven. The analysis of questionnaires further stipulated a majority of the senses were hearing and touch constituting 55 percent, the sense of smell 20percent, and least important sense of vision, movement and taste making up 25 percent, as seen in **figure 5.1**. This is astonishing; one expects the sense of touch to be high however the sense of movement is very low, inconsistent with information found in the literature review, as important to the involvement of the other sense. For this reason on questions the participant's inability to recognise movement and a sense contributing activity or the schools inability to employ strategies affording and encouraging movement. Within case studies, the second half is ruled out, as spaces and places of both environments were seen to employ long paths and passageways, as well as large external open spaces, seen in **figure 5.2** and **figure 5.3**, in order to achieve large school designs at appropriate scales for relative techniques. This meant that teachers either do not consider movement in relation to the senses or have little knowledge as to the importance of cognition for children with learning disabilities. One also notices the low numbers in children which identify with smell, an appropriate and necessary approach for children especially with autistic difficulties.

Figure 5.2 (Source: Author's Photograph, 2013) : Showing the implementation of open spaces at Golden Hours School.

Figure 5.3 (Source: Author's Photograph, 2013) : Showing the implementation of long corridors at Seven Fountains Primary.

When questioned what encounters are the most important and necessary, question eight, deeper qualities of multi-sensory design revealed colour, especially red, yellow and blue, as clear indicators of motivation however not so much tactile situations, but both are evident as seen in **figure 5.4** and **figure 5.5**. In regard to children with learning disorders, teachers and assistants focussed heavily on children with epilepsy or autistic deficits, as they *"respond more to tactile situations"* stated by one of the teachers, are extremely sensitive to light and colours as well as become emotional to stimulation. A common understanding is that not all students are the same, some grasp shapes and colours easily whilst others require repetition and added help, surely tactile stimulation can help with this approach? A school nurse suggests medical care and medication necessary to aid in the integration of stimulating environments, and with the inclusion of the community, would allow the bringing together of learning and medical facilities, so that professionals can assess and monitor whilst teachers follow precautions in the ever so important characteristics of gross and fine motor skills, daily living skills and reactions to stimuli.

Figure 5.4 (Source: Author's Photograph, 2013) : Showing tactile stimuli at Golden Hours.

Figure 5.5 (Source: Author's Photograph, 2013) : Showing the use of colours at Seven Fountains.

5.2.2 Gestalt

Within gestalt one needs to investigate elements of inner-outer perception, past and new experiences, functional systems as well as order to aid the child's visual system by the use of specific types of form and materials. Therefore questions 10 to 13 focus on the composition of such elements, in creating understanding, feeling and interaction necessary for children with learning disorders. The input of architects should be greatly compared to that of others using environments in this section to acknowledge if such interventions have been beneficial to its users

When questioning the architects on design principles relating to form and materials, most attributed spaces of non-schooling typology or of a direct character to form spaces of relief and freedom. Whilst van Heerden and Kinsler (Seven Fountains) expressed such spaces to be of outdoor spaces or teaching facilities of a different character to merge learning and freedom, Duvenage (Golden Hours) discusses spaces of play and intimate scale to further one's educational growth. In terms of the rural setting and cost implications at Seven Fountains, such principal discusses the simple warm spaces whilst Golden Hours principal explains the necessity of sensory environments of play as well as the characteristics of open, flat spaces, for easy access and integration. For this reason of conflict, it is imperative to investigate activities which children enjoy to those available spaces and areas designed and budgeted for by the architect.

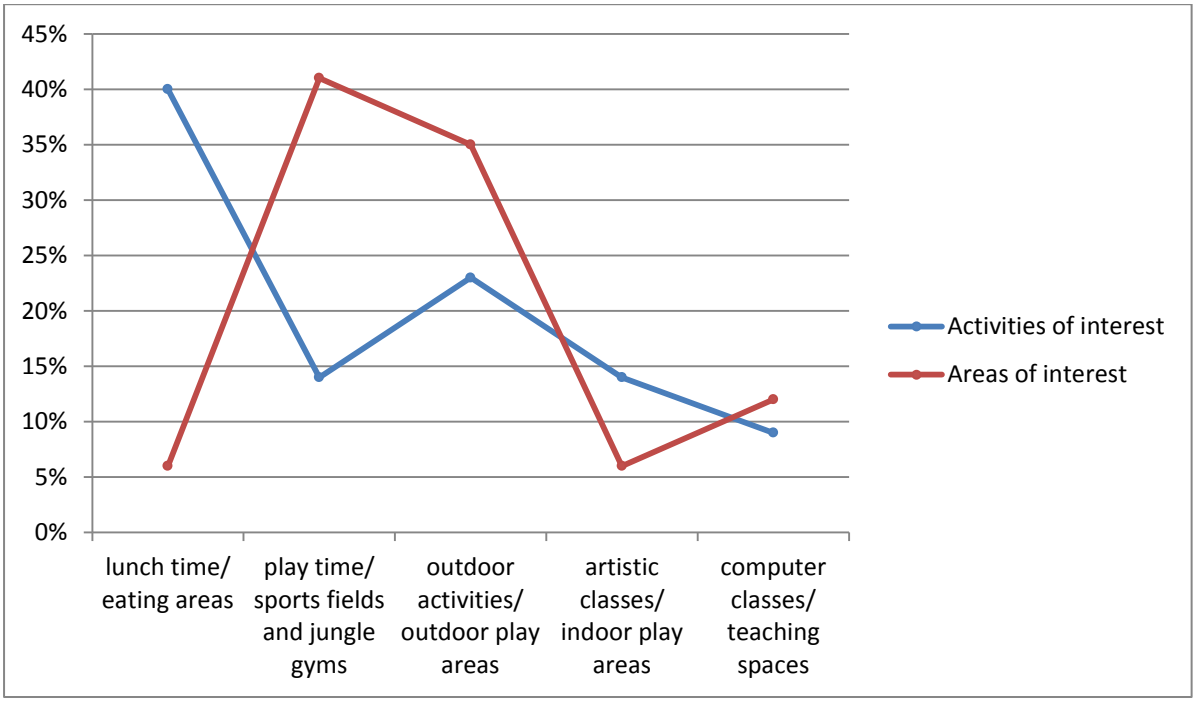


Figure 5.6 (Source: Author's Diagram, 2014) : Line graph showing the comparison between activities and areas of interest.

Comparing such findings of questions 10 and 11, by means of the line graph shown in **figure 5.6**, one notices that the areas of drastic difference attribute to those where 40 percent of children with learning disorders and disabilities enjoy the activity of eating for reasons of sense of taste, health or hunger however are six percent of the time attracted to such areas, **seen in figure 5.7**, and the opposite occurring where areas of sports fields and jungle gyms hit a 42 percent high where only 14 percent show interest in play time, **seen in figure 5.8**. This could be due to the need to eat but facilities which do not necessarily attract the student and involve him, or where students do not necessarily go to school to play but are attracted by free, open and playful environments. Another characteristic in design that is lacking is in terms of indoor play areas which do not play to the artistic characteristics of such children, with an eight percent difference. Other areas which attract the child include outdoor play areas with an 11 percent lead and teaching spaces of a different character, such as computer classes with a minimal three percent lead. Such findings enforce that outdoor fields and jungle gym areas are more successful than those of an outdoor play characteristic only, due to the fact that children prefer instruction ad areas where activities are depicted instead of necessitating their own. They also show that areas such as dining halls, indoor play areas and teaching spaces require more in terms of attraction and interaction for the child.

Figure 5.7 (Source: Author's Photograph, 2013) : Simple dining hall composure, Golden Hours.

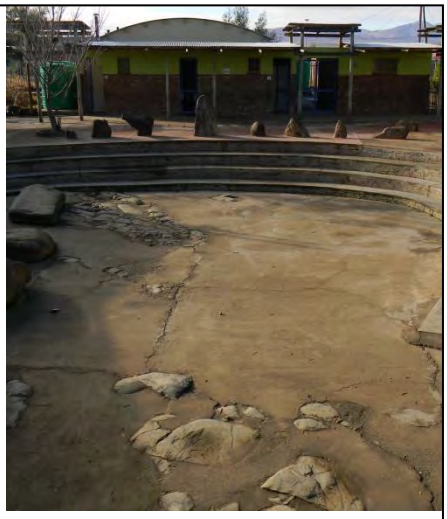


Figure 5.8 (Source: Author's Photograph, 2013) : Playful but open courtyard at Seven Fountains.

Further into the study of form and materials reveals spaces of social qualities, openness, equipment for climbing and exploration, simple design and free spaces to be of importance, **seen in figure 5.9**. A child with learning disorders or disabilities does understand the simple, ordered structure easier; however one must not forget the importance of multi-sensory design in creating enriched learning spaces, seen in **figure 5.10**. Building characters are therefore said to exude complexity and meaning

by means of natural lighting, support by favouring weather conditions (warmth or cooling), areas of easy access for the challenged, as well as large classrooms and courtyard areas to open up spaces for interaction and connection. Complexity is further explained by one teacher at Golden Hours, describing flexible multi-purpose rooms as beneficial to such children due to their different nature, possibilities and activities; however another teacher at the same school describes 'OT' (occupational therapy) rooms to be where the child benefits from specific areas dedicated to specific activities. The result therefore calls for specifics in the younger unguided or older unexperienced child and more freedom for those taking over therapy to guide their own activities and lives, where one must still remember the learning ability of shapes and colours through the buildings functional but enriching design.

Figure 5.9 (Source: Author's Photograph, 2013) : Junior jungle gym area at Golden Hours.

Figure 5.10 (Source: Author's Photograph, 2013) : Simple but complex bench design at Seven Fountains.

5.2.3 Existentialism

Existentialism looks into the child's existence/identity, his/her power of mind and will, the sense of belonging they feel and therefore promoting embodied experience, necessary to learn through one's interaction with form and materials through all the possible senses. Questions 14 to 17 and question 20, therefore investigates situations within such schools that allow the relation to other people and that promote such way of living. The two schools both housing sensitive children, obtain different levels

of integration within the community, and it is therefore important to investigate them in order to determine the best possible outcome for children with learning disorders.

When asking the architects on the importance of elevating, educating and empowering children, as well as creating beneficial encounters needed, wanted and engaging for the learning child, both had differing levels of outcomes. Although Duvenage (Golden Hours) described children to prefer direct and physical relations, he only mentions this to occur from teachers and friends whilst the design further implements an adjacent site for integration with the community on a secondary basis. Kinsler and van Heerden (Seven Fountains) support this approach in terms of security and management, important aspects for such children, however manage to implement both together into one scheme on a primary basis. Such basis allows for daily interaction after hours, community spaces at special events and facilities to benefit all opposed to a flea market that functions once a week, more to the benefit of the school than the community and a school environment not nearly visited enough by outsiders. The principal at Golden Hours describes the moods and emotions of such children to be *"generally happy"* as opposed to Seven Fountains principal commenting on students *"always happy"* and engaging in the community areas and sports fields. Calling for further views from teachers, assistants and staff on the matter; through their personal observations and educated beliefs.

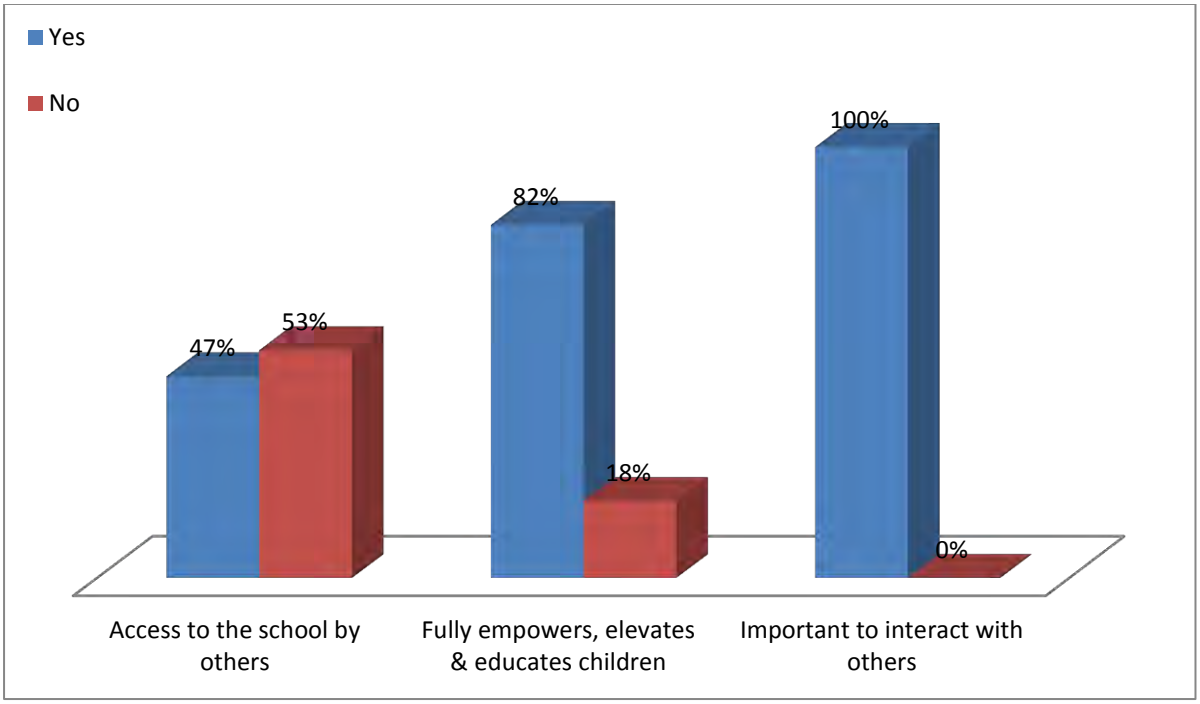


Figure 5.11 (Source: Author's Diagram, 2014) : Bar graph analysing information on social capacities of schools, given by teachers.

Questions 15, 16 and 17 relate the information of access to the school by who and when, if such environments empower, elevate and educate the child, and whether the teacher with experience in the field, necessitates the involvement of others .Such answers consisting of yes/no variations were tabulated into a bar graph, shown in **figure 5.11**, where major inconsistencies raise issues for discussion. Whilst 53 percent of participants declared access to the school by others not present or permitted, only 18 percent denied the school as fully empowering, elevating and educating its students, and more confusingly 100 percent answered that interactions is vital to the growth of the child. If such encounters are vital but not occurring in the environment, how can this fully empower, elevate and educate the child with learning disorders or disabilities? Although Golden Hours tries to integrate its students within the surrounding community via flea markets, work experience and developing skills for the child, such activities shut the school off from the community, to an extent that only one or two pieces of a façades allow views into the school, seen in **figure 5.12**. Seven Fountains however have determined that in order for a system to be supportive, both parties need to benefit from the proposal, where the community gets to use facilities and children grow from experience and develop much needed social skills, interaction seen in **figure 5.13**.

Figure 5.12 (Source: Author's Photograph, 2013) : View of facilities far from the community at Golden Hours.

Figure 5.13 (Source: Author's Photograph, 2013) : Outdoor classroom clearly visible to the street at Seven Fountains.

Going further into integration with others and situations which create this, participants at Seven Fountains listed a community area evident within the school, the assembly area where workshops are held and awareness campaigns benefit both the community and students. Participants at both schools listed good interaction between grades, groups of friends and friendships between students and teachers as positive and healthy. However in many instances teachers and assistants at Golden Hours reported some students, mostly those with autism, to show anger and create disruption causing other children to become scared and withdrawn. Such encounters create children minimally interacting, their response to shy away from physical contact and affecting therefor their ability to learn via the

senses and physical interaction, unsupported by environments seen in **figure 5.14**. If such places were integrated with children without disabilities, wouldn't such encounters of normal play or a friendship with only one affect party benefit such shy, withdrawn children? By imposing different spaces much like Seven Fountains, seen in **figure 5.15**, such play areas may encourage the interaction not by age but by level of difficulty, allowing the child to be able to pick spaces of quietness or those of playful, loud interaction. The aim is to introduce this slowly so that the child learns to develop the necessary skills of social encounters.

Figure 5.14 (Source: Author's Photograph, 2013) : Internal courtyards promoting focal points of discomfort at Golden Hours.

Figure 5.15 (Source: Author's Photograph, 2013) : Playful courtyards serving as areas of interaction or separation at Seven Fountains.

5.3 CONCLUSION

Within generalized questions; participants of this study create links between the two different school, one aimed at disorders and the other at disabilities, to support the need for an environment which can benefit them both, or more importantly all children. On their perception of such children, many described them as special children, who require assistance, are low functioning, contain dysfunctional families and are across a spectrum of variable strengths, difficulties and/or weaknesses.

Main areas of difficulties and issues arise from these situations listing further learning and physical problems, abuse/bullying and neglect, lack of financial support, parents with little knowledge, language as a barrier and fitting into society ad provident needs of focus. Creating such places which support the child through senses shown helpful for their education, spaces of easy identification but facilities of a high quality nature addressing their needs, and spaces which promote the interaction of society in order to develop a two way acceptance of one another. Participants further attributed the success of their current schools/institutions to focus on important individual programs, small classes, facilities and structure, staff of high knowledge and experience, and ongoing communication between parents, teachers and students to develop team situations.

The last and final step was to establish the need and demand for such facilities that better these conditions and what amount of facilities are required. For this reason an empirical study of some special schools in Durban were conducted, seen in appendix III, to establish such numbers and types of students in need. Schools in close proximity to the 'CBD' (Central Business District) and those far away were further investigated to determine places of more need, aiding in site selection at a later stage, and schools of a sever ('SMH' – Severely Mentally Handicapped) and not so severely disordered ('NICP' – Neurally Impaired and Cerebral Palsied) to access the need across disorders and disabilities. Findings showed that each school contained a waiting list, with those of a private school nature to have smaller numbers and those of full education (grades one – 12) containing enough students to fill another school.

When interviewing educational psychologist Steenhuissen, who is involved in a number of schools around the Durban area, he concluded that a major increase in numbers has occurred within those students identified with specific learning disabilities; due to lack of support in the academic field and that an increase in professionals would much aid in proper assessment situations. The researcher would also like to add personal feedback in obtaining such numbers, to be of a difficult and displeasing nature where teachers and professionals of such schools wish to protect and shelter the sensitive nature of such children, only to therefore support its degradation.

CHAPTER SIX:

ANALYSIS AND CONCLUSION

CHAPTER 6 – ANALYSIS AND CONCLUSION

6.1 INTRODUCTION

This dissertation sets out to identify problems within the educational and professional field for children with learning problems, assess methods and approaches contributing to the academic information within architectural design, and therefore create opportunities of tested appropriateness to aid in the upliftment of such children. The need to focus on the child's psychology, both emotionally and developmentally is enforced by assessing multi-sensory environments which can further this achievement, and the physical makeup of form and materials as the main focus to relate such interventions to design patterns, principals and methods. Lastly all results will be shown in one appropriate design of a children's centre and knowledge centre, due to the stigma currently placed behind schools/learning environments, the need to target a large intervention and an interactive space for the transfer of knowledge to all associated with children. For further conclusions to be made, it is therefore imperative to revisit the hypothesis of this dissertation: **"Through the intervention of multi-sensory architectural design, new approaches to assessment and learning facilities will produce a centre for children and knowledge to educate society and create a catalyst for the greater Durban area".**

Information was explored, examined and expressed in sections of defining the problem and issues, the review of literature for successful intervention, the successful and unsuccessful use of such compared in existing building typologies, and first-hand/personal information interrogated to further its relation to specific need. In order to have a fully encompassing research document, information gathered was done by means of global and local means, opening up this information to not only benefit the Durban region by means of a proposal in later sections, but also to benefit anyone, anywhere on this topic, currently lacking information.

6.2 CONCLUSIONS

Creating a common stitch throughout the dissertation, perception allows the investigation to look at all three concepts of multi-sensory, form and materials, as well as interactive knowledge, in having the ability to change the way in which things are regarded, understood and/or interpreted. By focusing on positive and successful encounters, the research takes one step closer in aiding society and the disabled to achieve their full potential, through architectural design which allows for the enhancement of learning experiences. Suitable architectural interventions relating to the concepts identified by the topic were found to be related to the theories of phenomenology, gestalt theory and existentialism.

Multi-sensory design elicits an approach to structure within environments for children with learning disorders, which contain and convey impulses and sensations in many ways. Benefiting the child through multiple opportunities and senses, as well as interaction of a physical rather than verbal transfer of information, affords situations to complement their sometimes lacking, withdrawn and shy characteristics. Phenomenology of perception therefor further regards the interpretive study of human being experiences, in which such children require spaces that implement the testing of their current development, cognition for further growth, aiding in the development of visual perception, and therefore helping them gain meaning and retain information from their surroundings. Such aspects aiding in the learning and development process, seems the first approach in turning current and failing school systems into those which focus on physical and psychological interventions, guiding the process and activities for the child.

Form and material compositions, affected by appearance and substances of makeup, inform the type of structure which can be focused on, altered and improved within architecture. Elements of scale, proportion, colour, texture, shape and overall composition, allows means to benefit the learning disabled child in current stressful situations, to create spaces of connect and interaction, as well as an environment of understanding and therefore relation. Gestalt theory of perception therefore focuses on the quality and dimension of forms required for meaningful configurations, through the use of multi-sensory environments and more, calling for experiences of receptivity, activity and clear reflection. These aid in the learning experience and information gained via mind and body interactions, conscious and subconscious experiences for spaces of close and brief interactions, and engaging experiences allowing clear, concise and informative knowledge to enter the mind of the disabled child.

Interactive knowledge, lastly informs the ability of knowledge transfer through experiences which make one familiar, aware and/or understanding of situations. These benefits create encounters for the learning disabled child which may not have previously been availably/present, and encounters for the community who have previously overlooked such problems, mistreated and/or ignored such children. Existentialism focuses on the nature of one's existence, our freedom and choice in relation to experiences, and allowing means to better our academic performance by such encounters. Social encounters elevate, educate and empower such children by means of; awakening one's experience, creating opportunity for important relationships aiding self-hood, connecting one's self fully within the world of belonging, and attempts to allow the discovery and existence of each being. Encounters of parents, teachers and children have further elicited a teamwork approach to supporting and accepting children with learning disorders, holistically creating what they need, want and engage with to affect everyone's knowledge on the situation.

6.3 RECOMMENDATIONS

Although the stitch of perception is commonly visible, one may argue from an architectural standpoint that gestalt theory of perception is the main subject of research within these, necessitating methods, principles and patterns that aid in the others. The theories of phenomenology and existentialism therefore further such study into more specific focuses and/or outcomes. These aid in the learning and assessment process by means of creating environments which stimulate and highlight the child's development, revealing current stressors evident in current situations for pure assessment, and by incorporating facilities of a mixed situation, aiding as a school, medical and treatment intervention for further cross analysis.

In relation to the study conducted, site selection needs to take into account its proximity to children with learning disabilities mostly located in rural and over populated areas, and to children with learning disorders, located all around Durban. It should further be located where it's most beneficial properties address the highest numbers of students found on waiting lists and/or without current education, stipulating the need in that area and connecting children of a vulnerable nature. The site should also, in relation to precedent studies and literature review, be located as a portal between environments of current parent inhabitation, to aid in their involvement currently overlooked in school environments.

The building and program will include additional supportive facilities currently found worlds apart in collaboration with those currently found in schools, such as; medical, educative and play. An approach targeting more than just the educative side allows a larger number of students to benefit from such facilities, targets a variety of people positive for social encounters and acts as a catalyst in changing the opinions of the community. Specific facilities of a medical relation, such as psychological, therapeutic and counselling will target the needs of children with learning disorders and their families, whilst others of an educative, nutritional and supportive type aid children with learning disabilities and their families. With the additional characteristics of concepts and theories used, such an environment will create an all-encompassing, fully supportive, knowledgeable environment for children alike.

REFERENCES

Books

ARNHEIM, R. 1971. *Entropy and Art – An Essay on Disorder and Order.* Berkley: University of California Press.

AYRES, A.J. 1972. *Sensory Integration and Learning Disorders.* California: Western Psychological Services, Publishers and Distributors.

CHARLES, B. 2004. *The Existentialists: Critical Essays on Kierkegaard, Nietzsche, Heidegger, and Sartre.* United States of America: Rowan and Littlefield Publishers, Inc.

FRAMPTON, K. 2003. *Architecture: Steven Holl Architect*. Britain: Phaidon Press.

GETMAN, G.N; KANE, E.R; HALGREN,M.R & MCKEE, G.W. 1968. *Teacher's Manual : Developing Learning Readiness – A Visual-Motor-Tactile Skills Program.* St. Louis: Webster Division, McGraw-Hill Book Company.

GIURGOLA, R. 1994. *Louis I. Kahn – Works and Projects – 4th Edition.* Barcelona: Gustov Gili Publishers.

GROPIUS, W.1962. *Scope of Total Architecture*. New York: Collier Books.

HOCHBERG, J.E. *Foundations of Modern Psychology Series: Perception*. United States of America: Prentice-Hall Inc.

JENCKS, C & KROPF, K. 1997. *Theories and Manifestoes of Contemporary Architecture.* Great Britain: Academy Educations.

KELLERT, R.S., HEERWAGEN, J & MADOR, M. 2008. Biophilic Design: *The Theory, Science and Practice of Bringing Buildings to Life.* New Jersey: Wiley Publishers.

KING, B & WERTHEIMER, M. 2009. *Max Wertheimer and Gestalt Theory.* New Jersey: Transaction Publishers.

KURTZ, L.A. 2008. *Understanding Controversial Therapies for Children with Autism, Attention Deficit Disorder & Other Learning Disabilities: A Guide to Complementary and Alternative Medicine.* London: Jessica Kingsley Publishers.

NORBERG-SCHULZ, C. 1971. *New Conceptions of Architecture: Existence, Space and Architecture.* Great Britain: Cox and Wyman Ltd.

PALLASMAA, J. 2005. *The Eyes of the Skin: Architecture and the Senses.* Great Britain: John Wiley and Sons Ltd.

PALLASMAA,J. 2009. *The Thinking Hand: Existential and Embodied Wisdom in Architecture.* Great Britain: John Wiley and Sons Ltd.

STOLLER, E. 1999. *The Salk Institute.* New York: Princeton Architectural Press.

Journals/Articles

AMELAR, S. 2003. *Steven Holl experiments with constructed "porosity" in his design for Simmons Hall, an undergraduate dorm set in the scientific realm of MIT.* Architectural Record, Volume 171, Issue 5, pp. 204 – 215.

AMSTERDAM, E.M. 2010. *Interview – Steven Holl – "Architecture surrounds you, in the same way as music surrounds you.* ArchIdea, Volume 42, pp. 4 – 11.

BRODY, L.E & Mills, C.J. 1997. *Gifted Children with Learning Disabilities: A Review of the Issues.* Journal of Learning Disabilities, Volume 30, No. 3, pp.282.

CUTTING, J. 1989. *Gestalt Theory and Psychiatry: Discussion Paper*. Journal of the Royal Society of Medicine, Volume 82, pp. 429 – 431.

FITCH, J. 1984. *Experiential Context of the Aesthetic Process.* Journal of Architectural Education, Volume 41, No.2, pp. 4 – 9.

KAHN, L. 1972. *Louis Kahn on Learning.* Design Quarterly, No. 86/87, pp. 41 -44.

KINSLER, S. 2006. *Sustainability: Private Sector Development – Seven Fountains Primary School, Kokstad.* KZNIA Journal, Volume 31 (2), pp.8-15.

MORRISON, G.M & COSDEN, M.A. 1997. *Risk, Resilience and Adjustment of Individuals with Learning Disabilities.* Learning Disability Quarterly, Volume 20, No.1, pp. 43 – 60.

RAMAN, 2009. *Mutating Typology – Seven Fountains Primary School, Kokstad, KwaZulu-Natal.* Architecture South Africa, September/October, pp.30-34.

UHRMACHER, P. 2009. *Toward a Theory of Aesthetic Learning Experiences*. Curriculum Inquiry, Volume 39, Issue 5, pp. 613 – 636.

VON DER HEYDT, R & OTHERS. 2012. *A Century of Gestalt Psychology in Visual Perception: Perceptual Grouping and Figure-Ground Organisation.* Psychological Bulletin: American Psychological Association, Volume 138, No.6, 1172-1217.

WIENER, J. 2004. *Do Peer Relationships Foster Behavioural Adjustment in Children with Learning Disabilities?* Learning Disability Quarterly, Volume 27, No. 1, pp. 21 – 30.

WISE, J. 1997. *Children with Learning Disabilities Lack Information and Support.* British Medical Journal, Volume 314, No. 7086, pp.995.

Theses

DU PLESSIS, E. 2001. *Chapter 2: The Nature and Extent of Special Needs in a South African Context.* Gauteng: University of Pretoria.

MCDONALD, M. 2005. *Epiphanies: An Existential Philosophy and Psychological Inquiry*. Sydney: University of Technology.

SHIRAZI, M. 2009. *Architectural Theory and Practice, and the Question of Phenomenology.* Germany: Brandenburg University of Technology.

TAN, T. 2007. *Existentialism and Sammuel Buckett's two plays: Endgame and Happy Days*. Asia: Middle East Technical University.

Brochures & Publications

CENTRE FOR MENTAL HEALTH IN SCHOOLS. 2008. *Assessing to Address Barriers to Learning.* Los Angeles, CA : University of California, Los Angeles.

LARKEY, S. 2006. *Strategies for Teaching Students with Autism Spectrum Disorder and Other Students with Special Needs.* Learning Links.

Websites

BLYTH, S.G. 2011. *The right to Move: Assessing Neuromotor Readiness for learning why physical development in the early years supports educational success.* Available at www.ecswe/downloads/publications/QOC-V3/Chapter-1.pdf (last accessed 19/05/2014)

dictionary.refrence.com/browse (Last accessed on 06 April 2013)

EMERSON, E & HATTON, C. 2007. *The Mental Health of Children and Adolescents with learning Disabilities in Britain.* Available at www.lancaster.ac.uk (last accessed 26/05/2014)

KANG, S.T. 2012. *Multi-sensory Design and Synaesthesia.* Available at http://www.wearematik.com/playground/multisensory-design-and-synaesthesia. (last accessed 09/03/2013)

KINNEALEY, M & MILLER, L.J. 1993. *Sensory Integration/ Learning Disabilities.* Available at spdfoundation.net/pdf/kinneakey_miller.pdf. (last accessed 19/05/2014)

NORBERG-SCHULZ, C. 1979. *Kahn, Heidegger and the Language of Architecture.* Available at http://iris.nyit.edu (last accessed 25/05/2014)

SEAMON, D. 2000. Phenomenology, Place, Environment and Architecture: A Review of the Literature. Available at http://www.environment.gen.tr/environment-and-architecture-a-review-of-the-literature.html. (last accessed 13/04/2013)

Audio Visuals

ROBERTS, K. 2006. *Creativity in Schools*. Monterey, California: TED Talks. (Last accessed on 23 February 2013).

ROBERTS, K. 2010. *Leading a Learning Revolution.* Monterey, California: TED Talks. (Last accessed on 23 February 2013).

APPENDICES

APPENDIX I – INTERVIEW (Educational Psychologist)

The information gathered during this interview, has been included in this study on acceptance by the person interviewed under the terms that it will help in the study of children and learning disorders. It will in no way degrade, or question the integrity of such people but rather gather useful information.

Name: Bruce Steenhuisen

Profession: Educational Psychologist (Durban North)

Date: 08/04/2013

Questions:

1. What qualifications do you obtain that allow you to work closely with and make decisions about children? And where were these obtained?
   Master's Degree in Educational Psychology

2. How many years have you been working with children?
   32 years as a school psychologist/private practice.

3. How sensitive are children to the questioning or interview process? Please elaborate.
   Depends on how it is conducted. It is important to make children relaxed before questioning/interviewing. Also depends on age and sensitivity of individual child. Some tests (e.g. IQ) are more threatening than others. Also need to explain purpose of assessment.

4. How much more sensitive is this for children with learning disabilities? Please explain.
   Children with learning disabilities often have 'secondary emotional' difficulties and this can influence their confidence, self-esteem etc.

5. Do you think this time frame and daily exposure, has allowed me to obtain enough insight into the matter to exclude the direct contact and questioning of children?
   Yes. Interviews can only occur if the atmosphere, manner of interview and type of questions asked are appropriate.

6. Is research on these children through books, journals, articles and internet sites, acceptable and of an equivalent or better quality? Please explain.
   Certainly it gives the person more insight, and this assists with the approval to interview.

7. Which of the above sources do you think would be of most to least importance and beneficial? Please number the following list from 1-4, where 1 is of most importance. Please give reasons.
   Books – *2*
   Journals – *4*
   Articles – *3*
   Internet Sites – *1*

8. Working within the region of Durban, how have you found the statistics for such children, over the years?
   An increase in learners presented with specific learning disabilities, particular reading and attention deficit disorder.

9. What reasons do you think are responsible for such findings?
   More learners appear to be less interested in reading. More interested in visual multi-media such as TV games, Play Station, cell phones etc. With the advent of TV, parents are less inclined to sit and read with children or to encourage them.

10. Do you believe more facilities and resources will help with such statistics and reasons in the greater Durban area? Please explain.
    Yes. Increase of professionals (psychologist, speech therapist, occupational therapist). At present only four "government" remedial schools and three private remedial schools are available in the greater Durban area.

APPENDIX II – QUESTIONNAIRE (Architects, Principals and Staff)

The information gathered during this questionnaire, has been included in this study on acceptance by the person interviewed under the terms that it will help in the study of children and learning disorders. It will in no way degrade, or question the integrity of such people but rather gather useful information.

Name:

Age:

Profession:

Institution/School:

Date:

Questions:

Questions of general intent:

1. What is your perception of the children who attend this school/institution and what major difficulties and issues do you think they face?
2. Does this school/institution address such difficulties differently to other general schools? Please explain your reason.
3. Do you think that such children learn and develop skills at a slower rate compared to others?
4. Are there any facilities available at your school/institution that are not available at others and that are of great use and importance?
5. How do you believe that these benefit and enrich the learning experience had by such children?

Questions pertaining to Phenomenology:

6. Because your school/institution is of a different nature, have you noticed a character within children that is different or unusual? Please explain.
7. Have you found or assessed any children attracted or intrigued by any objects or circumstances where they use any of their senses besides vision, such as hearing, touch, smell or taste? Please list such places, objects or things that create this.

8. What encounters would you say are the most important and necessary for the learning and development process of the child?
9. How do these children respond to certain colours, lighting and shapes? Whether negative or positive.

Questions pertaining to Gestalt:

10. What part of the school day do you think the children look forward to and impact them the most? And why?
11. Are there any places or areas children repeatedly want to go, gather there or find interesting?
12. Can you describe the characteristics of such places, anything interesting or out of the usual?
13. When looking at the structure of your school/institute, what characteristics of the building do you believe beneficial to the child?

Questions pertaining to Existentialism:

14. How do children in this environment interact and get along with classmates, friends in other grades or with teachers?
15. Do any other people access any of the facilities or does the school function anytime outside of school hours or terms?
16. Are there any spaces dedicated to such community areas, where students can interact with people outside the school, to further their knowledge?
17. Do you believe that such a school/institution empowers, elevates and educates children to its fullest extent? Please explain.

Questions of general closing intent:

18. Each child is unique and has his own personality; why do you think this one school/institution can benefit them all, the entire school, or any children for that fact?
19. If you had the budget or ability to change such an environment, addition or removal, what would these things be?
20. Lastly, do you believe it is important for such children to interact with other children, from other schools, backgrounds or stability? Please explain.

APPENDIX III – Empirical Study of Durban, KwaZulu-Natal

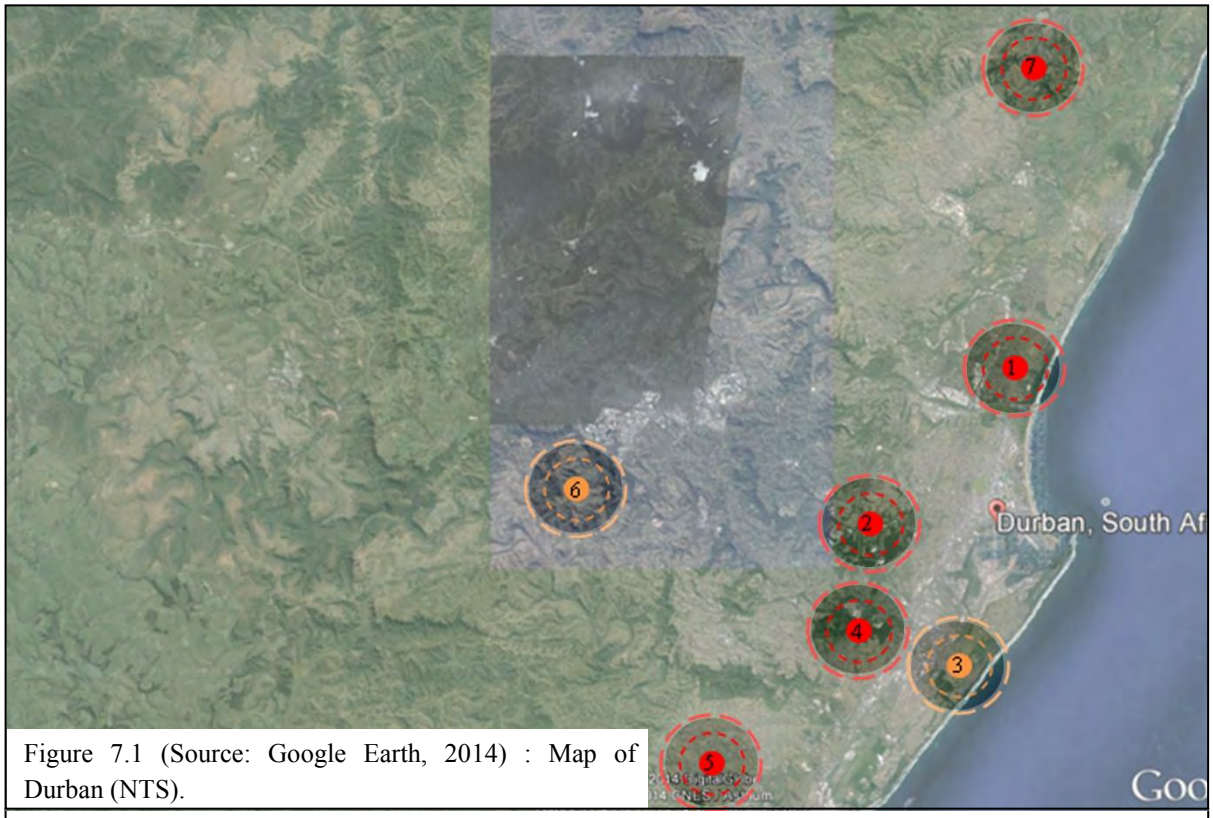


Figure 7.1 (Source: Google Earth, 2014) : Map of Durban (NTS).

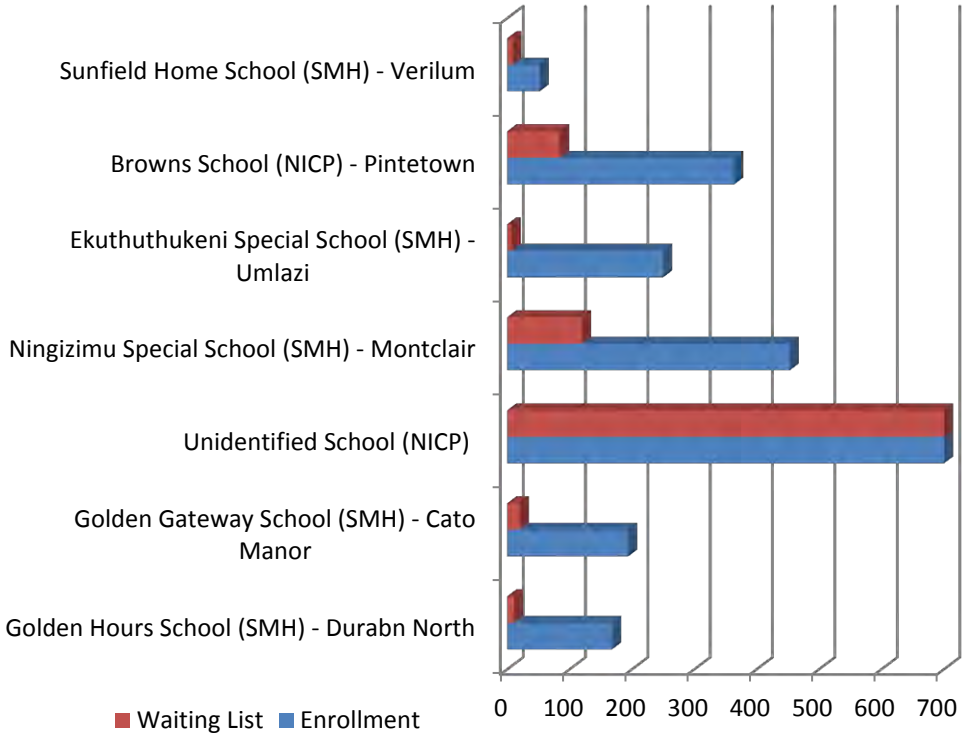


Figure 7.2 (Source: Author's Diagram, 2014) : Bar Graph illustrating statistical information for schools located in the Durban Region.

(SMH) – Severely Cognitively Challenged (NICP) – Neurally Impaired and Cerebral Palsied

APPENDIX FIGURES