Facilitating Adult Learning Through Responsive Architecture:

The Design of a Community Education & Training Centre
in Bridge City Town Centre, Durban.

By

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**A Dissertation Submitted in partial
fulfilment of the requirements
for the degree of
Master of Architecture**

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DECLARATION

I hereby declare that this dissertation is my own unaided work. All data sources consulted for this research have been duly acknowledged in the reference list contained here-in.

This dissertation is submitted to fulfil the requirements for the degree of Masters in Architecture, in the School of the Built Environment and Development Studies (SOBEDS), at the University of KwaZulu-Natal. This work has not been previously submitted for any examination or degree at any other university.

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Thobani Gumede

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Date

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Magdalena Cloete | Supervisor

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Date

ACKNOWLEDGEMENTS

All praise and glory be to God, for he has blessed me.

> "[2] Consider it pure joy, my brothers and sisters, whenever you face trials of many kinds, [3] because you know that the testing of your faith produces perseverance. [4] Let perseverance finish its work so that you may be mature and complete, not lacking anything."
>
> *– James 1:2-4 (The Bible - New International Version)*

I am eternally grateful for all the prayers, love, support, and understanding shown by all during this research, especially my:

- Mother,
- Sister Nompumelelo,
- Grandmothers, Gogo Maduna and Gogo Ma'Anti,
- Anti Zimasa Magwentshu,
- Cedric Gbede, Tinashe Nyambuya, Vukile Mbesa, Sinenhlanhla Mzelemu, Nokukhanya Ngcobo, Nqobile Zulu, Luthando Madonsela, Bakari Kilumbilo, Zamantimande Ngwenya
- Family – both of this world, and those who have passed on as ancestors, ngithi Qwabe! Mnguni! Phakathwayo! Yeyeye! Wena owathi dlula kubeyethwe!
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- DM6 and DM8
- Friends and
- A special thank you to my Supervisor Magda Cloete, who's guidance, support, understanding, and patience was unparalleled. You believed in me when no one else did. You always showed-up for me, especially when it mattered the most.

Thank you.

> "[24] The Lord bless you and keep you; [25] the Lord make his face shine on you and be gracious to you; [26] the Lord turn his face toward you and give you peace."
>
> *– Numbers 6:24-26 (The Bible - New International Version)*

DEDICATION

This dissertation is dedicated to my Mother. She is everything to me. Without her, this journey would not have come to fruition.

Ngiyabonga Ma.

ABSTRACT

The Department of Higher Education and Training (2017) affirms that many South African adults in townships lack primary formal education. They in-turn have fewer employment opportunities especially in this digital era, resulting in negative outcomes society in general (de los Angeles, 1919). The current public institutions for adult education and training lack both capacity and institutional identity. The aim of this study is to investigate how didactic architecture could be applied to develop a contextually responsive design for adult education, within a township condition. It was envisioned that the design of a CET Centre, utilising didactic architecture principles would provide reprieve to a strained sector of the department. The study is underpinned by the Environmental Psychology field along with Place Theory, Critical Regionalism and Social Cognitive Theory.

This research entails a literature review, local and international precedents, a local case study in Zwide, Port Elizabeth. The research site is within KZN Community Education and Training (CET) Centres within the Bridge City area, and its immediate surrounding townships (Inanda, Ntuzuma, KwaMashu and Phoenix). The method of data collection included questionnaires as well as interview schedules.

The findings indicate that the location of an educational facility has paramount importance, as it needs to link the community to the facility and the facility to the community. an understanding of the unique parameters of the site, the context, movement patterns, client, desired uses, culture, ethnicity, and the vernacular elements of that community, develops the best architectural design solutions for educational facilities.

Adult learners require dedicated learning environments that possess an institutional identity and are independent of the mainstream children's education. These environments must be articulated, universally accessible, well lit, well ventilated, and offer quiet spaces for individual study. Adult learners require workshops suitable for vocational skills, libraries and outdoor learning environments designed with an educational value. Toilets are to be located in close proximity to all learning spaces. All learning spaces are to be specified with comfortable and ergonomic furniture, at a suitable scale.

Shape, form, colour, daylight, acoustics, air quality, ventilation, didactic architectural expressions, soft nurturing environments, and environments of curiosity and discovery stimulate learning.

LIST OF ILLUSTRATIONS

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LIST OF ABBREVIATIONS

ABET	Adult Basic Education and Training
AET	Adult Education and Training
CET	Community Education and Training
CET Act	Community Education and Training Act, 2006 (Act No. 16 of 2006)
CETC	Community Education and Training Colleges, hereafter referred to as CET College
CLC	Community Learning Centre
DHET	Department of Higher Education and Training
LTSM	Learning and Teaching Support Material
NEET	Not in Employment or in Education or Training
NQF	National Qualifications Framework
PALCs	Public Adult Learning Centres
SMME	Small, Medium and Micro Enterprises
TVET	Technical and Vocational Education and Training

GLOSSARY OF TERMS

Facilitate. Make (an action or process) easy or easier.

Adult. A person who is fully grown or developed. A person who has reached the age of majority.

Adult Education and Training. All learning and training programmes for adults on level 1 registered on the national qualifications framework contemplated in the National Qualifications Framework Act, 2008 (Act No. 67 of 2008).

College. A public College that is established or declared as a Community Education and Training College under the CET Act, 2006 (Act No. 16 of 2006)

Connect. Bring together or into contact so that a real or notional link is established.

Context. The circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood.

Didactic. Designed or intended to teach, particularly in having moral instruction as an ulterior motive.

Formal Learning. Learning that occurs in an organised and structured education and training environment and that is explicitly designated as such. Formal learning leads to the awarding of a qualification or part-qualification registered on the NQF.

Informal Learning. Learning that results from daily activities related to paid or unpaid work, family or community life, or leisure, including incidental learning.

Learn. The acquisition of knowledge, understanding, values, skill, competence or experience.

Learning and Teaching Support Material. A variety of learning and teaching materials used in classroom. These range from teachers and learners created resources to commercially produced classroom resources such as wall charts, workbooks, textbooks, e-books, readers, stationery, science kits, dictionaries, encyclopaedia etc.

Learning programme. A purposeful and structured set of learning experiences that leads to a qualification.

Lecturer. An inclusive term referring to teachers, facilitators, assessors, moderators, and others teaching, educating, training, facilitating, assessing, or enabling learning in learning contexts across the board in all Community Education and Training (CET) learning contexts.

Lifelong Learning. Learning that takes place in all contexts in life from a life-wide, life-deep and lifelong perspective. It includes learning behaviours and obtaining knowledge, understanding, attitudes, values and competencies for personal growth, social and economic well-being, democratic citizenship, cultural identity and employability.

Mixed-mode or Multi-modal Learning. Learning that makes use of different learning sites and different forms of delivery including but not limited to face-to-face, distance and e-learning, and fulltime, part-time, and block-release study.

Non-formal Learning. Planned educational interventions that are not intended to lead to the awarding of qualifications or part-qualifications.

Open Learning. An approach which combines the principles of learner centredness, lifelong learning, flexibility of learning provision, the removal of barriers to access learning, the recognition for credit of prior learning experience, the provision of learner support, the construction of learning programmes in the expectation that learners can succeed, and the maintenance of rigorous quality assurance over the design of learning materials and support systems.

Principal. The chief executive and accounting officer of a public college, and includes a rector of a public college.

Public College. Any college that provides continuing education and training on a full-time, part-time or distance basis and which is:

(a) Established or regarded as having been established under section 3 of the Continuing Education and Training Act 16 of 2006;
(b) Declared as a public college under section 4 of the above-mentioned act.

Responsive Architecture. Architecture that measures actual environmental conditions (via sensors) to enable buildings to adapt their form, shape, colour or character responsively (via actuators).

Student. Any person registered as student at a college

1 CHAPTER 1

1.1 INTRODUCTION

The importance of education in today's myriad of convoluted economic and social environments has been increasingly acknowledged worldwide. The rate of scientific and technological progression is increasing proportionally to the complex nature of skills required in the 21st century and beyond. If South African society is to achieve its goals of transformation, reformation and development, education will form a pivotal role (Department of Higher Education and Training, 2015).

Opportunities of a second chance in the form of adult education and training, now termed 'community education and training', are of great importance in education if South African society is to progress as a whole. The Department of Higher Education and Training, and researchers such as Tight, believes the community education and training approach can foster lifelong learning, facilitate skills development and enhance the quality of life in communities (Department of Higher Education and Training, 2015, Training, 2015, Tight, 2002). According to Elliott (1999) lifelong learning will be just another catch-phrase, if the educators involved are not provided with adequate resources to empower learners.

Architecture forms an integral role in education and training as a form of a teaching and learning aid, in which it can allow for the creation of physical environments that may foster suitable conditions for learning to take place. A focus on the architecture of learning spaces may make a positive contribution to South Africa's development aims set-out above.

This chapter discusses the context of the study and highlights other research related to the topic. The importance of the study is brought to the fore, and the research problem clearly outlined. The research structure, questions, objectives, and aims set out the scope. A brief overview of the theoretical framework is introduced, which is discussed in more detail in chapter two. At the close of the chapter, the research methodology is set out, detailing the processes undertaken to carry out the study.

1.1.1 Research Background

A high percentage of adults in South African townships lack primary formal education. Several reasons contributed to this fact, namely, rebellious students, discontented teachers, financial constraints, as well as the legacy of apartheid - both in education, and urban planning (Barer-Stein and Draper, 1988). Other students may have been experiencing poor performance for reasons linked to dysfunctional families, or apparently possessing different aptitudes yet not provided alternative ways to learn, among other things (H. GardnerKornhaber and Wake, 1996). The latter may be observed through the theory of multiple intelligences (Howard Gardner, 1983, H.E. Gardner, 1993).

Access to adult education for individuals affected by the aforementioned circumstances may increase their employability, enable better employment opportunities, improve their work-related skills, equip them with basic entrepreneurial knowledge towards self-employment, and generally improve their sense of self-respect. Improvement in adult education therefore leads to peoples' participation and contribution to the local economy, decrease unemployment, and curb extreme poverty rates (LayardLayardMayhew and Owen, 1994, Mayo and Lank, 1994, Tight, 2002, Schweke, 2004, Coffield, 2004, Taylor and Enggass, 2009). The level of education and employment has a direct impact on the reduction of crime and related social ills (de los Angeles, 1919).

The provision of quality and appropriate learning environments forms the key to accommodate this transaction of knowledge. The architectural spaces required for adult learning environments are unique. This fact becomes even more evident when adults are educated in spaces not designed for adult learning due to lack of infrastructure (Galbraith, 1991).

This study will investigate the architectural design of effective adult learning spaces within a township context with the aim to empower individuals and the community, through skills and education.

The research will consider views of Jos Boys (2009) who questions the definition of learning spaces, and the impact the environment has on the learning experience. She questions how best the various kinds of learning space can be interrogated to determine their effectiveness.

Boys also seeks to identify the multiple spaces in which learning can take place, whether it be within or outside of the campus boundaries. Similarly, Hertzberger (2008) suggests a different typology from the school with conventional classroom rows; one that will allow for a sense of freedom, whilst instilling knowledge. He suggests architects to explore a form for learning spaces that can accommodate many diverse experiences, as one would experience in a city or the internet. Day (2002) on the other hand, delves deeper into factors of the immediate physical environment that stimulate physiological and psychological responses that influence learning.

Hartl (2008), Salvesen (2010), and Randeree (2014) have explored adult education in their research thesis in past years. The noticeable differences of the studies are mainly the chosen location of the research, and the theoretical framework utilised to explore the phenomenon.

In terms of location, in particular, Hartl focuses on the Durban CBD – the greater Warwick Junction in particular - as the research site for her study. Her study differs in that her proposed solution has a far-reach into all parts of the greater Durban area. The students envisioned to access the Adult Education and Training (AET) facilities would be doing so primarily by public transport. Salvesen is less specific, extending his research area to the entire province of KwaZulu-Natal. Randeree's research location is bound to Durban.

This research aims to investigate how didactic architecture can be applied to develop a contextually responsive design for the unique requirements and architectural qualities of adult education, within a township condition, in a manner which will enhance learning. The township selected is Bridge City and its immediate surrounding communities.

Though the research focuses selectively on architectural spaces to enhance learning, it is acknowledged that a variety of other factors contribute to academic success. These factors may include hard work, discipline, and a mindset within the individual and the community that places values in studying. The latter, together with an educator's intrinsic belief that their students are capable of success, has proven to increase learning success rates (H. Gardner et al., 1996).

Principles for Learning and Teaching Support Materials (LTSM) functionality development are listed in The National Policy on Learning and Teaching Support Materials for Community

Education and Training (CET) Colleges (Department of Higher Education and Training, 2016). The last three principles, in particular, can be directly applied to the architecture of CET Spaces - extending the LTSM's to including the building itself. These call for the LTSM to be:

1. *Relevant to the individual, community or learning context and the society*
2. *Flexibility of learning provision and*
3. *Learner Centred.*

This is a clear indication that governmental policy already calls for CET Centres to be responsive from the micro to the macro scale, from the students to their communities.

1.1.2 Research Site

The study was conducted within the adjacent context of the Bridge City Development, situated centrally to the eThekwini Central townships of Phoenix, Inanda, Ntuzuma, and KwaMashu.

Africans made up 87% of the population; with Indians, and coloureds making up 12% and 1% respectively. The dominant home language was isiZulu (79%), followed by English (14%).

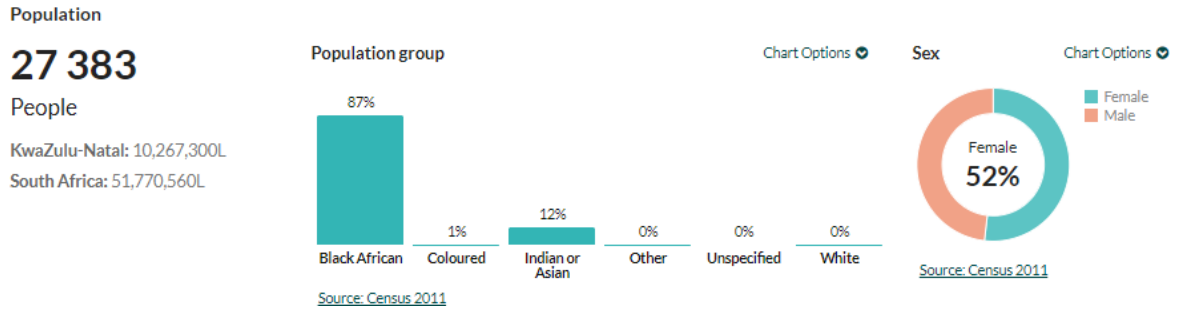


Figure 1.1 – Population of the research site (Wazimap, 2016)

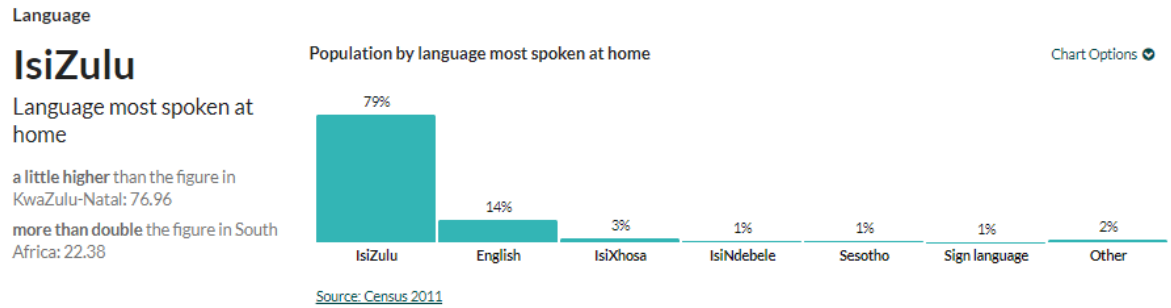


Figure 1.2 - Home language in research site (Wazimap, 2016)

4% of the population had never been to school. 15% of residents' last formal education was in primary schools. 73,3% had completed grade 9 or higher, 40% had completed matric and 1% had completed a higher qualification. The unemployment rate sat at approximately 68,7%. Of those employed, the average monthly income was R2500-00 (Wazimap, 2016).

The developments in the fairly new mixed-use precinct were realised through an initiative by Tongaat Hulett and the eThekwini Municipality. The precinct was to become a hub consisting of municipal services which include a magistrate's court, a government hospital, and in the near future, a government services mall (with departments such as home affairs). The development currently includes retail and commercial offerings, which together with the adjacent industrial park, and surrounding residential areas, complete the mixed-use objective. Public transport had also been taken into consideration; patrons have access to a taxi rank on the roof of the Bridge City Mall, a train station below the mall, as well a bus-rapid-transport (BRT) system currently under construction (Tongaat Hulett Developments, 2017).

1.1.3 Motivation for The Study

Educational institutions need to be successful to ensure the survival of society. The mobilisation and fulfilment of potential in skills and talent remain crucial to remain on par with other societies (H. Gardner et al., 1996).

The preamble of The Continuing Education and Training Act (Anonymous, 2006) lists key desirable outcomes of the Act, which can be translated into tangible built form. These include the transformation of CET Colleges to respond to community needs, universal access to education and training that transcends physical ability, gender, and economic status, and provide an ideal opportunity for skills development and learning towards global standards and quality.

The National Policy on Curriculum Development and Implementation in CET Colleges (Department of Higher Education and Training, 2017) desired outcomes are intangible in contrast. The policy aspires to eradicating adult illiteracy and affording flexible lifelong learning through second-chance opportunities for adults to complete their schooling.

A localised study into didactic spaces, forms and context might prove to reveal more responsive outcomes, unique to a particular community, and contributed to the knowledge base required to realise the above-mentioned desired outcomes.

1.2 DEFINING THE PROBLEM, AIMS & OBJECTIVES

1.2.1 Definition of The Problem

Post-1994, a significant number of South African adults living in the townships were lacking formal education (Department of Higher Education and Training, 2017). Several factors might have contributed to this outcome, including but not limited to rebellious students, discontented teachers, financial constraints, the legacy of apartheid in education and urban planning as well as unconducive learning environments (Barer-Stein and Draper, 1988).

This lack of education had adverse effects on the individual. They were generally laden with resentments and bad memories, and were frequently socially and economically excluded (Tight, 2002). An uneducated adult had fewer employment opportunities as their employability was reduced, particularly in that digital age where education served as a foundation for the complex skills required in the evolving industries. Unemployment had adverse effects on the community as well, and together with non-participation or contribution to the local economy, increased poverty rates. Where education was lacking, and unemployment and poverty were rife, crime and related social ills were increased (de los Angeles, 1919).

The current public institutions for adult education and training were poorly articulated. The Centres lacked both capacity and institutional identity, as they were primarily dependent on public schooling infrastructure. The absence of learning resources and learning environments not only inhibited the facilitation of the CET programmes but also affected student attendance (Department of Higher Education and Training, 2015).

It was envisioned that the design of a CET Centre, utilising didactic architecture principles would provide a reprieve to a strained sector of the department.

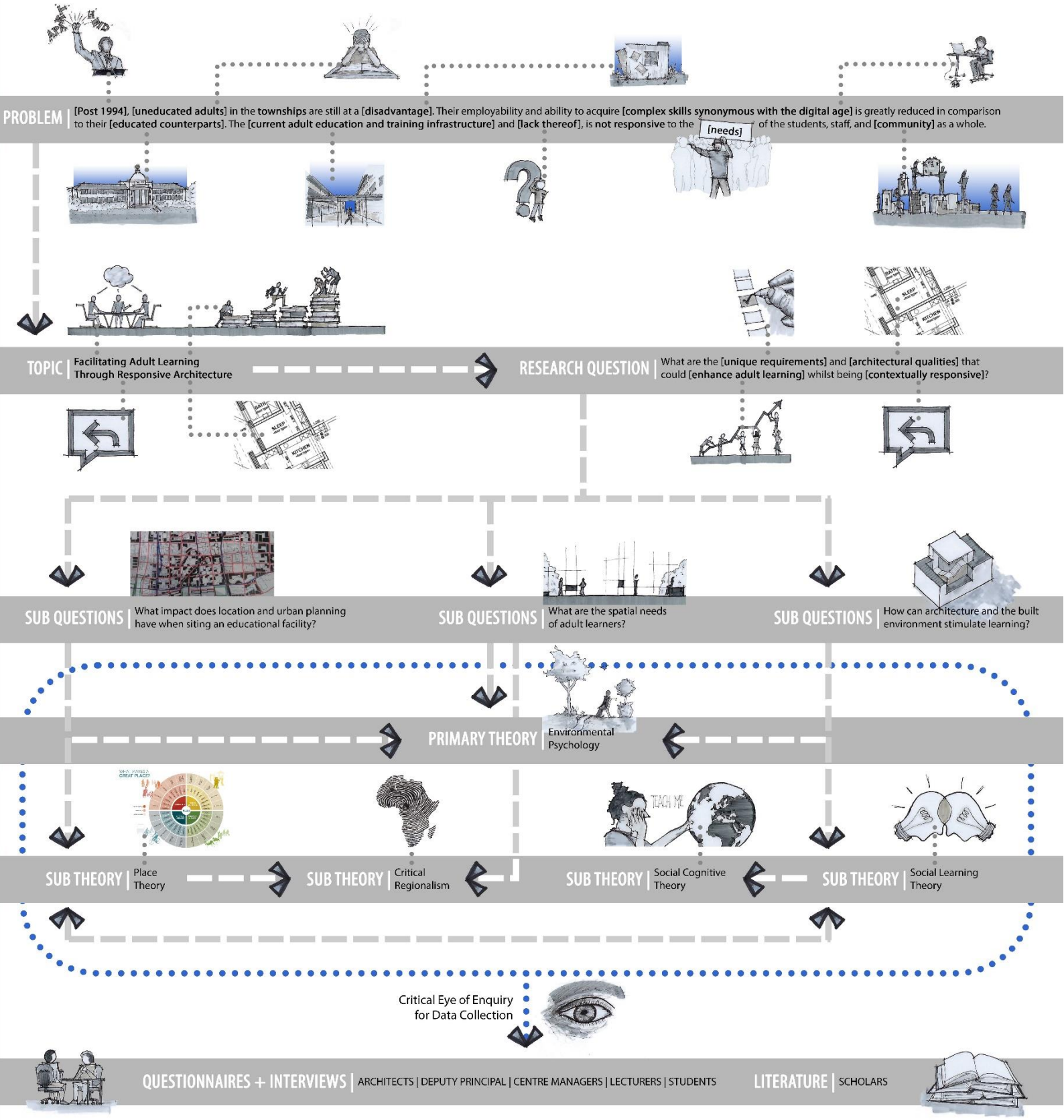


Figure 1.3 - Research flow diagram (Author, 2021)

1.2.2 The Problem Statement

Post-1994, uneducated adults in the townships were still at a disadvantage. Their employability and ability to acquire complex skills synonymous with the digital age was significantly reduced in comparison to their educated counterparts.
The current adult education and training infrastructure and lack thereof were not responsive to the needs of the students, staff, and community as a whole.

1.2.3 Research Aim

This research aimed to investigate how didactic architecture could be applied to develop a contextually responsive design for adult education, within a township condition.

1.2.4 Research Objectives

The research objectives of this study were:

a. To investigate the impact of the location and urban planning when siting an educational facility in the Bridge City precinct.

b. To understand the diverse spatial needs of adult learners.

c. To investigate architecture and built environments that stimulate learning.

1.3 SETTING OUT THE SCOPE

1.3.1 Delimitation of the Research Problem

The study excluded private colleges, community-based organisations, non-governmental organisations, faith-based organisations, and non-profit organisations.

The research solely focussed on CET centres and students within the Bridge City Precinct and the immediate surrounding townships (Inanda, Ntuzuma, KwaMashu, Phoenix).

Only students from level four in the CET learning continuum were selected to participate in the research, as they could be considered to have been in the CETC for the longest period.

It is imperative to note that this study was conducted within the discipline of architecture and as such cannot explore the details of the education and training programme or pedagogy, as these only provide a background to the research.

1.3.2 Assumptions

The following assumptions had been made by the researcher:
The urban context/planning had a direct effect on the success of an educational facility.

A Community Educational & Training Centre deemed to be responsive to its environment and occupants would stimulate learning.

The school governance, curriculum relevance, curriculum implementation, and teaching abilities were independent variables to responsive architecture or built environments that stimulated learning.

The respondents of the questionnaires and interviews answered questions truthfully.

The respondents had a uniform understanding of all questions posed.
The secondary data consulted did not omit data that did not align to their anticipated outcomes, or the requirements of high impact journals (Boddington and Boys, 2011).

1.3.3 Key Question

What are the unique requirements and architectural qualities that could enhance adult learning whilst being contextually responsive?

1.3.3.1 Sub Questions

a. What impact does location and urban planning have when siting an educational facility?

b. What are the spatial needs of adult learners?

c. How can architecture and the built environment stimulate learning?

1.4 KEY CONCEPTS AND THEORIES

1.4.1 Introduction to Key Concepts and Theories

The literature considered Environmental Psychology, Place Theory, Critical Regionalism and Social Cognitive Theory.

Environmental Psychology considered the impact or effect that the built and natural environment had on people (Lewin, 1935, LewinHeider and Heider, 1936).

Place Theory considered the way people experienced architecture. And how the built environment could achieve a sense of place through using specific mechanism and architectural elements, largely based on the interpretations of Christian Norberg-Schulz (1979) and more recently amongst others Day and Midbjer (2007), and Pallasmaa (2012).

Critical Regionalism seeked to integrate the placelessness of universal modernism with the peculiar elements found within the local context. Lefaivre and Tzonis (1981), as well as Frampton (1983a) were the most prominent contributors.

Social Cognitive Theory suggested that knowledge could be acquired by observing others within environments of social interaction, experiences, and outside media influences (Bandura, 1989).

The above theories were utilised within the data collection and data analysis activities of the research and guided the exploration and interpretation of phenomena within the data (Imenda, 2014).

1.5 RESEARCH METHODOLOGY

This study seeked to determine effective learning spaces for adult learners in a township context. The stimulus for learning was an intangible psychological process which was difficult to quantify. That suggested a qualitative approach to be implemented as it unveiled the attributes of particular settings, situations, systems, relationships, human interactions and lived experiences (Peshkin, 1993, Leedy and Ormrod, 2009). That understanding and interpretation of phenomena were crucial for the research to inform an architectural

response which was relevant to its context, and responsive to the end-user. Whereas the actual physical elements used to stimulate learning were quantifiable, alluded to a qualitative method as that method involved the identification of attributes of phenomena. That ultimately suggested that a mixed-method approach was to be used to conduct the study, as both qualitative and quantitative methods applied to this study.

1.5.1 Instrumentation

Two instruments were utilised to facilitate data collection for the study; a questionnaire as well as an interview schedule.

The questionnaire was used by the researcher to confirm the respondents' demographics, educational background, and characteristics of his/her physical learning spaces and the context therewith. It was completed by willing participants (students) from two selected community education centres. The covering page of the questionnaire was comprised of a brief introduction, and an endorsement of the participants' rights to anonymity and non-participation. A maximum of 30 multiple-choice questions were included. The estimated time for completion was between 10 to 15 minutes. The questionnaire session was facilitated by either a lecturer of the selected CET Centre or the researcher. The completed questionnaires were collected and placed in a marked envelope before being sealed and collected by the researcher.

The interviews allowed the researcher to gain insight into the respondents' feelings, perspectives, and beliefs regarding the learning environments of adults. That instrument was semi-structured. The flexibility in the structure allowed the researcher to possibly gain further unplanned for information compared to a fully structured approach (Leedy and Ormrod, 2009). Individual interviews were conducted. The respondents were briefly introduced to the study and its objectives without giving away information that might influence the outcomes of the interviews. Respondents were reminded of their rights to anonymity and non-participation. During the interview, the conversation was voice recorded in English, isiZulu or both languages with the interviewee's permission and later transcribed and translated into English. A copy of the transcribed interview, as well as the analysed data, would be emailed to the respondents on request.

1.5.2 Sampling

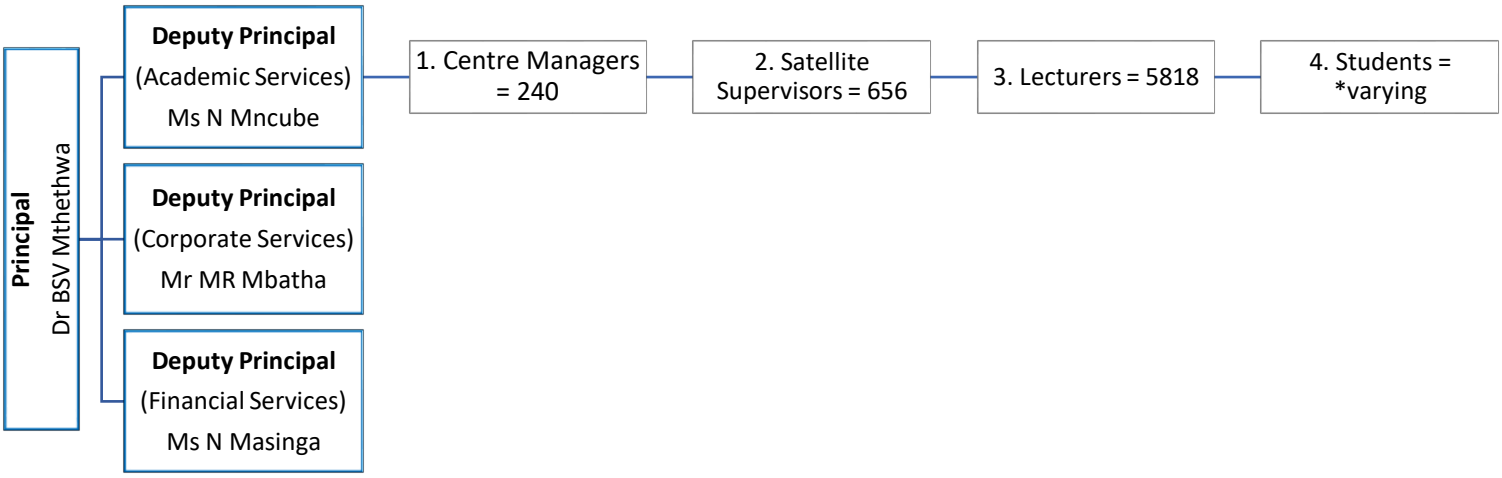


Figure 1.4 – Organigram of KZN CET College Structure (adapted from Nxumalo, 2017)

Preliminary research had indicated that the deputy principal (academic services) of the KZN CET College, Ms N. Mncube, collated and evaluated all statistics and centre functionality feedback conducted by CET College officials. The researcher conducted an interview with the deputy principal primarily to ascertain statistics regarding the academic performance of the centres. That information was utilised to select two CET centres – the best, and the worst-performing centres within the Bridge City area, and in the immediate surrounding townships (Inanda, Ntuzuma, KwaMashu and Phoenix).

The researcher interviewed two centre managers, one from each of the selected CET centres identified above. The centre managers presented the spatial successes and challenges of the centre identified from a management perspective.

The researcher interviewed four lecturers – two from each of the selected CET centres identified above. The lecturers presented the spatial successes and challenges of the centre identified from a teaching perspective.

The researcher interviewed four students – two from each of the selected CET centres identified above. The students presented the spatial successes and challenges of the centre

identified from a learning perspective. The student participants chosen to undertake the interviews were residents within the location of the institution, or at least a neighbouring township. There are four levels in the CETC learning continuum. The fourth level is equivalent to NQF Level 1 (Grade 9) (Training, 2013). Students were only solicited from this level, as they had experienced adult learning for a more extended period than other levels.

The last set of interviews was conducted with five architects with vast design experience of education facilities. The architects provided information through experience, as to what type of built environments have proven to be successful in stimulating learning, as well as to validate the unsuccessful environments.

One of the interviewed architects, Mr Greg Hendricks of TJ Architects International, is the architect for the Grantleigh Titanium Learning Centre precedent study in Section 4.1.3 of Chapter 4, and therefore gave greater insight to this project as well. Another of the interviewed architects, Mr Stan Field of Field Architecture, is the architect for the Ubuntu Centre case study in Section 4.2.1 of Chapter 4. He too included in depth insight for the case study.

To further deepen the knowledge base of the Ubuntu Centre case study, an interview was undertaken in the form of a guided tour in and around the building and the immediate community with Mr Gcobani Zonke, the deputy president of Ubuntu Pathways - the organisation that established and runs the centre.

A total of 17 participants participated in the interviews. The above interviews were facilitated to understand the spatial requirements of CET centres better; how their current learning environment affects them and the changes they perceived to have a positive impact in the way they teach/learn.

A total of 25 students participated in the questionnaire survey, 10 and 15 from each centre respectively. The number of participants was limited to level four learners for the same reasons mentioned above in the selection of students for interviews, and determined by the number of students enrolled, and in attendance of their respective classes at the time.

1.5.3 Data Collection

Information was collated through a combination of primary and secondary data.

The primary information was collected by utilising questionnaires and interviews as per the methods described above in greater detail under the headings 'Instrumentation' and 'Sampling'.

The study was also comprised of secondary data in the form of a literature review. The main authors were Dr Jos Boys and Herman Hertzberger.

An analysis of four precedent studies and one case study were conducted. The case study and three of the precedent studies looked at local and international examples of adult/community learning centres which were deemed to be successful architecturally in accommodating or stimulating aspects of adult/community learning. The fourth precedent looked at modern African patterns and symbolisms expressed through architecture.

The secondary data was sourced from books, journal articles (if not published, must be peer-reviewed), the internet, and policy documents and templates from the Department of Higher Education & Training (CET Colleges).

1.5.4 Data Analysis

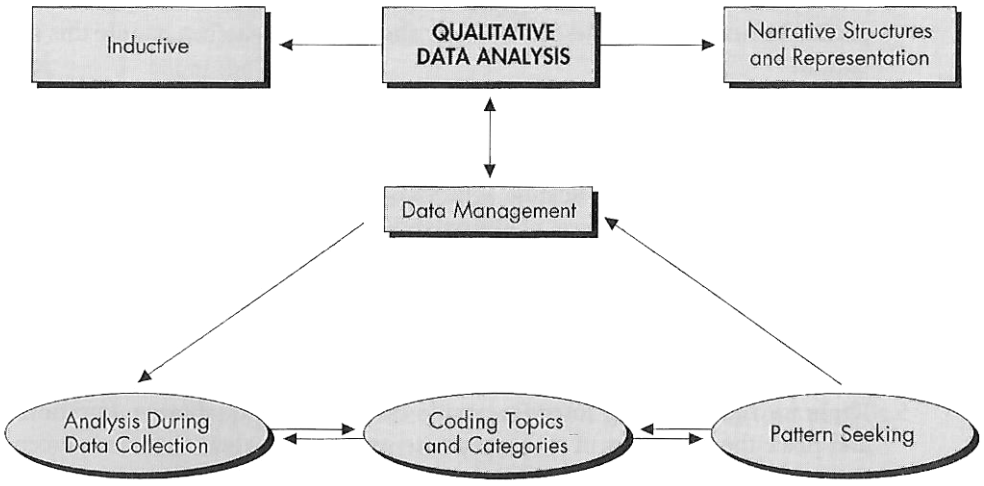


Figure 1.5 - Data analysis flow diagram (McMillan and Schumacher, 2001; pg 460)

The data was analysed through a process of inductive analysis. During the process the data was organised into topics and categories by coding the data. Ultimately the researcher seeked patterns and relationships between categories to give meaning to the data.

1.5.4.1 Inductive Analysis

Inductive analysis denoted that the patterns and categories emanated from the data as opposed to being generated prior to data collection and enforced on the data. Of this method, two particular techniques were employed; namely the template style and comparing and contrasting. The former technique coded and categorised the data logically. The latter technique was an intellectual tool used to identify similarities in the data, establishing data segments, and allocating such segments to a suitable topic, category or classification (McMillan and Schumacher, 2001).

1.5.4.2 Interim Analysis

The analysis commenced when the initial set of data was collected. It occured concurrently with data collection; this process was formally known as discovery analysis or interim analysis. Interim analysis assists in processing substantial amounts of complex data by focusing on smaller sets and in-turn informs and propels other research activities by directing data collection decisions and establishing recurring patterns and emerging topics. However, the researcher undertook intensive analysis when all the data had been read, to provide analysis of the whole (McMillan and Schumacher, 2001). Below were the steps implemented in the interim analysis process:

1. Perused for possible topics within the gathered data at a particular point, to acquire an overall perspective of the spectrum of data topics.
2. Identified significant patterns or themes through a process of seeking for recurring meanings. These clusters of meaning were obvious at the time or only became more evident during later analysis.
3. Refocussed the study, narrowed the focus of the data analysis, and refined the organising system.

1.5.4.3 Coding, Topics and Categories

The data was coded through a combination of two strategies: utilised predetermined topics and categories, and the inclusion of new categories emanating from the data.

The predetermined coding was formulated from research questions, research instruments such as topics in the interview guide, relevant categories identified in the literature, prior knowledge of the researcher, and the data itself (McMillan and Schumacher, 2001).

1.5.4.4 Patterns

Pattern-seeking defines a process of studying and scrutinising the data utilising multiple approaches. Through pattern seeking, the researcher attempted to comprehend the complicated connections that were evident in people's actions, mental processing, beliefs and situations.

Patterns represented a correlation between categories. The researcher studied that relationship and made observations of how the categories affected each other to provide meaning to the acquired data.

The implementation of deductive logic would ensure that the data collected was suitable, conducive, and pivotal in the process of unearthing patterns (McMillan and Schumacher, 2001).

1.5.5 Data management

The data was input, stored and edited in a word processing program i.e., Microsoft Word.

1.5.6 Dissertation Structure

Chapter 1

Through the research background, the researcher aims to bring the reader to an understanding of the context of the study. The necessity for the study is outlined, and the

research problem clearly defined. The research aims, objectives and questions, in conjunction with the selected theoretical framework, assumes the role of blinkers, guiding the direction of the research.

The chapter concludes with a concise clarification of the chosen research methodology, which is informed by the aforementioned key elements of the study.

Chapter 2

The theoretical framework introduced in chapter one will be discussed in greater detail; the relevance of the selected theories to the research will be elaborated, and the principles of the theory applied to architecture.

Chapter 3

The literature review will explore key areas identified in the research questions – essentially: the ideal context of an educational facility in a township, the spatial needs of adult learners, and architecture and built environments that stimulate learning. The literature review allows for the identification of the research gap, which will be further discussed and analysed in chapter five.

Chapter 4

The researcher will explore international and local precedent studies and a local case study deemed to be successful architecturally in accommodating or stimulating aspects of adult/community learning. Concepts from these studies will inform the design development and resolution in a separate design report. Research findings from the data collection and analysis thereof will be tabulated in this chapter.

Chapter 5

The researcher will ultimately derive conclusions and recommendations based on the findings. These findings will be carried through to the design report.

1.6 CONCLUSION

The research background to this study has been discussed. The research problem, research aims, and objectives have been defined, and the scope of the research clearly set out. The theoretical framework has been introduced and will be elaborated on in chapter two. The methodology utilised to conduct the research has been detailed. The implementation of the primary and secondary data collection, and the analysis thereof is presented in the chapters ahead.

2 CHAPTER 2

2.1 THEORETICAL FRAMEWORK

2.1.1 Introduction

This chapter delves into the theories selected to form the theoretical framework of this study. The chosen framework relates to the key and sub-questions introduced in section '1.3.4' in chapter 1, exploring theories that may influence architectural qualities that enable learning, as well as contextually responsive qualities.

The overarching theory is that of Environmental Psychology, a broad theory which all the others fit within. The architectural theory of Place is explored, which leads on to Critical Regionalism. Social Learning Theory and Social Cognitive Theory are explored together, but shown separately in the diagram below, as Social Cognitive Theory is derived from Social Learning Theory, but often the terms are used interchangeably. The various relationships are illustrated in *figure 2.1* below:

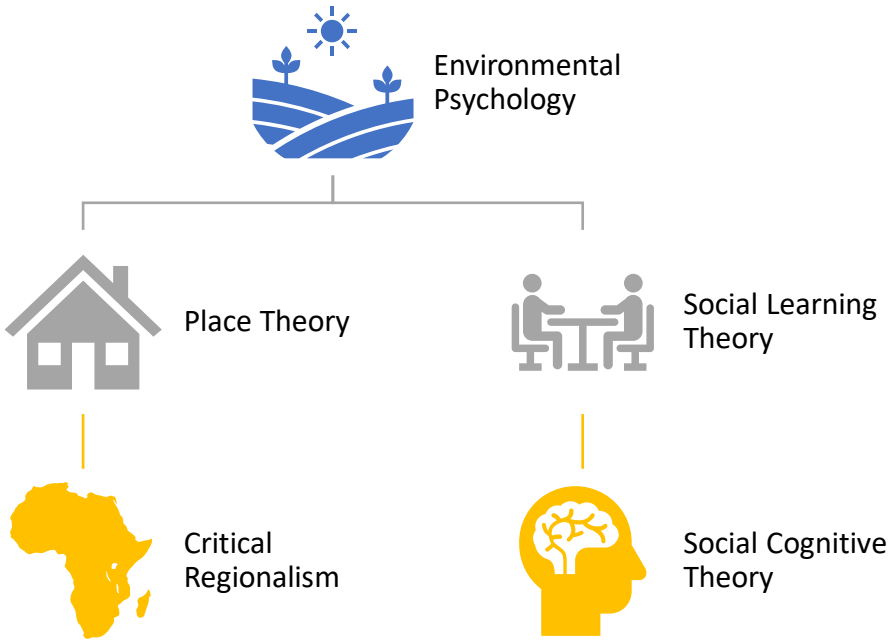


Figure 2.1 - Theoretical Framework (Author, 2021)

2.1.2 Environmental Psychology

2.1.2.1 Introduction

Environmental Psychology considers the impact or effect that the built and natural environment has on people (Lewin, 1935, Lewin et al., 1936). It is unclear from whom the theory of environmental psychology emanated; however, Kurt Lewin and David Canter are considered as part of the pioneering modern researchers in this field. Canter and Lee (1974) believe that in essence, all psychology falls under environment psychology.

People, let alone any organism, can only truly be understood within their environmental contexts. Unlike other organisms, however, people differ in that they have the capacity to construct and control their environment. This ability is enabled by experience rather than instinct and channelled through the culture of the individual (Canter and Lee, 1974). These environmental contexts may include the physical, political, social and cultural contexts. Azra Arza Churchman (2002) suggests this link between people and environmental contexts infers that changes that occur solely within the individual are insufficient; hence a change in the one should complement a change in the other.

Canter and Lee (1974) have determined that people actively engage with their environment. This interaction occurs more successfully through the intricate tact developed by people towards an assortment of environmental characteristics.
People have formulated a system of expectations within the relationships they have with their environments, as well as the activities which these environments host. These expectations influence people to alter their behavioural activities in a number of cases to gain a greater level of satisfaction with their engagements with their existing environments. Often, this influences pertinent alterations to these environments (Canter and Lee, 1974). A. Churchman and Altman (1994) believe that change is a requirement that should be instituted in all systems, inclusive of physical environments.

Culture and upbringing are closely related to the blatant differences observed among and within people over time. This diversity can be observed through people's behaviour: their affective and cognitive responses to their environment (Canter and Lee, 1974).

2.1.2.2 Environment Stimulates Response

Behaviour is closely linked to the environment in numerous ways. Certain conditions within an environment may stimulate responses, in-turn constraining or shaping the way organisms inhabit an environment. This environment is the setting in which we express our behaviour. Elements related to another context such as environmental variables not traditionally considered in behavioural studies include physiological responses and biological variables. These elements, particularly the physiological responses, tend to succeed, parallel or precede behaviour responses (Weiss and Baum, 1987).

Christopher Day and Anita Midbjer (2007) recognise that environment affects more than just peoples' behaviour and their physiological responses; it affects the psychological responses as well – that is – how we think and feel. It influences our habits, values and expectations of normality, and to this end when consciously designed for these outcomes, it may reinforce and foster physical, social and mental development. When the environment is not designed with due consideration, in contrast, it has adverse effects on development, and possibly physiological health. Day and Midbjer (2007) further suggests that it possesses a potent subconscious influence on its inhabitants. Although children are more susceptible to this influence, adults are still affected by it.

Social stresses, safety and security, are considered by Day and Midbjer (2007) to be impacted by physical settings. The environment is seen to have the capacity to provide comfort and reassurance, allowing for people to establish relationships with their habitat and other people with greater ease.

2.1.2.3 Environmental Factors

The environmental factors or 'environmental characteristics' as described by Canter and Lee (1974) are indeed numerous. Appleyard (1969: cited by (Krampen, 1991)), Weiss and Baum (1987) mention further examples of physical factors of the environment which contribute to the response, namely: temperature, noise, pollution, the intensity of certain uses - crowding, commuting, the design of business and residential areas - uniqueness of physical form and its visibility by commanding location, and the influence of technology and human-made calamities.

2.1.2.4 Differences in Spatial Conceptions

Moore (1979: cited by (Brauer, 1974)) opines that it is important to note that peoples' conception of space differs both in quantitative and qualitative terms; one person's castle is another person's cottage, and in the same breath, one person's urban village is another person's slum. Moore suggests that any endeavour to understand human response and behaviour through the lens of environmental cognition and environmental psychology, requires an understanding of how people perceive of their environment, and the meanings they attach.

In the building design process, architects frequently make design decisions based on preconceptions from personal experience to assume typical ways in which people behave. These decisions affect users' thoughts, actions, and responses toward the finished structure. However, a typical person does not exist. Peoples environmental preferences and responses greatly vary (Brauer, 1974, Arza Churchman, 2002). Churchman further notes that the architect's goals to relate the environment to aspects of individuals 'lived space' and phenomenologically experiences are also hampered by the format in which physical plans are presented. The utilisation of two-dimensional drawings, as opposed to words, proves to limit as all the logic and considerations that helped formulate the final product are difficult to express fully; an argument similarly supported by J. Boys (2011) and Nair et al. (2009).

2.1.2.5 Flexible Environments

It is evident that people's responses and preferences towards built environments differ; however, such differences are not to be disregarded. It is of great value for individuals to have a connection with the environments they occupy. Flexible solutions are key options to catering for varied environmental preferences, although not all flexible environments are deemed appropriate or executed successfully (Brauer, 1974). A deeper understanding of individual relations to the environment will allow the architect to provide greater levels of satisfactory solutions for a broader range of inherent differences (Brauer, 1974).

2.1.2.6 Teaching Environments

Day and Midbjer (2007) suggest that all places and buildings exude lessons, though they may be subtle. Lessons may be deliberate or unintentional. Day and Midbjer make their point with the example of litter: proposing that overflowing rubbish bins unintentionally encourage littering, whilst well-maintained and clearly marked cluster recycling bins encourage waste separation. Lessons related to responsibilities, behaviour expectations, values and self-esteem are considered by the duo to be more deliberate.

In most instances, the notion that environments teach is not considered in the design process. This may prove to have either unplanned negative or positive outcomes for the inhabitants. Space may bring inspiration and enrichment to individuals or adversely devalue and demoralise.

These lessons, though subtle, are vital as they contribute to shaping the minds of individuals throughout their lives.

This analysis by Day and Midbjer causes them to be critical of the status quo of our current environments, leading them to pose the following questions:

> *"[…] what are we teaching [individuals] all the time we're not teaching them? What will their everyday environment teach? […] What do schools, playgrounds, flats and houses say about the value of each individual […]? Do they confirm that [individuals] are respected, loved? If not, why did we build them? And what sort of people do we expect […] to become?"* (pg 147)

2.1.3 Place Theory

2.1.3.1 Introduction

Place Theory considers the way people experience architecture. And how the built environment can achieve a sense of place through using specific mechanisms and architectural elements, primarily based on the interpretations of Christian Norberg-Schulz (1979) who regards *place* as "totality made up of concrete things having material substance, shape, texture, and colour…" (p. 6). "For Norberg-Schultz, place is a total phenomenon that cannot be reduced to either physical form or spatial relationships." (Groat and Després, 1991) -

It is the essence of a place and embodies an environmental character. More recently, place theory interpretations have been expressed by others such as Day and Midbjer (2007), and Pallasmaa (2012).

Relph (1985; p. 27), quoted by Graumann (2002; p. 108) denotes that places "are constructed in our memories and affections through repeated encounters and complex associations . . . place is an origin, it is where one knows others and is known to others, it is one's own." The encounters of a student in a school, with all the physical and social connections that occur are bound to formulate associations of place.

Tuan (1977) identifies place as environments of perceived value which satisfy our biological needs. It has the potential to exist at different scales – from a favourite chair to a whole planet. The analogy can further be from a city to a building, and from a building to a classroom.

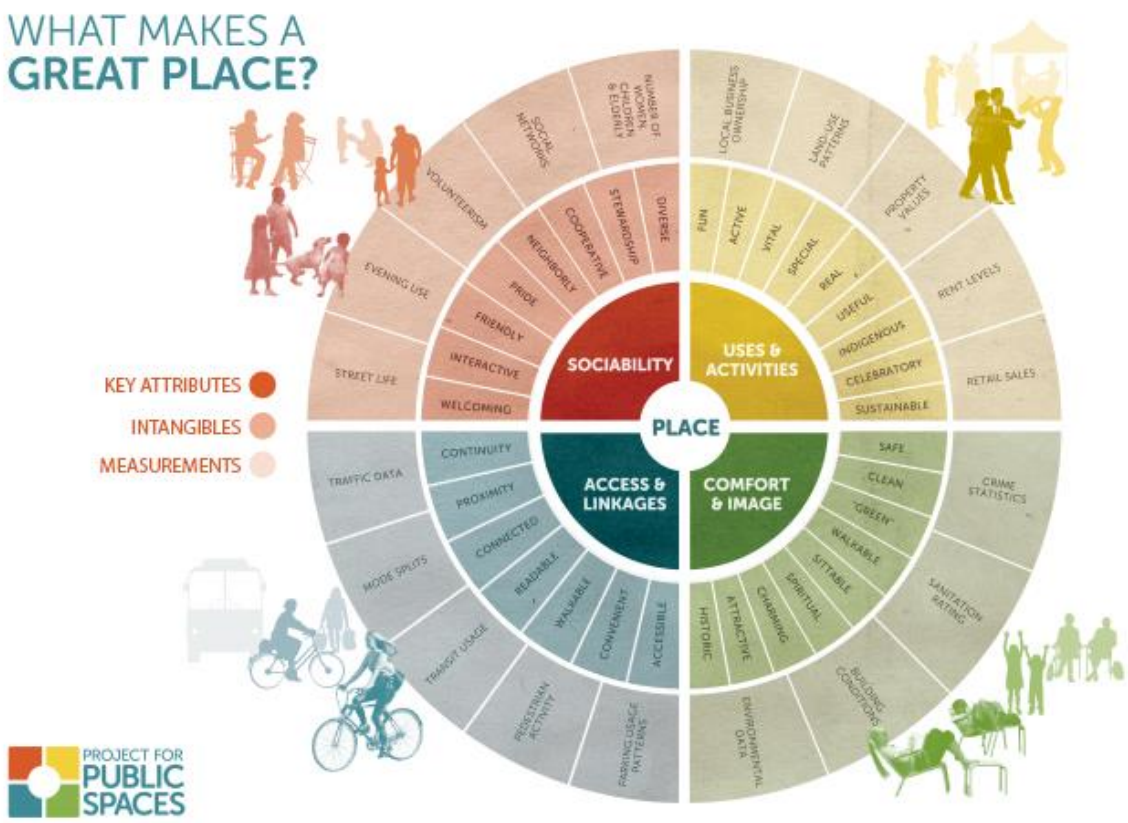


Figure 2.1 - Characteristics of Place (Projects for Public Spaces)

2.1.3.2 Dwelling, Meaningful Relationships and Environment

Dwelling is commonly associated with a place of residence – and so it is. Christian Norberg-Schulz (1985, p. 13), however, describes dwelling in another perspective. According to him to dwell "implies the establishment of a meaningful relationship between people and a given environment." Landscape, place, and experience are integral elements of dwelling, which Jager (1975) feels immerses inhabitants within their present environment. This engagement encourages further experiences and discovery of place (Seamon, 1984).

2.1.3.3 Healthy Places

Day (2002) and Dovey (1985) see place as being assessed and supported by ecological health. These 'healthy' places are judged by various characteristics which include: the ability to be controlled by users, dynamism, balance, integrity, a tangible identity, wholeness, accommodation of learning opportunities and social connections.

Day (2002) opines that the spirit of a place has the potential to shape and define people, affecting their actions and sense of self due to its nature of evoking peoples' self-consciousness. Our awareness and placing of value, fortifies the spirit of place, deepening its effects on the inhabitants.

2.1.3.4 Genius Loci and Place

Genius loci - as termed by C. Norberg-Schulz (1980), is the sense of place. This notion which is related closely to place is linked to more intangible qualities of the environment such as character, mood and atmosphere, which are less perceived. Lewis (1979) shares similar views in which the states that these intangible qualities make the place special, and particularly defensible to the people who experience it (Seamon, 1987).

2.1.3.5 Children vs Adults

It is important to note that children and adults' experience of place differs. The differences range from scale, navigation, and responses. In terms of scale, the size of children's space, reach and range, as well as the size of their furniture, is unsuitable for adults. Adults feel

cramped in children's spaces. Children tend to navigate through space without any pre-thought rationale, actioning spaces more with their emotions. Adults, however, traverse space with greater thought, on an invisible cartesian grid (Day and Midbjer, 2007).

2.1.3.6 Place vs Space vs Forms

In Day's deliberations, he observes that place and form differ in function. Forms and objects emanate energies of meaning which decrease with distance, whereas place contains the energies of meaning. Hence people *live* in places and *see* forms. Day defines place as 'space with identity'. To him, place and its qualities have a major influence on people. He questions the ability of people to see the effects forms have on place, instead of being fixated on the surface of the forms (Day, 2002). Though they differ, it is evident that place, space and forms are closely related to each other, having some degree of influencing on each other.

2.1.3.7 Place Connection and Attachment

Culture is an inherently unique attribute to human beings. When it comes to attaching meaning and organisation principles to place and space, culture can be identified as one of the major influencing factors. More than meaning and organisation, values and behaviour also become strongly influenced by it (Tuan, 1977).

With meaning, comes attachment. Attachment is developed over time from all the pleasurable 'feel-good' memories of a place. This feeling, developed in the deep subconscious of the mind, through engagement with secure and nurturing environments, develops with familiarity and ease (Tuan, 1977). Later research by Gifford (2002) and Scannell and Gifford (2010, 2014) delves further into theories of Interpersonal and place attachment.

Memories are part of who people are and serve as reminders of their roots. Places are containers for memories. Childhood places have the ability to resurrect memories long forgotten. Even the furniture and other architectural elements from such places evoke such memories which have formed our identity (Day, 2002). Day infers that a perfect balance is necessary of remembering our roots, without being trapped by the past. Places we inhabit should allow for that balance.

We have four levels of connection to anything (or anybody): practical, material needs; a continuum relationship (history, memory, expectations); emotional connections; and something in the essence of the place, thing or situation that inspires – or rebuffs – us. This is just how we get to know a person: what they look like, their character-shaping biography, how it feels to be with them, and what inspires and motivates them.
Human relationships are not sustainable when one layer is missing. Likewise, places are compromised and project founder if they don't have this multi-dimensionality. (Day, 2002)

According to Day (2002), people possess four types of attachment to anything: emotional connections, pragmatic material needs, inspirational connections – a 'spirit of a place', and a continuum relationship. These characteristics create a multi-dimensional place, of which would not prove to be as sustainable or successful if this layered attachment is absent of one or more of these characteristics.

A successful built environment design that is based on the principles of place-making is, in judgement of Jager (1983, 1985) and Seamon (1987), truly successful when it supports, enhances, and embodies group as well as individual humanness.

2.1.4 Critical Regionalism

2.1.4.1 Introduction

Critical Regionalism is a term coined by Lefaivre and Tzonis (1981), which was derived from 'arrieregardism'. One of the protagonists to elaborate on this architectural concept is Kenneth Frampton (Eggener, 2002). The concept is characterised by a conscious dialectic expression, as a deconstruction of universal modernism utilising indigenous elements to merge a design into its physical and cultural contexts (Frampton, 1983a). Frampton (1983b) sees Critical Regionalism as fundamentally a form of mediation between universal innovations and elements stemming indirectly from indigenous places.
Critical Regionalist theorists distinguish the concept from conservative concepts such as a sentimental regionalism and populism as it has often been reduced to in association. It is deemed not to be seen as a revival of lost indigenous architecture (Frampton, 1983b).

2.1.4.2 Critical Regionalism Characteristics

Apart from aspiring to a form of independence of an economic, cultural, and political nature, Critical Regionalism has a deep inclination for realising an identity.

Frampton argues that Critical Regionalism is an agency of resistance going beyond conscious expression, accommodation and comfort. He considers it to resist the placeless, dehumanising movement referred to as 'modernism' (Eggener, 2002, Frampton, 1983a).

Critical Regionalism is characterised by considerations of elements such as natural light, indigenously inspired architectural elements or construction, and the design response to the topography opposed to be simply established on indigenous forms peculiar to a region (Frampton, 1983b).

Modernisation has a tendency to level a site to create an entirely flat datum of which an avant-garde construction can follow, of which economic benefits are the primary rationalisations. This however tends to ironically provide a *platform* for placelessness, whenever such a levelling opposes the natural terrain. In stark contrast, critical regionalism has a more direct connection with nature and specifically the topography. The same sight would be characterised with a terraced site, whilst being met with a building that engages with the site and steps along with it (Frampton, 1983b).

Critical regionalism diverges from the Western norm of focusing on the on the perspectival image of the environment. In contrast, attention is redirected to the tactile range of perception to add to peoples visual experience, in effect to strike a balance between the perspectival image and the tactile perceptions (Frampton, 1983b).

2.1.4.3 Concerns of Critical Regionalism

Within the last three centuries, regionalism has been a predominant architectural expression in almost all countries at a point in time. In the view of some theorists, regionalism has its shortcomings. Lefaivre and Tzonis (1981) attribute ambiguity to this architectural concept, citing that it is a chauvinistic and repressive tool, whilst on the other hand it is related to liberation and ameliorative campaigns. It is unclear however if their concerns refer to regionalism in its broad sense, or specifically to critical regionalism.

It is evident through Frampton's frequent assertions in his writings that Critical Regionalism is commonly mistaken for a sentimental, a vernacular or a populist movement. He affirms this when he states that "unless such a distinction is made one will end by confusing the resistant capacity of Regionalism with the demagogic tendencies of Populism" (Frampton, 1983a; pg 149). It is quite ironic that it is characterised as a concept that seeks to preserve identity, whereas its own conceptual identity is at times unclear. Eggener (2002) justifies critical regionalism's complex definition and lack of uniformity in style, concluding that the concept 'of resistance' is not a product, but rather a process which varies in each individual circumstance.

Eggener (2002; pg 228) in support of his judgement, refers to the words of Mumford (1941) to expand on the definition of critical regionalism, and distinguish it from other concepts:

> "Regionalism," […] "is not a matter of using the most available local material, or of copying some simple form of construction that our ancestors used, for want of anything better, a century or two ago. Regional forms are those which most closely meet the actual conditions of life and which most fully succeed in making a people feel at home in their environment: they do not merely utilise the soil but they reflect the current conditions of culture in the region (pg 120)."

2.1.4.4 Built Example

Frampton (1983b) considers Jørn Utzon's Bagsværd Church built in Copenhagen, Denmark in 1976 as an example of the implementation of critical regionalism principles. This work marries an unassuming modernist exterior with a distinctive interior. The plan, the economic construction technique of utilising precast walls with an in-situ frame, as well as elements such as patent glazing found on the roof, are in keeping with the universal modernist trends found elsewhere in the region and around the world. The interior becomes quite peculiar in contrast. Though reinforced concrete shell vaults have become established in modernist architecture, the vaults of the Bagsværd Church nave allude to an Eastern, oriental expression. Hence it signifies a multiplicity of cross-cultural associations whilst exuding symbolism of sacred space.

Frampton further argues that the occlusion of regular sets of religious references renders a more secular space, appropriate for a secular age. It allows for the space to be more spiritual in nature. The distinct interior, though muted in connotations precludes a deviation towards an image of kitsch (Frampton, 1983b).

According to Shadar (2010) modern architecture literature is not lacking critical regionalist architecture examples showcasing the incorporation of local characteristics into modern techniques and global architecture. He feels however, that these cited projects possess a fundamental omission within the traits of local architecture: "the ability to change and adapt to the varying human and cultural conditions of the residents using them (pg 227)."

2.1.5 Social Cognitive Theory

2.1.5.1 Introduction

Social Cognitive Theory – derived from Social Learning Theory - suggests that knowledge can be acquired by observing others within environments of social interaction, experiences, and outside media influences (Bandura, 1989).

In social learning theory, behaviours are attained, retained or altered through continuous interactions with others. The social influences of such interactions have the potential to reinforce attitudes, values, as well as imitation (Akers and Sellers, 2013; p. 18).

H. Gardner et al. (1996) infer from their evidence that classroom life should not be solely focused on quantitative aspects of learning; a variety is key to the quality of classroom life. They single-out Japan, where students are granted a significant amount of time for problem-solving together. There exists a significant difference in the mindset of the students from an apparent competitive nature to that of supportive roles in each other's success. The processes for such activities are explicit and well-thought-out by the teachers. The environment should allow for such processes. The effects are positive for the students, but also for the teachers themselves. Equally as important are the interactions the students have at home, where schoolwork receives prominent attention.

To Krampen (1991), assessments should not be limited to how well individuals interpret their environment cognitively, but also extend assessments to the environment itself, and evaluate the characteristics that evoke specific meaning for different individuals.

Stea and Taphanel (1975), as well as Canter and Lee (1974), make arguments to a similar point with regards to cognitive spaces and structures. They argue that the physical design of a learning space in isolation to social cognitive activities and open-minded individuals is futile. The potency and range of cognitive spaces can be linked to the individual's ability to utilise such spaces to their full extent. These individuals not being limited to the students, but also the staff and principal as well.

2.2 CONCLUSION

In this chapter, the theories of Environmental Psychology, Place, Critical Regionalism and Social Cognitive/Learning Theory were explored, and the potential influence on people and the environment were extracted from the literature.

There are recurring themes that seem to overlap within most of the selected theories. These include interaction – of both physical and social environments, behavioural, psychological and physiological responses, sustainability, and flexibility.

One can deduce from the literature that environment does have an influence on people, and people in-turn affect the environment. Moreover, as mentioned by Day and Midbjer (2007), the environment has the ability to teach – though it may be subtle.

The literature review in the next chapter will expand from the themes and characteristics from the theories of this chapter, towards architectural design principles. These principles, together with the primary data collection from later chapters, will inform the design process of facilitating adult learning through responsive architecture.

3 CHAPTER 3

3.1 LITERATURE REVIEW

Figure 3.1 - Word frequency word cloud of collected secondary data (Author, 2021)

3.1.1 Introduction

This literature review explores key areas identified in the research questions – essentially: the ideal context of an educational facility in a township, the spatial needs of adult learners, and architecture and built environments that stimulate learning. The literature review allows for the identification of the research gap, which will be further discussed and analysed in chapter five. The main authors in this chapter are Christopher Day, Jos Boys, and Herman Hertzberger.

The review commences with distinguishing adults from children, which are part of the mainstream education. Learning is described, and a link is drawn between learning and architecture or learning environments.

The researcher then explores factors within the environment, in the micro-scale, that stimulate or effect learning, before continuing the exploration to spatial form, and other architectural forms within the school setting. Thereafter the focus shifts to the macro-scale of the context, community and city.

Finally, the review explores intrinsic concepts related to the main research question with regards to contextually responsive design for learning environments.

3.1.2 Adults

From the outset we have to distinguish adult learners from learners who are children. Adulthood is defined by age (Tight, 2002). In South Africa the age of majority is 18 years (Constitution of The Republic of South AfricaAnonymous, 1993). Apart from age, the major differences include voluntary enrolment and participation, hence there resides a greater degree of partnership. There also exists greater levels of experience and negotiation (Tight, 2002).

The field of adult education, also referred to as andragogy, is heterogenous in nature. It varies from basic education to post-compulsory education, to on-the-job work-related skills training (Tight, 2002). Though this research focuses specifically on adult basic education and training, literature from the broad field of education, and educational architecture was consulted where literature of adult basic education and training was limited.

3.1.3 Facilitating Learning

The word 'teacher' is no longer the accepted norm in the field of adult education. 'Facilitator', 'lecturer', 'tutor' and 'trainer' are titles that are more likely to be embraced concerning educators in this spectrum. Tight (2002) attributes this phenomenon to the perception that school teaching methods are inappropriate for adults, and thus educators need to distinguish themselves from schoolteachers. Heron (1989) defines a facilitator as, *"…a person who has the role of helping participants to learn in an experiential group…"* (p. 11-12). He goes on to say that *"Teaching is no longer seen as imparting and doing things to the student, but is redefined as facilitation of self-directed learning."* AsklingHenkel and Kehm (2001) and (Taylor and Enggass, 2009) affirm this conceptual pedagogic thinking. They advocate for a learner-centred approach to learning, where learning and learning processes take precedence to teaching, and thus encourage that greater attention is placed on how learning can be enabled. In light of these views of Boddington and Boys (2011), Tight (2002), Heron (1989) and Askling et al. (2001), architecture has an opportunity to influence the learning process. It may 'co-facilitate' through the design and creation of conducive environments that allow for learning.

3.1.4 Learning

Gagné (1985) describes the learning process as follows:

> A learning event, then, takes place when the stimulus situation affects the learner in such a way that his performance changes from a time before being in that situation to a time after being in it. The change in performance is what leads to the conclusion that learning has occurred (p.5).

Gagné's definition is consistent with the views of Hooper-Greenhill (2000; p. 133) and J. Boys (2011; p. 33).

According to GoffreeStroombergBarkerRichey and Vos (1989), Learning is viewed as the 'fundamental process behind human development'. They continue to maintain that learning does not occur in isolation, although it is determined by the individual. Goffree et al. (, Kolb (1984), Tight (2002) and Hertzberger (2008) are in agreement that there is an occurrence of interaction with the environment which enables support to the learning of others, among other things. Simply put in the words of Hertzberger (2008), "everything has something to teach us (p. 203)."

Goffree et al. (1989) notes two distinguishable learning processes: incidental/unconscious learning and purposeful learning process, of which adult learning can also occur. The latter process requires a great deal of perseverance, effort, and intensive activity when compared to the former which one has little control over, as learning sometimes takes place unnoticed. Tuan (1977) and Tight (2002) support the claim of the existence of incidental/unconscious learning. The former believes nearly all learning occurs at this level, and the latter likening its unobserved nature to that of breathing.

Kolb (1984), through his engagement with the works of Dewey, Lewin and Piaget, agrees that learning is in fact a process. However, both Kolb (1984) and Hertzberger (2008) state that it is a process which is rooted in the creation of knowledge through experiences. These experiences are deemed 'holistic' in the view of Tight (2002), as they are grounded in the interactions of the student with world, i.e., the environment.

Learning encompasses educational concepts which include training and development. Training is generally associated with the learning of new skills, with a focus on what Dearden (1984) and Tight (2002) align with 'competence rather than performance'. Whereas development is the primary desired outcome of learning, particularly in a formal setting (Garavan, 1997, Tight, 2002). Fordham (1980) believes the inclusion of non-formal education is more relevant in this age. The tendency for non-formal education is that the content for the programmes emanates from the community, which is within the environment the students reside in. This focus on the priorities of the community, which are not within the formal sector, makes attempts to improving people's subsistence related skills and wellbeing more relevant to the students.

Tight (2002) tables educational concepts which are linked to adult education in categories. Some these concepts can be interchangeably used in architecture of an educational typology in the form of either concepts or design principles. Within Learning Concepts, he mentions flexibility, experiential, independent, self-directed, andragogy, conscientisation, and communities of practice. Adult and continuing, community, formal, non-formal, and informal is what he categorises as Institutional Concepts. Curricular Concepts include knowledge and skill, capability and enterprise, competence, quality. Lastly, his Structural Concepts include social inclusion, access, and participation. This presents the opportunity to reinforce the link between architecture and education.

3.1.5 Stimulating Environments

Hertzberger (2008) describes a stimulating environment as *"an environment that appeals to you, that provokes you and incites you to act (p. 71)."* Fiske and Maddi (1961) and Day and Midbjer (2007) believe that this stimulation is an inherent part of life.

In keeping with Gagné (1985), Hooper-Greenhill (2000) and J. Boys (2011) with regards to their association of learning with stimulation, Day and Midbjer (2007) affirm that learning *is* more likely to occur when a student's interest is aroused, as this increases capacity to focus. This occurrence is supported by inspiring environments, whilst the opposite is true of lack-lustre environments. A lack of constant stimulation brings about boredom, and a lack of concentration. Whereas overstimulation causes stress. A balance of sensory stimulation and

relief is ideal, a phenomenon which Fiske and Maddi (1961) coined 'difference with sameness'; therefore environments need to provide varying sensory stimulation and calm, where they are unassumingly quiet and experientially sensorially rich. Day (2002) advocates for subtle stimulation in architecture with scenarios such as *"the play of light on a textured wall; echoes of a hard passage fading into soft open space; warm scents; cool light* (p. 114)*."* These form part of the design issues learning environments need to consider Day and Midbjer (2007).

Stimulation is affected by elements such as shape, clarity, moods, colour, light, air quality and ventilation, and noise. Of those afore-mentioned elements, Day and Midbjer (2007) and O'Donnell WicklundPetersonFurniture and Bruce Mau (2010) points out that the majority of learning occurs through visual stimulus, approximately 75%, whilst hearing and touch, as well as smell and taste accounts for 13% and 12% respectively.
The selected stimulus elements have to be well considered by the architect, though Day (2002) claims that our response to our environment is not subjective, and in fact the physiological responses to stimulation by the above factors are common to us all. However, he also claims that the psychological responses are more complex, as they can be influenced by culture, whilst others are highly individual.

"All aspects of our environment work on us, through all our senses, on all level of our being and at three levels of social scale: personal, cultural and universal (Day, 2002; p. 111)."

3.1.5.1 Space and Form

Day (2002) and J. Boys (2011) suggests that space and forms are subtle shapers of humanity, capable of influencing individuals or communities, or stimulating and enhancing their development. The argument of Day (2002) stems from people's perception of the feeling of comfortable in some spaces, and unease in others. He partly attributes this phenomenon to the proportions and scale of spaces; elaborating that low ceilings do not feel free and at ease, and tall/vertical spaces do not feel cosy and homely (Nair et al., 2009). He adds that the latter vertical proportions attract our attention upwards, whilst horizontal ones are calming.

In terms of scale, he argues that people feel at ease in age-appropriate scales, of which one can infer that adults feel cramped in low rooms. Day notes how the scale of elements such a door can stimulate a psychological response, such as old Norwegian farmhouse doors, or even more locally, Zulu beehive huts, which have low doors which leave people to feel vulnerable as they stoop to enter the space. He also describes how palaces with huge doors makes people feel inferior, and insignificant.

Day and Midbjer (2007) suggests that rectangular spaces are best suited for storage spaces. Where most spaces are inhabited by life, and movement, they suggest non-rectangular spaces.

3.1.5.2 Clarity

According to Day and Midbjer (2007) confusing built environments are oppressive. In contrast clear, interpretable environments liberate and users feel more confident as they navigate the spaces. Clear distinctions of hierarchy, room uses and relationships, building elements, materials, and moods, together with way-finding clarity allow occupants to feel safe as they are able to orient themselves in that space.

Hertzberger (cited by: Day and Midbjer, 2007) however contends the notion of 'clarity of function' in that a pre-determined use may actually stifle an individual. He argues a lack of stimulation for users who cannot manipulate the use of an environment in manner that suits them, in-turn weakening self-identity.

3.1.5.3 Moods

Day and Midbjer (2007) postulate that certain spaces contain distinct moods. These range lively, airy, or spacious to warm, cosy, quiet or cocooned. Such moods can be created environments through design features - an alcove with a low ceiling provides a private space which induces concentration on an individual task (Nair et al., 2009).

They continue to assert that transition spaces are vital between two environments of contrasting moods, allowing occupants to adjust moods from, for example, the lively outdoors to quiet indoors, from social areas to areas of focus and concentration.

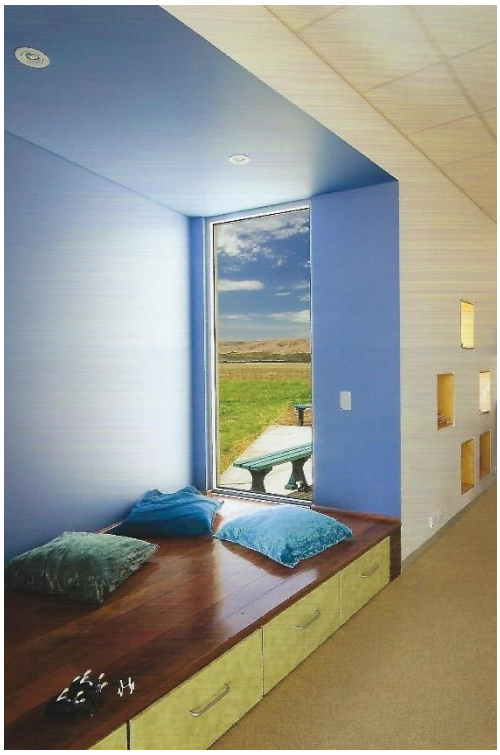


Figure 3.2 - Reading alcove (NairFielding and Lackney, 2009; pg 143)

3.1.5.4 Colour

Enns (2005), Day and Midbjer (2007) affirm the comments of Day (2002) that colour incites physiological response. The general principles they put forth are that reds, oranges and yellows are energetic, inducing excitement. blues and greens, and similar cool, soft colours induce calm, concentration or quiet. Day and Midbjer (2007) however, is mindful that the use of colour requires great consideration to achieve the desired effect, as the use of a blue may render a room cold, a dark green may be heavy and sickening, a grey dull, and white may be lifeless. This may make choice a complex task.

To add to the complexity, Day (2002) notes the prevalence of colour preference being a highly personal experience, over-and-above the cultural influences on the response to certain colours.

O'Donnell Wicklund et al. (2010) describes pragmatic techniques in the use of colour for different areas of a learning facility, from classrooms to libraries, auditoriums, cafeterias and circulation spaces.

O'Donnell Wicklund et al. (2010) suggests that classroom walls should be painted a dark colour on the teaching wall, and a lighter colour on the side wall. They claim this draws the student's attention to the teacher and the front of the classroom, whilst turning to the side provides variance and visual relief (J. Boys, 2011). This makes sense for a row-type instructive teaching seating layout, but what happens when students are seated in groups in an interactive learning situation? How can colour be utilised then to stimulate a response?

Colours that warm or brighten spaces are recommended by O'Donnell Wicklund et al. (2010) libraries. They propose that this encourages reading. However, care is to be taken when selecting colours where computers are used, that are not susceptible to glare.

In contrast, auditoriums and cafeterias are recommended to be coloured in lighter warm tones or neutrals, as brighter colours are overwhelming in larger spaces. Bright colours may be used to as an accent colour to liven parts of the space (O'Donnell Wicklund et al., 2010).

Circulation spaces, particularly corridors and stairwells are places which are to enjoy bright colours, and graphics which imbue energy and life. Colour combinations along circulation routes allow for colour-coding sections of large or multi-story building by uses, making it easier for users with regards to way-finding (O'Donnell Wicklund et al., 2010).

3.1.5.5 Light

"I see" means "I understand." Mental clarity has long been associated with visual clarity from light stimuli (Tuan, 1977, Day and Midbjer, 2007). As photo-centric beings light has been central to life. In its natural form, day-light, it is stimulating, enlivening, and invigorating. Day (2002), Day and Midbjer (2007), Taylor and Enggass (2009), (Dent, 2009), and Nair et al. (2009) attribute benefits to this life-giving stimulus, including mental clarity, alertness, improved health and general well-being, and improved academic performance, as its constant subtle variance of light quality keeps the brain awake. Day and Midbjer (2007), and Nair et al. (2009) agree on the importance of ensuring students who spend a significant amount of time in buildings throughout the day, are in daylight environments. The former authors claim side-effects such as fatigue, moodiness, stress, and attention deficiency in environments that lack the full spectrum light synonymous with daylight.

Good design can maximise on the benefits and optimal lighting conditions of daylight in buildings, whilst balancing glare and solar heat gain, factors that accompany natural daylight. Principles including building orientation, solar shading, and glazing technologies assist to mitigate the negative contributions and effects (Nair et al., 2009, Becker, 2009a, Taylor and Enggass, 2009, Day, 2002).

Nair et al. (2009), Becker (2009a), and Day and Midbjer (2007) support assertions by Day (2002) regarding the introduction of daylight into learning environments. They assert that windows from at least two directions or more improve the quality of light, softening it, whilst reducing glare. Daylight can also be introduced through skylights, roof monitors, and clerestory windows. Light shelves, splayed window reveals, and high white ceilings reflect light deeper into the classroom, providing a greater distribution of light on work surfaces and in the space in general.

Designing with this natural resource in mind benefits not only the users of those environments, but also generates substantial cost savings in the day-to-day operations of a building (Taylor and Enggass, 2009, Nair et al., 2009).

3.1.5.6 Air Quality and Ventilation

Air quality and ventilation are extremely important, as oxygen is essential for life. It is as important in learning spaces. A lack of good air quality and ventilation is unhealthy, and is responsible for a reduction in energy, enthusiasm, concentration and alertness, whilst concurrently increasing headaches and absentee rates in the classroom (König, 1989, O'Donnell Wicklund et al., 2010, Day and Midbjer, 2007, Taylor and Enggass, 2009).

The primary antagonists for poor interior air quality are poor ventilation and indoor pollution from mould build-up, or other bacteria from inadequate maintenance.
Since carbon dioxide (CO_2) is a by-product of breathing, a poorly ventilated space can quickly reach undesirable CO_2 levels when occupied, resulting in the negative effects afore-mentioned (König, 1989, Taylor and Enggass, 2009).

Nair et al. (2009), and Day and Midbjer (2007) support the implementation of natural ventilation to combat challenges of poor indoor air quality. They bring forth factors of its

affordability, and ease of adjustment, and claim that it is healthier and more locally responsive than air-conditioning. Becker (2009a) notes that in such cases where natural ventilation is not adequate for optimal ventilation and thermal comfort, the mechanical ventilation system selected for such as space has to be sufficiently sized, efficient, and effectively operated and maintained.

3.1.5.7 Noise

Any undesirable sound is referred to as noise. Noise induces both physiological and psychological responses, all of which are negative. It introduces stress. When associated with learning, it reduces concentration and reading ability, negatively affecting academic progress – "students do not learn when they cannot hear well (Taylor and Enggass, 2009; p. 128)". It is claimed to also contribute to depression, heart disease, high blood pressure, muscle tension, fatigue, violence and aggression, and other behavioural problems (Day and Midbjer, 2007, Day, 2002, Taylor and Enggass, 2009).

Learning environments contend with noises from different sources, from external background noise to internal noise of students, to prolonged reverberations from HVAC systems (Taylor and Enggass, 2009). Becker (2009b), Day and Midbjer (2007), and Taylor and Enggass (2009) each contribute to design principles to be considered to achieve better acoustic performance in learning environments as follows: locating facilities away from noise sources, configuring spaces to reduce reverberation, utilizing insulation technologies in walls, roof assemblies, and glazing, and grouping quiet environments together away from noisy spaces.

Withstanding the contributions from researchers regarding stimulation, Boddington and Boys (2011), (Hertzberger, 2008), Budde (1963), and Durlak and Lehman (1974) ascertain that a stimulating environment cannot be effective to its full extent in isolation from both the educator's ability to correctly use all the features of such environment, and their teaching abilities and creativity in sparking students' intrigue. The architect's efforts to provide optimal andragogic conditions through the control of lux, thermal and oxygen levels or clear functional design, are in vain if these environments are not brought to life during the interactions of the student and the educator.

However Durlak and Lehman (1974) do note that there are people who believe the design and the layout of a learning environment is irrelevant; it is the educator alone who is central to learning. This argument may seem plausible due to the subtle nature of the stimulus of environments. However, just because the effects are inconspicuous does not mean they are not there. It would be detrimental to ignore any of these effects from the environment. Day (2002), and Boddington and Boys (2011) share the same sentiment, describing physical environments as insidious. They assert the subtle powerful influence they have on us.

3.1.6 Learning Environments and Spatial Form

We are more likely to find a form for learning than a form for education. The requirement of this space is to provoke exchange and confrontation, culturally, politically and intellectually, ultimately inciting learning through curiosity and debate. Learning should no longer be bordered by classroom walls, but needs to be evident in the entire building, and the new roles of learners and educators expressed in the institution's spatial order. The building needs to be accessible, inviting, and flexible enough to accommodate change of contents in evolving situations (Hertzberger, 2008). Taylor and Enggass (2009) affirm that educational environments need to motivate and inspire learners to learn and be at their best, as our ability to learn is linked to our interactions with our environment. However, researchers such as Hertzberger (2008), (Nair et al., 2009) and (Budde, 1963) note that this was not always the case with earlier learning environments.

These environments earlier environments are characterised by square classroom boxes designed for linear instructive lessons where the educator imparts knowledge unto the students. These box classrooms are attached to long straight circulation corridors – a model based on a meagre budget, student supervision and control (Hertzberger, 2008, Nair et al., 2009). Nair et al. (2009) and Taylor and Enggass (2009) describe early traditional classroom models as a lifeless factory production line, where students are transported on long 'conveyor belt' corridors to be deposited into classroom, where they are to be filled with knowledge all day for a number of years, with little to no diversification in the content, delivery or environment to cater for the homogenous group of students. Budde (1963) and Hertzberger (2008) add how the seating layout was characterised by furniture fixed in rows, close to the

window walls on the left which served to prevent casting of shadows on the worktop for the mostly right-handed students.

Hertzberger (2008) attests that in order for learning to be encouraged beyond basic knowledge, the spatial programme of a learning environment needs to be more than just classrooms with an adjacent corridor. Fortunately, the ideas around architectural design of learning environments have evolved and aim at aligning to contemporary educational theories and practices, holistic and multifaceted in nature (Nair et al., 2009), for as education changes, so must design (Taylor and Enggass, 2009). Present-day architects are now responsible for taking contemporary ideas on education and translating it into stimulating spatial form (Hertzberger, 2008) – a task Durlak and Lehman (1974), and Taylor and Enggass (2009) believe would yield greater results from a collaboration with educational specialists.

On the other hand, these contemporary learning environments are not realised in newer schools (Taylor and Enggass, 2009), more especially in the public schools of South Africa. Prescriptive government guidelines and specifications, and tight budgets for educational buildings are too limiting. The strict adherence by departments to dated concepts allow little room for innovation. Often this results in rooms of minimum sizes, in standardised school blocks which aren't specific to the unique needs of the community (Nair et al., 2009, Hertzberger, 2008).

When it comes to other public buildings such as convention centres, sports arenas, and shopping centres, there are implicit standards expected in terms of their spatial qualities and finishes. However, public schools do not enjoy the same; they are merely seen as commodities rubber-stamped in communities (Christopher, 2009).

Well-designed ecologically responsive learning environments which are of comfort and quality, stimulating, attractive and supportive of learning processes cannot be considered a waste of money. Such places create greater opportunities for learning; non-academic spaces such as corridors become obsolete, making way for wider multi-use common areas. They are pivotal for the development for our communities and the world (Taylor and Enggass, 2009, Hertzberger, 2008).

According to (Day, 2002), understanding and responding to the users' requirements is critical. Equally important is to understand and address the physical context of the school and its

connectivity to other spaces (Boddington and Boys, 2011), and other contextual factors such as the climate and social patterns. Forms and buildings derived with this critical engagement provide a more authentic experience. Jamieson (cited by J. Boys, 2011) questions if it is possible to anticipate all the educators and students' requirements, and how to prioritise them in their order of importance.

Schools have the potential to be 'museums for learning', where learning happens at the students own accord, outside of formal lessons. When the whole educational facility is designed to be experientially rich with educational offerings beyond the classrooms, like a museum, active learning is encouraged where the occupants sets their own agenda with the content they choose to engage. This freedom, and discretion engages the mind in learning which is meaningful to the student (O'Donnell Wicklund et al., 2010).
This would answer Hertzberger (2008)'s call for schools to be less of an institution lacking freedom, but instead be of an environment with wide ranging experiences similar to the world of the internet, and in the city. He remarks that rich learning environments are filled with positive stimuli, opportunities for discovery, and social interaction. This can be linked to the experiences available in a museum.

Architects of learning environments of public schools contend with the issue of maintenance when selecting materials and finishes. Often a selection of maintenance-free and vandal-proof materials and finishes, that will withstand the 'test of time', is made as public schools are seldom maintained. This implementation of brutalist characteristics exude hostility and an unwelcoming nature. (Hertzberger, 2008), Day and Midbjer (2007), Robinson (2005), (Gifford, 2002), Day (2002), and Sommer and Olsen (1980) reveal the negative consequences of brutalism in learning environments. This brute architecture style has been shown to bring about aggression attract vandalism it was meant to deter. Soft classrooms on the contrary, with cushions, rugs, plants and adjustable lighting, are more effective in deterring vandalism, whilst at the same time create environments that result in increased student participation and academic performance (Jilk, 2009). Day (2002) summarizes this phenomena when he explains, *"When you expect the best (or worst) of people, you usually get it (p. 117)."* He continues to reveal that,

> *Places that respect us as individuals draw out this best. Environment can heal as well as harm. Places of spirit-uplifting beauty, honest and unpretentious, with loving care manifest in every detail, nourish both individual and society. They encourage sensitivity to others' feelings, responsibility for actions, communal concern and honesty (p. 117).*

Architects often use analogies and metaphors in naming spatial environments. Metaphors such as 'learning streets' replace 'corridors', 'monk cells' replace 'individual learning pods', et cetera. Boddington and Boys (2011) and Nair et al. (2009) argue that there is a tendency for the complexities, between learning and that particular space it occurs, to not be addressed. They call for much consideration into ensuring the creative design intentions of such metaphors, the actual form of the environment, and the lived experiences of various occupants align. Temple (cited by J. Boys, 2011) condemns the use of such metaphors as spatial representations to communicate meaning, as if the metaphor will mysteriously translate to the actual environment.

As contemporary learning concepts emerged, informal learning received greater attention, with a shift from traditional formal learning environments to innovative developments of informal learning environments. It has become common place for the two to be pitted as binary opposites, a view challenged by Boddington and Boys (2011). According to them, the two learning environments are more than just simple opposites. The complexities of the two prove a binary patterning to be inadequate. Further, formal spaces in such a static model shown with associative metaphors, is seen in a negative light, as though schools should only comprise of informal learning environments.

Jos Boys (2009) however, criticizes the design approach of informal learning spaces, indicating that it is simply idealistic. She proposes that at times, better formal spaces need to be designed, or a hybrid is to be considered.

J. Boys (2011) also recommends a combination of individual and group activity environments, where the setting in the former allows for refuge to concentrate and reflect, and in the latter allows for collaboration and interactive engagement.

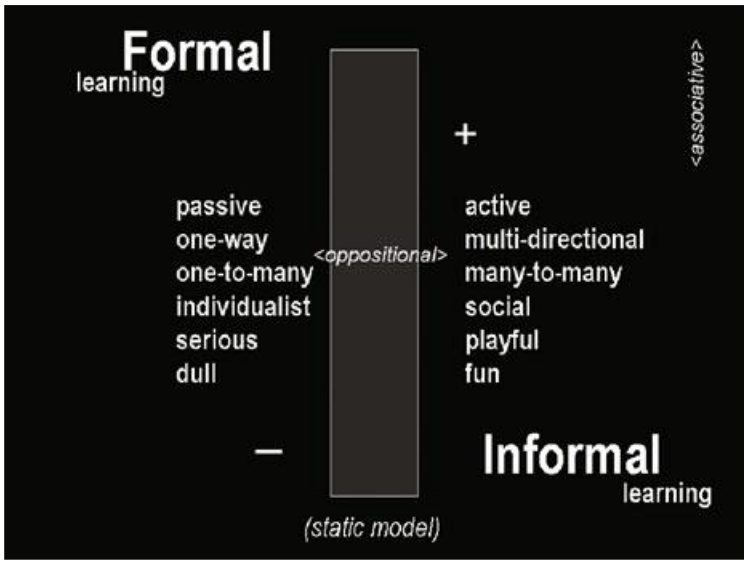


Figure 3.3 - Formal and informal learning as oppositional (J. Boys, 2011; pg 5)

Boddington and Boys (2011), Taylor and Enggass (2009), and Nair et al. (2009) note that in higher quality learning environments students feel respected and cared for. Educators as well are friendlier, and more sensitive towards students, whilst encouraging students in their activities. The opposite was noted for poor quality learning environments, with poorly designed spaces, and a lack of maintenance.

Importantly, any architectural environment will not work for everyone all of the time. Interpretations and experiences of these environments will differ between individuals. To find a perfect fit between spatial arrangements, aesthetic considerations, and activities is improbable. Compromises, and unexpected outcomes are to be expected in the process (Boddington and Boys, 2011).

3.1.6.1 Articulated Classroom Spaces

The move from instruction to learning has necessitated articulated spaces - break-out spaces, corners, and nooks which allow for a balance of individual and group learning simultaneously within the same environment, without distracting each other unduly (Hertzberger, 2008). This diversity of space provided by such articulation caters for the differences in the students thinking and concentration abilities in different environments (Nair et al., 2009, Taylor and Enggass, 2009).

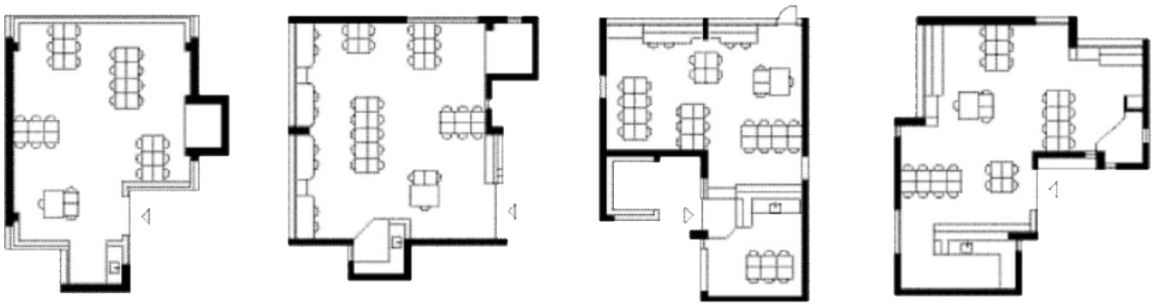


Figure 3.4 - Articulated Classrooms (Hertzberger, 2008; pg 25)

The articulation can occur by designing workspaces off to the side of the main learning space, from a variance in ceiling levels, a difference in floor levels, or a combination of the above. The variance in floor levels allows for seating steps, which tend to draw people together, and encourages a theatre-like setting for impromptu presentations without having to drag around chairs. It allows for an uninterrupted visual connection between the main space and the articulation, fostering a continuum through the divisive threshold (Hertzberger, 2008).
How the articulations occur influence the number of individuals or groups who can occupy the space, and also dictate the size of the latter groups of students. Hertzberger (2008) encourages that these articulations should provide adequate view of other users to arouse curiosity, and encouragement. He also importantly feels such articulations should be executed in a manner that creates place.

The treatment of acoustics in articulated learning spaces is vital. It assists with levels of concentration with activities, strengthening the sense of individuality and creating a distinction from the collective groups in other parts of the space (Hertzberger, 2008).

3.1.6.2 Didactic Building Elements

O'Donnell Wicklund et al. (2010), Nair et al. (2009) and Taylor and Enggass (2009) reveal that a school can be an instrument of learning which displays a wide range concepts pertaining to mathematics, science, technology, biology, horticulture, conservation and various other subjects. Taylor and Enggass (2009) elaborate with the following examples:

The structure of the building can be exposed and accentuated with colour. Columns, beams and trusses will express the physics and composition of the structure, whilst mathematic principles of geometry, angles and triangles can be expressed with exposed triangular trusses. Fencing can also display mathematic concepts, particularly of the geometry of lines where parallel, perpendicular, diagonal, curved lines et cetera are on display.

Transparent waste pipes can be fitted below hand wash basins and sinks, with signage annotating the components and how the plumbing works. This particular lesson can be expressed to include water recycling systems, with the transparent piping making its way into a water purification plant, before terminating through a transparent irrigation system in a greenhouse. This provides an opportunity to witness working examples of the recycling and conservation of water, sustainability and environmental ecology (Nair et al., 2009).

The sustainable process of creating electricity from collecting solar energy can be showcased with the solar panels of the building located in visible locations. Much like the water process, the circuitry can be annotated, the process explained, and clear plates installed over light switches and other systems at the end points.

With all other subject matter, including those mentioned above, paint and graphics can be used to create educational murals, or express the school's values and ethos. This not only brings an opportunity for learning, but also brightens and invigorates those spaces (Taylor and Enggass, 2009).

These conscious design decisions contribute to the concept of O'Donnell Wicklund et al. (2010) to realise 'museums for learning' in schools, similar to what Taylor and Enggass (2009; p. 181) refer to as 'three-dimensional textbooks'.

3.1.6.3 Outdoor Learning and Courtyards

Inspiring learning environments are experientially rich (O'Donnell Wicklund et al., 2010), and essential resources for learning (Chillman, 2005, Taylor and Enggass, 2009). According to Day and Midbjer (2007), the outdoors offer a richer experience than buildings. However, they highlight that this environment needs to be well designed and attractive to contribute educational value (Taylor and Enggass, 2009). To them, the benefits of well-designed learning environments far outweigh any cost savings in standard buildings in the long-term.

Fenoughty (cited by Day and Midbjer, 2007) discovered a vast improvement in behaviour problems of adolescents who participated in a balance of indoor and outdoor learning activities. Day and Midbjer (2007) link this result to the effect nature has on nurturing damaged senses. Surely this environment can also have a positive effect on the learning of all students. These views align to Budde (1963) who asserts the greatest number of classrooms feasible must have direct access to the outdoors, with both spaces designed to contribute an educational effect, effectively "expand[ing] the learning environment" in the words of Taylor and Enggass (2009) by providing the opportunities to bring the outside in.

Figure 3.5 - Articulated classrooms connected to outdoor learning environments (Nair et al., 2009; pg 31)

Day and Midbjer (2007) advocate for use of courtyards and wide balconies, flooded with daylight, in schools. They feel that courtyards are able breakdown the institutional feel of

homogenous buildings, whilst avoiding isolated pavilion-type classrooms synonymous with suburban sprawl; essentially providing a middle-ground. They believe courtyards assist to breakdown buildings to human scales, whilst providing a social link to the different components.

Outdoor learning landscapes are best to be considered at the site selection phase of a school project, where important issues of the context of the site can be evaluated to determine the potential of the site for creating such environments effectively. These considerations can then be taken forward to the design phase where supporting outdoor infrastructure can be designed towards the final product (Taylor and Enggass, 2009).

3.1.6.4 Interaction and Social Learning / Cognition

Learning occurs in more ways than just through books Day and Midbjer (2007). Collins (1983) highlights the importance of the learning environment. He states how the learning process and environment can be remodelled by the students into an environment of their own, partially through interaction. Boddington and Boys (2011), Hertzberger (2008) and Tight (2002) affirm that the presence of others in a learning space invest most meaning, especially with adults. Others become your source of reference and inspiration. This mutual dependency encourages learners to be more accustomed to each other not only in an educational institution, but also in society. The spaces provided for both adult and children's learning in the building need to therefore be suited to this aspect of encouraging social exchange. Harrison and Cairns (2008) concurs with the latter, stating that the traditional teacher-centred learning process is gradually being replaced by 'shared knowledge situations' of student-centred approaches (Hertzberger, 2008, J. Boys, 2011).

J. Boys (2011), and Boddington and Boys (2011) argue that informal interactions may improve learning, and contribute to innovation through collaboration. The setting may maximise beneficial encounters for such interactions, from locating facilities to be easily accessible, to providing places to cross paths, and pleasant places to linger and socialise (Day and Midbjer, 2007). Views of activities often encourage lingering, whilst seating angled to each other invites socialising. Informal seating such as dwarf walls and window seats are just as apt for this purpose as formal seating (Day and Midbjer, 2007).

3.1.6.5 Corridors as Educational Promenades

If indeed all environments are capable of inciting learning when designed with consideration, doing so within the entire school would mean there is no wasted or unused space. One of the spaces that could reap benefits from such a transformation is the corridor. Corridors have the opportunity of transforming from spaces of circulation to destination (Taylor and Enggass, 2009, Hertzberger, 2008). A complete change of the current corridors in terms of its spatial arrangement, aesthetics, and lighting is required (Hertzberger, 2008).

The corridor is to become wider and accommodate furniture and alcoves, designed to encourage people to inhabit the space (O'Donnell Wicklund et al., 2010). A variety in the environment is required to allow for both individuals and groups to occupy and work in the space without unduly distracting each other, but still possess a counterbalance of high visibility of the activities within the space.

As you move through the school in what Hertzberger (2008; p. 114, p. 124) calls an 'educational promenade' or 'learning street', you become aware of what other students are engaged, and the activities and possibilities on offer may arouse your curiosity, much like the experiences in a city, and the world.

The spatial qualities of educational promenades create an atmosphere less like corridors, but more like hotel lobbies where behaviour changes to suit. They imbue a greater sense of place, where occupants feel more at ease to explore more of their environment, and engage in activities of social and emotional development (Hertzberger, 2008, Nair et al., 2009).

3.1.6.6 Furniture and Ergonomics

Furniture in schools is often the last item to be considered in the design process, and the first to be compromised during budget cuts and overruns. The lack of knowledge on the significance of furniture in the learning process has led to the selection of cheap, outdated, unattractive furniture which does not conform to ergonomic standards (Taylor and Enggass, 2009). Much like how adjustable, ergonomic seating is specified in office environments to increase comfort and productivity of employees, the same should be employed in schools (Nair et al., 2009, O'Donnell Wicklund et al., 2010).

Adjustable seating capable of rocking, rolling and swivelling has an increase in concentration levels. The most ideal furniture for learning is that of the afore-mentioned seating in combination with height-adjustable tables with inclinable tabletops (O'Donnell Wicklund et al., 2010). Beanbags, sofas and other forms of soft seating are encouraged in less formal learning areas and reading spaces. Implementation of furniture that is comfortable, helps you to feel at ease, more at home, and can be linked to place-making at a personal level (Boddington and Boys, 2011).

3.1.6.7 Seating Layouts

Desk arrangements have subtle implications. Straight rows refer to hierarchical formalities between educator and student, whilst curved rows are similar, slightly more subtle. These formal layouts, which occur in amphitheatre seating as well, suit instructive learning.

Social learning benefits from seating around tables (Day and Midbjer, 2007). The main forms of group seating consist of seminar-type and café-style table arrangements. The former unifies focus, whilst the latter creates multiple focal points. Students feel more comfortable in the smaller groups formed by the café-style table settings, as conversations flow easily with more opportunities for members around the table to engage. Whereas the seminar-type setting proves to be daunting for shy students, as they have to be in the spotlight of a larger audience when raising a comment. Finding a gap to make a comment is also quite challenging in large numbers (J. Boys, 2011).

3.1.6.8 Safety

Feeling at ease is linked not only to physical comfort, but also safety. In today's society where crime is a reality, especially in South Africa, creating publicly accessible environments which are inviting, but also offer some level of security to users is a challenge the architect has to contend with. Barriers feel oppressive. However, Day and Midbjer (2007) make suggestions to soften security elements by averting it's obstructive nature through the generation of other functions. They suggest growing climbing plants, like roses, on fences to form a hedge. The hedge then becomes an attractive feature that looks and smells appealing, that attracts birdlife, whilst the thorns of the rose bush add to security. Walls can be transformed with

murals and displays or incorporate wall-climbing or ball-bouncing activities to change perceptions of the users.

Taylor and Enggass (2009) are in agreements for the softening of barriers, and advocate for all spaces to be well-lit, and staircases to be opened-up, all to ensure the environment is read as stimulating and inviting whilst being secure.

3.1.6.9 Flexibility and Polyvalence

O'Donnell Wicklund et al. (2010) and Hertzberger (2008) suggest that a school should be able to accommodate and respond to changes in the school community and community at large with regards to social dynamics, demographics, technology, and pedagogy. Essentially the changing user requirements should be able to be accommodated in learning spaces.
Jilk (2009) maintains that sustainable design incorporates considerations of longevity and greater flexibility of use.

Flexibility has its challenges and complexities. When users request flexibility, often they do not know what they want yet, and want to keep their options open. Other times, they are afraid to decide (Boddington and Boys, 2011).

Jamieson cited by J. Boys (2011) puts forward questions to critically engage with the concept of flexibility:

> What is meant by flexibility? Does it refer to the capacity to move and re- arrange furniture at the discretion of the user, allowing the use to change according to need? Does it refer to the range of activity that can be supported in a single space simultaneously? Alternatively, does it mean that a space is adaptable and able to support pedagogical alternatives – in other words, different modes of teaching and learning? (p. 18)

Boddington and Boys (2011) also pose similar questions:

> What aspects in particular need to be flexible? What kinds of learning experiences should flexibility enable? Where might we find good examples of flexibility in action?

The discussions Boddington and Boys (2011) led them to discovery that flexible space are only flexible when their users are empowered to interact with their environment and enact the flexibility (J. Boys, 2011). Hertzberger (2008) remarks that the identity of users becomes reinforced when they influence the environment.

An entirely open floor plan that can be divided by movable lightweight partitions is identified by Hertzberger (2008) as an option to suit varying occasions and needs, where teachers are encouraged to participate in making the changes to the environment to align to their specific pedagogic needs of each lesson.

He notes that in the designing for changing situations, there is opportunity for uncertainty and doubt to arise, resulting in a bare, emancipated building without identity (O'Donnell Wicklund et al., 2010). Architects then hide behind the dogmatic phrase of “less is more”, which is often incorrectly interpreted as reduction, when in fact it speaks to concentration.

Within changeability a stable framework is required to not compromise on the connectedness and identity of the whole (Hertzberger, 2008). Jilk (2009) proposes an unfinished aesthetic, where all major spaces are built as permanent but incomplete. However, this links back to emancipated buildings with a lack of distinct features, where the users and architect are afraid to commit to decisions.

Hertzberger (2008) postulates that flexibility a standpoint that no correct solution exists, that the most appropriate solution is unattainable. It is contained in uncertainty and doubt, within a refusal to take responsibility through commitment. Due to this constant changing nature of flexibility of which the environment adapts to a particular situation, he believes it can never provide the most appropriate solution to one problem, but instead a set of unsuitable neutral solutions.

Changeable environments must still have the capacity to stimulate specific responses, unlike flexible environments that are neutral. Hertzberger (2008) advocates that architects should design for polyvalence rather than flexibility. Polyvalent environments are put to different uses without undergoing changes, producing optimal solutions from minimal flexibility. They therefore allow for multiple interpretations or exude and absorb multiple meanings, and can therefore withstand changes

3.1.6.10 ICT and Technology

As we are in the period of the digital age, where technologies have become complex, computers have become common place among schools, though this is not necessarily the case among township schools. In an endeavour to ascertain ideal learning environments for adults, computer technology is an essential that needs to be taken into consideration to bring schools to align with current times.

Nair et al. (2009) advocates for the use of class laptops as opposed to computer laboratories. This allows for an increase in flexibility and negates the requirement for a dedicated space. Daylight, and the other stimuli that induce healthy learning environments listed previous are just as important when working with computers. Glare from daylight can be mitigated by ideally specifying laptops with anti-glare screens, or otherwise with the use of translucent shading devices.

Nair et al. (2009) recommends for printer/copiers/scanners to be located in the commons areas where it won't be a disturbance to lessons, and still be easily assessable from multiple areas.

Supporting infrastructure such as well-ventilated server rooms, ICT administration offices, and wired and wireless networks are to be factored in the design with the use of computer technology.

3.1.7 School, City and Context

Learning is a lifelong journey which should not be restricted to the boundaries of the school. Learning should be made possible from micro scales through to macro scales. From a classroom, to school grounds, to the community, to the city. Architects and urban planners have an opportunity to create instructive environments that stimulate and encourage learning along the student's journey to school, through varies visual and interactive experiences. The learning that occurs in schools in-turn spills out into the community and city (Hertzberger, 2008). In the words of Hertzberger (2008), "*we must do everything to bring city, school and home into alignment and make of them one seamless world of experience* (p. 213)." Learning is to no longer to be seen as a daunting task, but a part of everyday life.

The link between micro and the macro, the school and the city is furthered as analogies of a school as a city by Hertzberger (2008), a city of learning, a paradigm of a learning city. He postulates that the freedom of choice, discoveries, the spatial orders, the linkages and interactions experienced on streets and squares are to be manifested in the design of the school.

According to J. Boys (2011) and Taylor and Enggass (2009) an understanding of the unique parameters of the site, the context, client, and desired uses, develops the best architectural design solutions for schools. In their understanding of context, architects must be cognisant of culture, ethnicity, and the vernacular elements of that community. This understanding supports the creation of appropriate aesthetics and functionality within the learning environment.

The understanding movement patterns is vital where densities are important. Where connectedness is at a greater level, along with direct universal access, higher densities of movement are attracted (Peponis and Wineman, 2002).

3.1.8 Culture and Identity

Knowing your roots, heritage, origins, and yourself forms a base for your identity. Your formulation or lack thereof of identity effects physiological and psychological health, values, and social cohesion. Some people tend to turn to illicit activities to fill the void when lacking identity. It is therefore vital for architects to create environments where people feel they belong, where such places pay homage to their ways, and grounds their users (Day, 2002). Environments that negate the cultural context and that of identity provide a sense of disrespect, disconnect and imposition (Day and Midbjer, 2007). Day and Midbjer (2007) point out that European-styled buildings may exude such feelings to African students.

Hertzberger (2008) adds that the identity of the institution is also important. It is not something that can be applied ad hoc but needs to be an inherent part of the building from conception to completion.

The Adult Learning Centres in the Bridge City Precinct suffer from institutional identity and cultural representation of the context as mentioned above.

3.1.9 Community and Mixed-use Spaces

Apart from the primary functions of teaching and learning, the school is instrumental in bringing communities together through shared facilities and multiple use. When schools become assets for the community, they become a cultural hub for the community, one which exudes a sense of pride, attracting members of the community (O'Donnell Wicklund et al., 2010, Budde, 1963, Taylor and Enggass, 2009, Hertzberger, 2008). Schools that are attractive and inviting for the community, make them more appealing to students (Day and Midbjer, 2007, Nair et al., 2009). They encourage lifelong learning when the learning offered is real and relevant (Taylor and Enggass, 2009).

J. Boys (2011) and Boddington and Boys (2011) indicate Telford College in Edinburgh, Scotland as a prime example of a school integrated with community-friendly spaces which are welcoming to the community. The school comprises of spaces like shops, restaurants, food stalls, hairdressing salons and beauty therapy salons. Other common facilities are that of emergency shelters, childcare centres, exercise, recreation, business incubators, and libraries (Taylor and Enggass, 2009, Hertzberger, 2008).

J. Boys (2011) notes that the most common best practice examples in the United Kingdom of community integration within schools is that of schools of the libraries, resource centres or learning support units. One of these is the Idea Store in Whitechapel, London. It combines adult education classes and a traditional library, offering students and the public quiet study spaces and seminar rooms – a luxury many do not have at home. The centre uses a rooftop café as a feature which draws patrons past the facilities on display and terminates on a rooftop vista of the city.

Nair et al. (2009) summarise the characteristics of learning centres integrated into the community, touching on areas covered in the literature above. Fittingly they call these community learning centres and mention the following:

> Of course, a community Learning Center (CLC) can be a school but not all schools are CLCs. In order to qualify as a CLC (in our eyes at least), it must meet several conditions:
>
> The CLC is seen as a resource for the whole community and not only for parents and children. It is located in a place that is easily accessible to people in the surrounding community - to walkers, by cyclists and those arriving by car and bus.

> It provides a rigorous, interdisciplinary curriculum enriched by the available learning resources within the community. It provides co-curricular and extra-curricular activities for young people as well as career development options for adults. it is a global hub that connects the community via technology to the rest of the world. It is a part of and not separate or isolated from the community in which it belongs and secures itself in ways that are as far removed as possible from the prisons that so many of our schools have become.
>
> Its doors opened early in the morning and close late at night. It provides a wide range of services and facilities by bringing together a diverse group of public and private stakeholders and by combining various funding mechanisms. It is created by way of an inclusive and collaborative process (p. 200).

3.1.10 Participatory Planning

The most valuable input within the design process of learning environments today is that of the users. Users contribute soul to environments as they enliven places.

Participatory planning improves quality of good design by making it appropriate and reflecting and responding to the real requirements of occupants.

This socially inclusive and socially bonding process ensures environments are shaped not only by the thoughts of the architect, but also the feelings of users, thereby increasing the sense of value in the users. In-turn these places are cared for long after construction.

Architects and occupants need each other. There is tendency for occupancts who have been in their current situation to not have a holistic overview. They do however know a great deal about their past and present. Outsiders on the other hand can consider the future, however, it would need to be informed by the past and the present (Day, 2002, J. Boys, 2011, Wiesenfeld and Sánchez, 2002, Fenoughty, 1997, Day and Midbjer, 2007).

Once architects and users can overcome the barrier of misunderstanding emanating from the unfamiliar language of architecture and design, the additional expenses, and the tedious nature of the exercise, the end process can be quite rewarding (Boddington and Boys, 2011, Horelli, 2002, Wiesenfeld and Sánchez, 2002).

Day (2002) and Lang (1991) caution architects against bringing preconceived ideas into the participatory process. He maintains that ideas need to emerge from the collaborative process.

J. Boys (2011) and Boddington and Boys (2011) note, however, that there is a possibility for stakeholders to hold steadfast perceptions of their flawed experience, therefore failing to imagine anything beyond their experiences. Boddington and Boys (2011) note students and educators' responses as follows.

> Despite the volumes of research showing that students learn little in traditional lecture theatre based, information delivery oriented, learning scenarios (Bligh, 1998; Gibbs & Jenkins, 1992; Ramsden, 1992), students consulted in focus groups continue to identify lecture theatres as desirable learning spaces. Despite the desire of educators to encourage active learning, many continue to advocate for spaces configured to allow their own voice to dominate (p. 111).

Architects, and other consultants are not exempt from being guilty of expressing their flawed experiences within learning environments, despite being exposed to novel ideas.

> Despite the awareness that industry representatives have of rapidly changing practices within their workplaces, both their criticisms and their expectations of learning spaces tend to draw on their own educational experiences, often twenty or thirty years previously (Boddington and Boys, 2011p. 111).

These perceptions tend to then find their way into design briefs, and outdated learning environments are then invariably replicated.

> Assumptions about the nature of learning spaces, informed by habit and a preference for the familiar, are built into the brief, and so fuel the designer's own tendency to reproduce known models (Boddington and Boys, 2011p. 111).

Fortunately according to Boddington and Boys (2011) this can be mitigated through the process of participatory planning.

J. Boys (2011), however, highlights a few other concerns related to educators and students. She reveals that most of them are oblivious of how the physical environment influences them, and the quality of the learning experience that takes place. The students' emphasis was focused on the teaching abilities of staff, libraries, IT facilities, and similar concerns as opposed to physical spaces.

3.1.11 Post Occupancy Evaluation

Boddington and Boys (2011), and Taylor and Enggass (2009) believe that the design of learning environments and how it affects student and staff performance is under-researched and lacks adequate evaluation. This applies even more so for basic adult education.

Post-occupancy evaluation of learning environments will improve future learning environments by allowing architects to increase and refine their knowledge base and decision-making for future projects. All the claims in the sections above in terms of physiological and psychological stimulation that improves academic, social performance, and general efficacy can be assessed, and comparative studies undertaken.

Though funding in public schools is seldom available, the benefits of such exercise will positively shape learning environments for the future (Taylor and Enggass, 2009, J. Boys, 2011).

The vast majority of literature focuses on designing learning spaces for children. Although the fundamentals of child learning environments are the same, there are peculiar user requirements which distinguish adults from children. Further research, especially in characteristics that differ between the two will help to shape learning environments to suit adults in their quest to learn. This may then refine the answers we seek with this study and answer some important additional questions by J. Boys (2011):

> Are these new kinds of environments enhancing learning as predicted? Does this recent addition of new types of learning space provide for the full range of learning in post- compulsory education, or are there important gaps and alternatives which are not being considered? (p. 15)

These assessments will be far-reaching considering the claims of Temple (cited by J. Boys, 2011; p. 103) that a significant amount of claims and findings in literatures are either unsupported or flawed.

3.2 CONCLUSION

Designing learning environments is complex as there are a multiplicity of factors that need to be considered for its success. The literature indicates that architecture and built

environments can stimulate learning, though through subtle psychological and physiological responses. These responses are achieved through a combination of spatial arrangement, clarity, colour and moods, natural light, air quality and ventilation, and acoustic control. The environment has to be attractive, encourage curiosity, interaction – linked to social cognitive theory, and discovery through a variety of sensory experiences like a museum – tied to place theory and the field of environmental psychology.

The literature also indicates that for a learning environment to be contextually responsive, it must be appropriate. These qualities of appropriateness can be achieved by participatory planning process and acquiring understanding of the unique parameters of the site, the context - the community, culture, client, and desired uses, which speak to the theory of critical regionalism.

However, the literature specific to adult education is mostly pedagogic. The literature within the field of architecture primary focuses on child learning spaces, with no references to the townships of South Africa, as much of the literature is based abroad in the UK. Although many of the principles of learning environments are general, there is an opportunity to affirm similarities, and where applicable distinguish peculiar characteristics of adult learners in the township area of Bridge City, South Africa.

The next chapter will focus on precedents, a case study, and present the questionnaire and interview data. The primary data collected in chapter four aims to discover such characteristics. The precedent and case studies will provide examples of stimulating, contextually responsive environments.

4 CHAPTER 4

4.1 PRECEDENT STUDIES

4.1.1 Career Academy of Pella, Pella, United States of America

Architects | Neumann Monson Architects

Typology | Vocational Learning Centre

Area | 23 000m²

Year completed | 2015

Client | Pella Community Schools

Figure 4.1 - South façade (Neumann Monson Architects, 2017)

4.1.1.1 Introduction

The Career Academy of Pella is a vocational learning centre which provides STEM instruction, a teaching method which combines science, technology, engineering, and mathematics. The skills training provided is to cater for particular skills required in the local economy (Neumann Monson Architects, 2017). Its selection as a secondary international precedent is based on its

primary use of space dedicated to vocational workshops, in a simple, yet pragmatic and contemporary form and aesthetic, as well as its expression of the curricular in the building.

4.1.1.2 Participatory Planning

The project was realised through a participatory planning process, with various stakeholders, namely, the community, the building occupants, the school administration, and the design consultants. They worked together to seek to establish an appropriate design with the funding available (Neumann Monson Architects, 2017).

4.1.1.3 Context

The building is located next to an existing high school in what is an educational precinct. It is across the street from a residential area, and diagonally opposite the Pella City Park. In this context, the centre stands out, creating interest with its pure modernist shape and contemporary concrete, brick, timber and glazed finishes. The building is a maximum of two storeys high, with half of it tucked into the terrain to reveal only one storey in the South and East Elevations. The allows for the centre to respect the scale of the neighbouring one storey houses. The brick coursing and sizes mimicking those of the neighbouring buildings as well (Neumann Monson Architects).

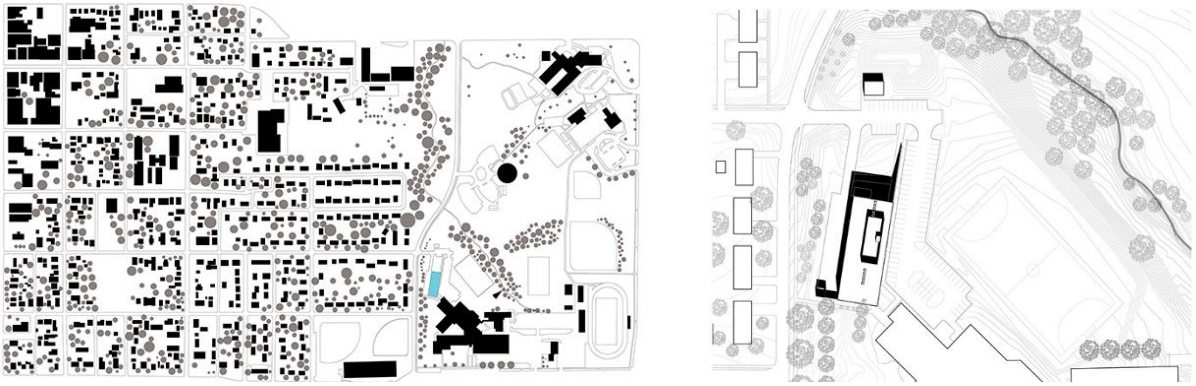


Figure 4.2 - Locality and site plans (Neumann Monson Architects, 2017)

4.1.1.4 Structure and Finishes

The building structure is in concrete, masonry and steel. The facades' materials are primarily of natural glass and the tactile materials of dark face brick and timber slats.

Figure 4.3 - Primary finishes (Neumann Monson Architects, 2017)

Figure 4.4 - North elevation (Neumann Monson Architects, 2017)

4.1.1.5 Spatial Programme

The upper storey hosts 'flexible' classrooms, a computer laboratory, a meeting space, and an administration office. The lower storey consists of double volume vocational workshops and support spaces for industrial technology, automotive mechanics, and welding and advanced manufacturing, and an agricultural science classroom. They house high-tech equipment to expose learners to current production methods. All the spaces are linked via a double volume circulation spine that also links the two storeys (Neumann Monson Architects).

Figure 4.5 - Floor plans (Neumann Monson Architects, 2017)

4.1.1.6 Learning Stimuli

The learning spaces of the workshops and classroom are simple utilitarian rectangular forms, with no shapes of interest, typical of traditional instructional spaces. The ceiling heights are consistent with anticipated activities. The high double volume soffit in the workshops suits the high level of movements, physical activity, and noise that occurs in workshops. The ceilings are lower in the classrooms where quiet and concentration required.

The simple arrangement of the buildings spaces and uses is clear, and easily interpretable, making way-finding easy. Users can orient themselves, therefore influencing confidence and a sense of safety.

Colour has been kept to a minimum, and a palette of durable finishes is opted for instead, leaving those spaces very hard, industrial and lifeless. Where colour was introduced in the computer laboratory, a brighter colour was used on the teaching wall, and light colours on the side walls, drawing the students' attention to the educator in the front, and allowing for varied stimulation to the side. The colour palette of the circulation spaces is dull, and uninviting.

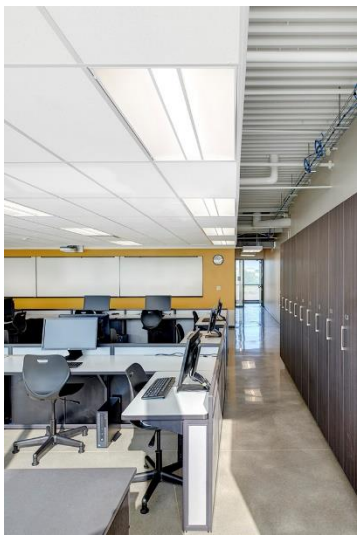


Figure 4.7 - I.T. classroom (Neumann Monson Architects, 2017)

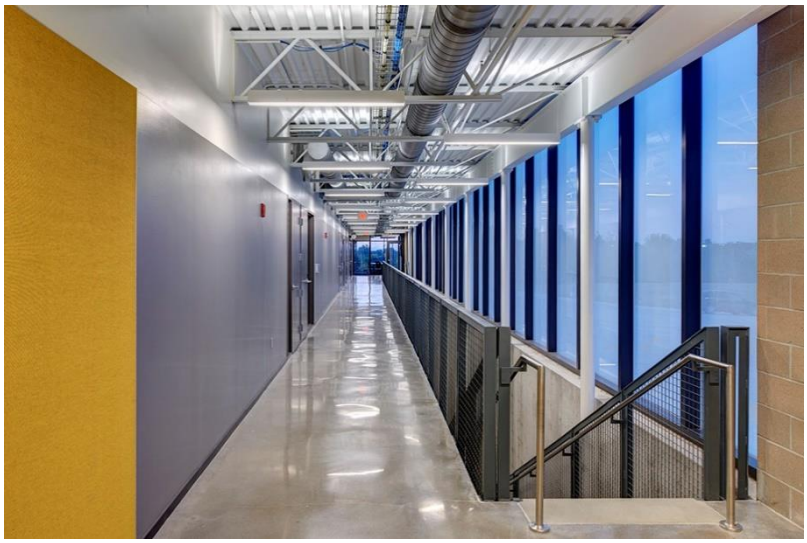


Figure 4.6 - Corridor (Neumann Monson Architects, 2017)

Daylighting strategies were implemented despite the main axis of the building running along the North-South axis. The workshop spaces enjoy diffused daylight through translucent panels along the entire upper part of the workshop wall, on the one side. In the absence of secondary window walls, the height and positioning of the translucent panels allows light to

penetrate deep into the workshop space, providing stimulating natural light to workspaces without glare. The solid lower section of the workshop however provides a disconnect from the outside, isolating students from the outside world. Students would have benefitted from a visual connection with the outdoors.

The I.T. and agricultural science classroom in contrast have a visual connection to the outdoors through full height glazing that allows for deeper penetration of daylight which is reflected by the white ceilings.

The other learning spaces, however, are artificially lit, which compromises the receipt of daylight stimulation.

The whole building is mechanically ventilated to ensure controlled air quality ventilation.

The exposure of the building's structure and services in the workshops and corridors lends itself to a didactic expression that provides occupants an opportunity and spatial experience to explore their environment and make discoveries. The STEM curricula and concepts, and workings of the building is evident in the exposed polished floors slabs, walls, columns, girders, electrical and HVAC reticulation.

Figure 4.9 - Exposed building services in utilitarian vocational workshops (Neumann Monson Architects, 2017)

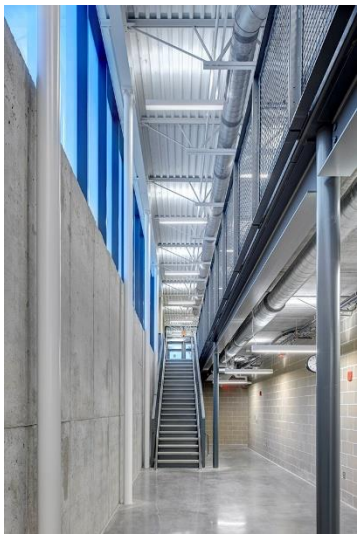


Figure 4.8 – Corridor (Neumann Monson Architects, 2017)

Figure 4.11 – Perspective (Neumann Monson Architects, 2017)

Figure 4.10 - East façade (Neumann Monson Architects, 2017)

4.1.2 Maunula House, Metsäpurontie 4, Helsinki, Finland

Architects | K2S Architects

Typology | Cultural Centre

Area | 31 000m²

Year completed | 2017

Client | City of Helsinki Real Estate Department

Figure 4.12 - (K2S Architects, 2017)

4.1.2.1 Introduction

Maunula House is a cultural and learning hub in the heart of the neighbourhood of Maunula, which comprises of an adult education centre, youth centre, community hall, library, and café.

This combination of uses increases the rate of utilization of the spaces (K2S Architects Ltd., K2S Architects, 2017). The international precedent is selected based on its combination of uses based on the needs of the community, conveniently located to shops and other amenities.

4.1.2.2 Participatory Planning

The inclusive processes of participatory planning were adopted prior to and during the design phases, enabling the participants to engage with the design to ensure appropriate solutions – a first for a project in Helsinki. The community has carried through these processes post the completion of the building, to plan the activities occurring within the building. Therefore, the building continues to respond to the changing requirements and activities of its users (K2S Architects Ltd., K2S Architects, 2017).

4.1.2.3 Context

The building is situated in a primarily residential neighbourhood of predominantly mid-rise mixed-use residential buildings. It is bordered by a major road in the North, and a secondary road in the south – both of which are public transport routes. The Maunula House is attached to a grocery store along its east façade and enables direct access to the library from the adjacent store and its roof parking. The west façade faces a park (K2S Architects Ltd., K2S Architects, 2017, 2019). The building steps along the west façade in response to topography, engaging with the fall of the site.

Figure 4.13 - Site plan (K2S Architects, 2017)

Figure 4.14 – Adjacent grocery store (K2S Architects, 2017)

4.1.2.4 Structure and Finishes

The building structure is in concrete and steel. The facades' materials are primarily of natural glass and the tactile materials of white face brick and timber slats.

The interior finishes are a balance of natural finishes of exposed concrete and timber contrasted with smooth plastered and painted walls and steel supports.

4.1.2.5 Spatial programme

The main entrance is located on the upper-ground storey along the north-west façade, in the middle of the building. Directly linked to the entrance are the shared spaces, namely, the library, hall and café. Deeper within the intimacy gradient, in the south end of the building, on the upper-ground storey is the youth centre.

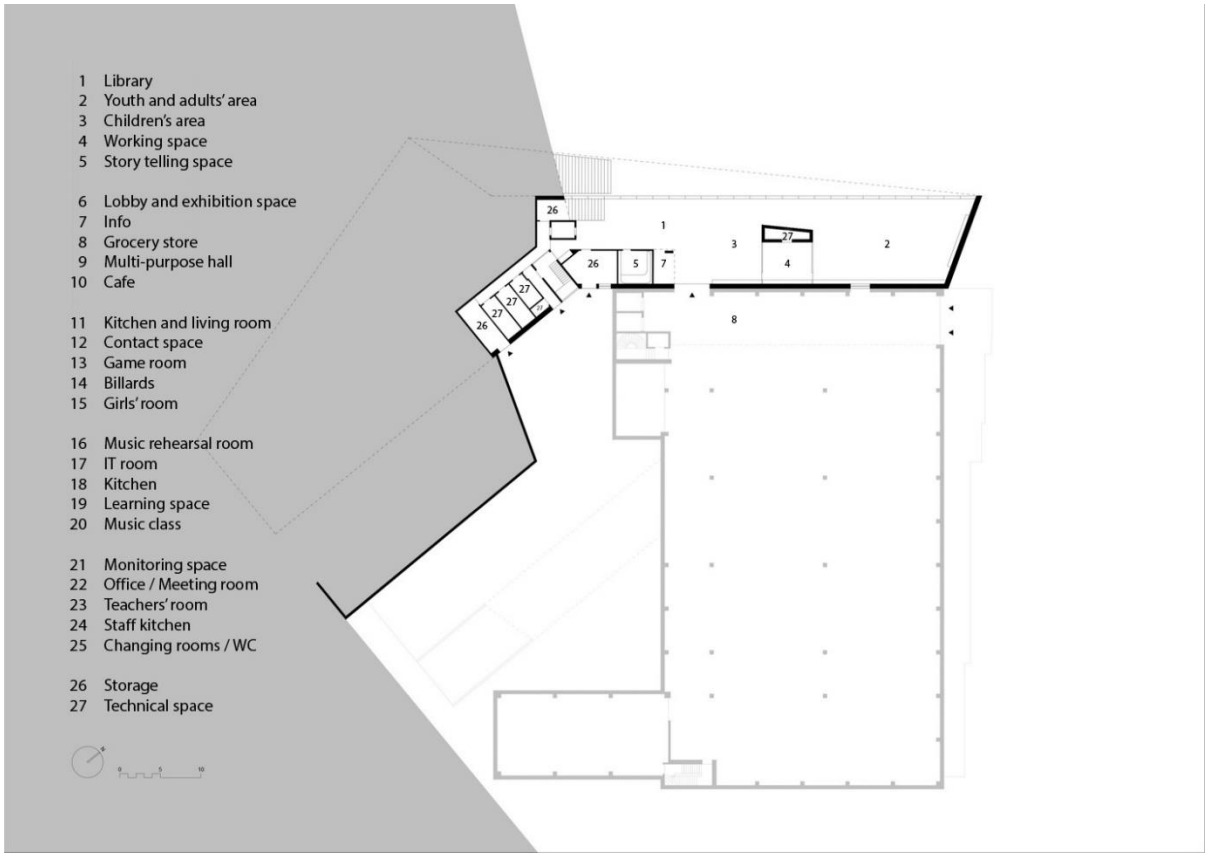


Figure 4.15 – Lower ground storey (K2S Architects, 2017)

It is directly accessible from the main entrance, but also has its own entrance on the south-west of the building, allowing it to be isolated from the rest of the building with sliding doors.

The adult education centre occupies the top floor of the building (K2S Architects, 2017).

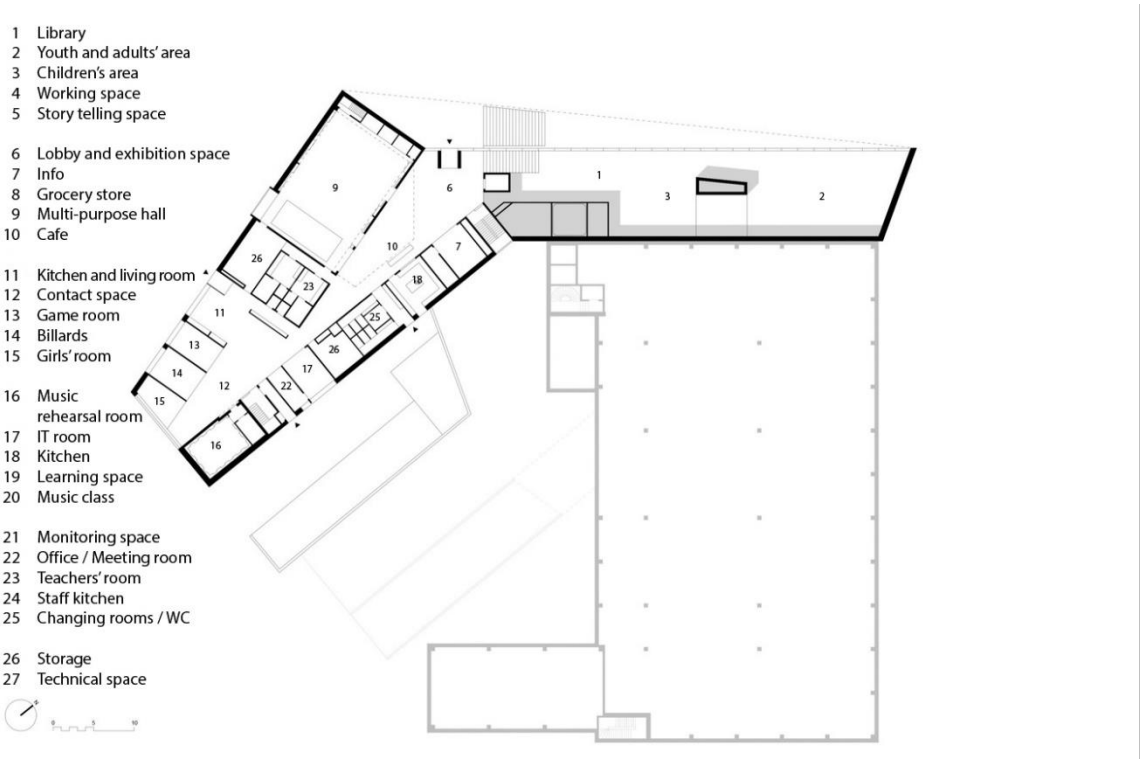


Figure 4.16 - Upper ground storey (K2S Architects, 2017)

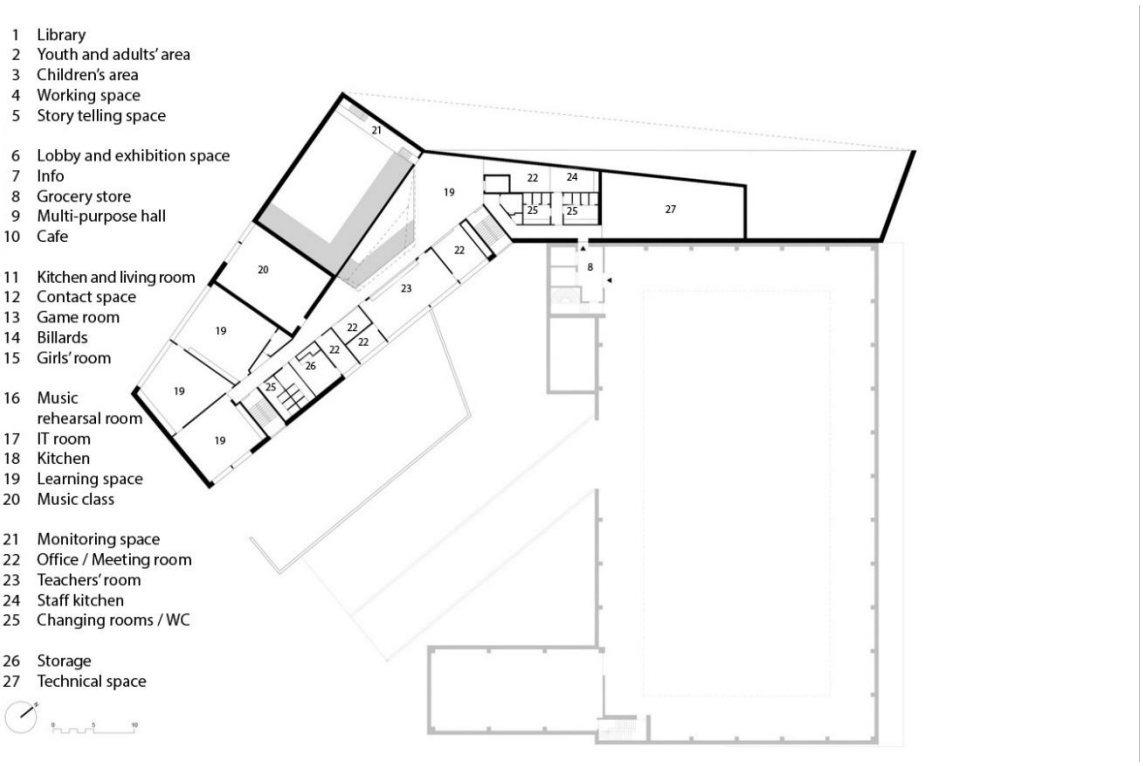


Figure 4.17 – First Storey (K2S Architects, 2017)

4.1.2.6 Learning Stimuli

The angled walls in some of the spaces within the centre provide interest, and are in accordance to Day and Midbjer (2007) with regards to their support for non-rectangular learning spaces. The freeform timber ceiling of the library with its varying heights, and the double volume light well in the centre of the building provides a distinct character, not only as a visual stimulus, but also providing an open airy feel.

The colours in the library are a combination of soft and warm colours that induce concentration, whilst the bright lime green furnishings add invigoration. The shared common areas incorporate a bolder approach with the shaded variation of exposed concrete finishes and the bright yellow of the large skylight energizes these spaces of social interaction.

Figure 4.19 - Library interior (K2S Architects, 2017)

Figure 4.18- Library interior (K2S Architects, 2017)

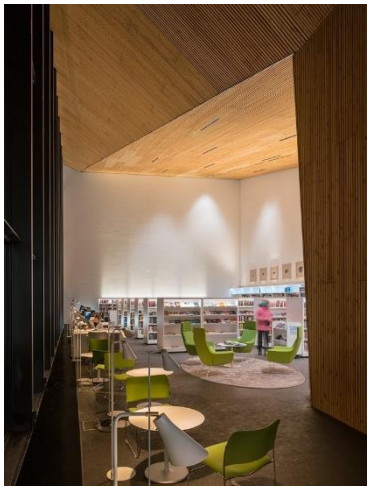
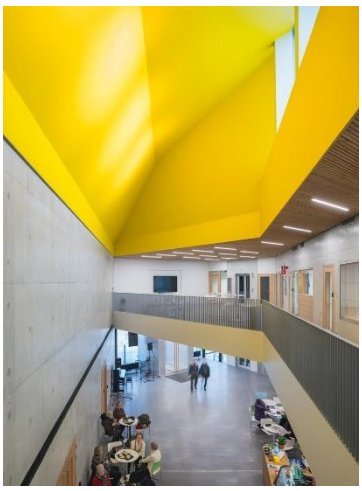


Figure 4.21 - Shared common area (K2S Architects, 2017)



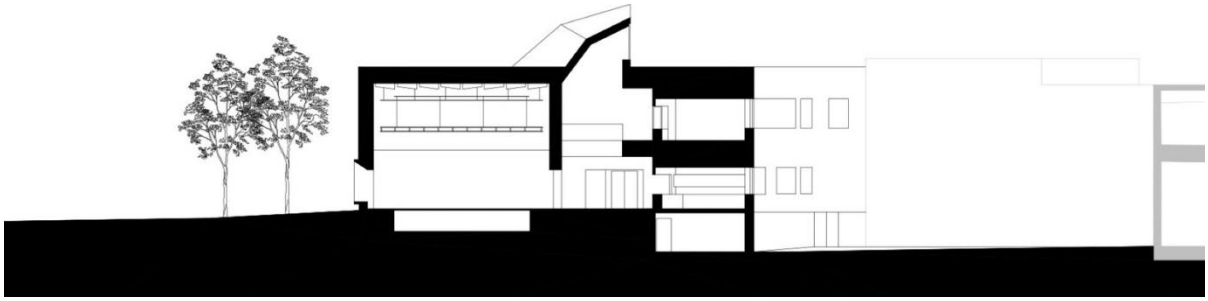


Figure 4.20 – Section (K2S Architects, 2017)

The full-height curtain wall spanning the entire north-west elevation, brings ample daylight and views to the library. Triple glazing ensures there is no compromise on thermal comfort. The learning spaces of the adult education centre and the activity spaces of the youth centre and central cafe are invigorated by two daylight sources; one from the external window walls,

and the other through internal glazed doors, windows and lightwells that permit indirect light from the large central trapezoidal skylight on the roof.

Air quality and ventilation is regulated mechanically through HVAC systems.

In terms of acoustics, the classrooms and activity rooms have been positioned farthest from the traffic noise of the major street. The music room on the top floor is specified with thicker walls all round. These steps will minimize disruption in the learning areas of the building.

The common spaces of the corridors have been widened and furnished to accommodate pause and interaction. The youth centre has two such spaces, a living room and contact area. Further towards the shared spaces, the widened corridor is constricted before opening up again into a café space where further interaction occurs – both visual and social. The library offers various settings for individual study and interaction, all connected to each other visually. Enclosed areas integrate the use of glass partitions to strengthen visual connections. The lobby of the adult education centre storey features the distinctive

Figure 4.22 - Main entrance perspective (K2S Architects, 2017)

Figure 4.24 - Library interior (K2S Architects, 2017)

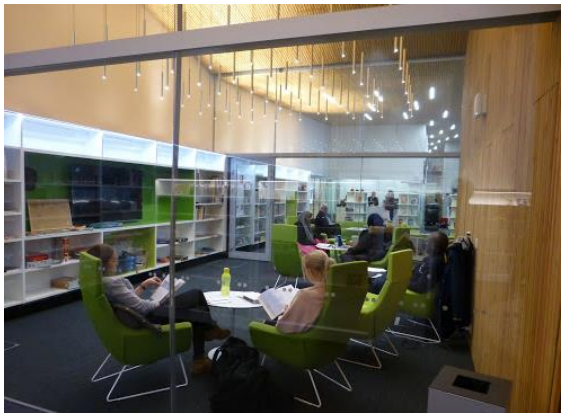


Figure 4.23 - Working space (K2S Architects, 2017)

widened corridor furnished and assigned as a learning space. This enables for learning to continue outside the classrooms, overflowing onto the corridors.

In the same year the building was completed the adjacent park was due for renovation, with the objective to link the activities within the building with the park (K2S Architects, 2017, K2S Architects Ltd.).

Figure 4.25 - North west elevation (K2S Architects, 2017)

4.1.3 Grantleigh Titanium Learning Centre, Richards Bay, South Africa

Architects | Theunissen Jankowitz Architects

Typology | Science Centre

Area | 1 722m²

Year completed | 2012

Client | Grantleigh School

Figure 4.26 - Grantlegh titanium science centre (Theunissen_Jankowitz_Architects, 2013)

4.1.3.1 Introduction

Grantleigh Titanium Learning Centre is a science education facility within Grantleigh School in Mposa, north of Richards Bay. The centre was conceived to host top achieving learners from the surrounding rural disadvantaged community, affording them the opportunity to integrate with the private school learners of Grantleigh, and expose them to modern science technologies. The idea is to encourage the spread of science and technology to the rural communities in the wider vicinity (Moorcroft, 2013, Steel Awards 2013, 2013). The Titanium Learning Centre is presented here as a local precedent, primarily selected for its didactic expression of its curriculum - the sciences, in the building.

4.1.3.2 Participatory Planning

The project architect, and director of Theunissen Jankowitz Architects, Mr Greg Hendricks (2020) during an interview with the researcher revealed that weekly workshops were conducted with grade 11 and grade 12 learners, and teachers from the school. According to him this collaboration in the form of participatory planning process that yielded results reflected in the building. Unfortunately, some of the ideas which emerged from this process were thwarted by budget restrictions.

4.1.3.3 Context

The Titanium Learning Centre is situated in the northern section of a private school campus, isolated in the middle of gum tree forest plantation between the communities of kwaMbonambi and Bhejane, approximately 25 km from Richards Bay. It is a destination location which is influenced by site planning rather than urban planning. In essence it has to respond to the site and needs of the school community, then the greater community at large.

The building is bordered by neo-classical inspired auditorium and main reception buildings of the existing school on the west, a new maths science block in the north, and the gum tree forest on the east, situated at the end of an avenue. The design sought to contrast the existing context with modern forms and an organic shaped roof. (Leading Architecture and Design, 2013, Hendricks, 2020).

Figure 4.27 - Site satellite image (Google, 2021)

4.1.3.4 Structure and Finishes

The structure consists of plastered and painted reinforced concrete columns and brick walls. The distinct steel roof which was derived from the concept of a bird in motion, mimics the rib cage of a bird. The roof span increases from the west to the east section of the building. The curved cold-rolled steel beams supporting the roof extend, connecting to the ground at certain points to reveal the bird-like 'ribcage' (Moorcroft, 2013, Steel Awards 2013, 2013, Leading Architecture and Design, 2013, Hendricks, 2020).

4.1.3.5 Spatial Programme

The Titanium Learning Centre features a raked 144 seat auditorium, two science laboratories located on the first storey, teachers' offices, a boardroom, kitchen, and an outdoor covered amphitheatre. The building is linked to an enclosed courtyard, the new maths block, and ablution block. The spatial programme makes provisions for water harvesting utilizing three 5000 litre water tanks above the ablution blocks. The enclosed central courtyard is employed for outdoor lectures and dissections. The building itself is arranged symmetrically to the auditorium.

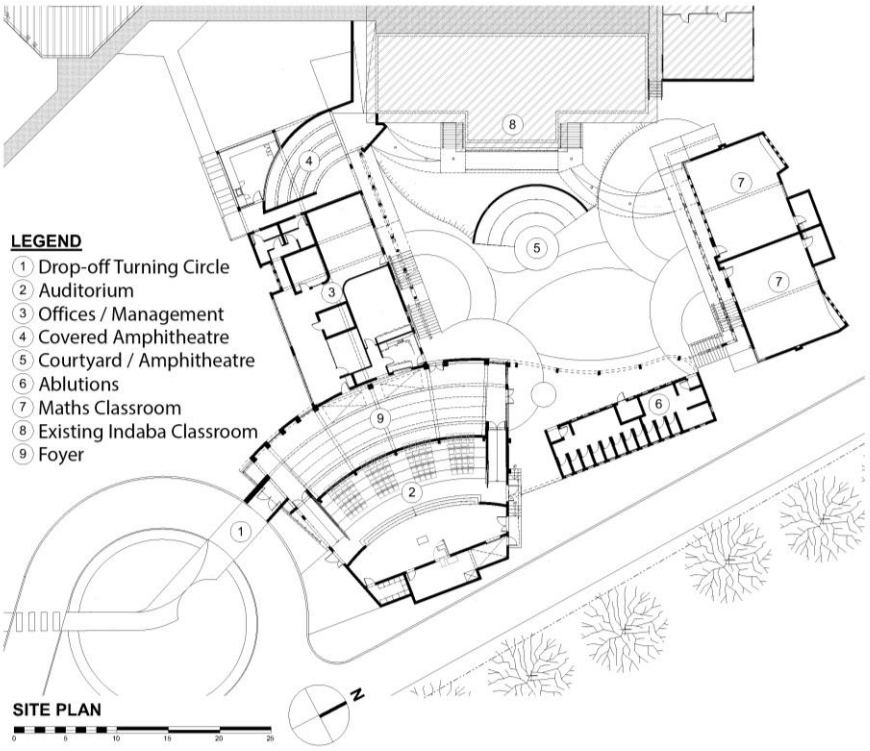


Figure 4.28 - Site plan (Hendricks, 2020)

The auditorium and administration areas are accessed from the foyer, which links the porte cochère to the outdoor courtyard. The laboratories upstairs are accessed via a bridge and staircase (Moorcroft, 2013, Steel Awards 2013, 2013, Leading Architecture and Design, 2013).

Figure 4.31 - Building section (Hendricks, 2020)

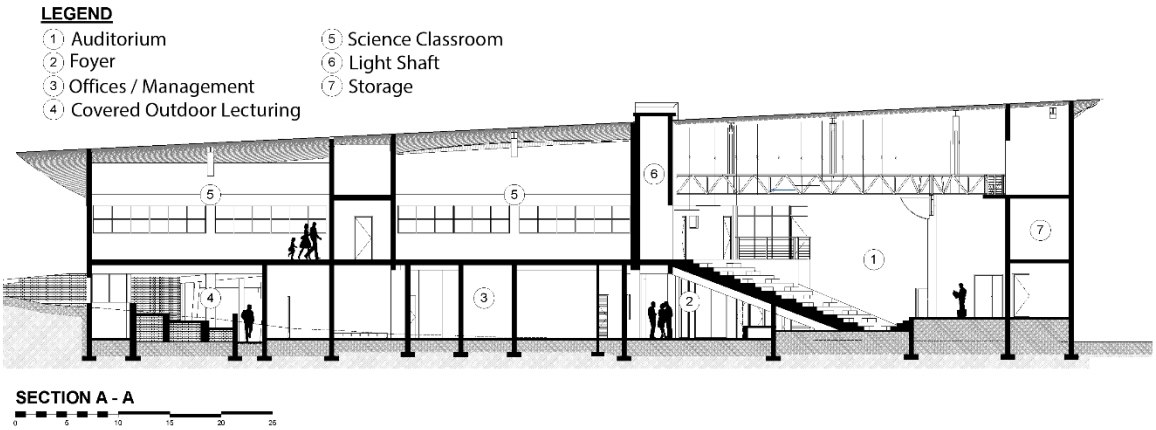


Figure 4.29 - Enclosed courtyard (Leading Architecture and Design, 2013)

Figure 4.30 - Maths and ablution blocks (Theunissen_Jankowitz_Architects, 2013)

4.1.3.6 Learning Stimuli

The roof structure elevates the character of the building through its form. Navigating around the exterior of the building becomes an experiential, and visual gratifying encounter, considering that the visual perception of the building changes in relation to various viewpoints (Moorcroft, 2013, Steel Awards 2013, 2013, Leading Architecture and Design, 2013).

The Centre features brightly coloured accents on certain elements of the building, utilizing energetic colour palettes, on contrasting lightly coloured walls. This is synonymous to comments of Day and Midbjer (2007), regarding such colours as invoking physiological responses of excitement. The design architect, Hendricks (2020), confirms this as his intention during the interview.

> "Colour, obviously [was used] for motivation and inspiration to the learners (Hendricks, 2020; 08:30)."

He further elaborates on the selection of colours.

> We just looked at vibrant colours. You know. The whole, the existing building of the school is, it's very dull. And you know, we just wanted to, to, colours that when kids go there, they're going to be alive and you know, just feel alive. And hence our palette was based on, on vibrant colours (Hendricks, 2020; 14:26).

Figure 4.32 – Perspective
(Theunissen_Jankowitz_Architects, 2013)

Figure 4.33 – Bright colours
(Theunissen_Jankowitz_Architects, 2013)

Daylight is considered in all learning spaces. They consist of glazing on at least two sides of the space, which also have openable sections for natural ventilation – with the exception of the auditorium. Inverter air-conditioners compensate when consistent air quality is required. Lightwells positioned centrally in the building transmit daylight from the skylights on the roof to the entrance foyer.

The architect designed a multi-dimensional timeline under the raked ceiling which indicates scientific pioneers and milestones throughout history. The idea was to transcend the foyer from a transitional space to an inspirational space that extends learning beyond the classroom (Leading Architecture and Design, 2013, Hendricks, 2020, Steel Awards 2013, 2013).

> But the whole idea was that you'd sit underneath it and you'd read, you know. You'd basically, if you're waiting for somebody, you won't wait idly and look at your cell phone. You'd look and walk and learn about lots of things. And that's what it was about. It's about having this, taking every wall, every panel, texture, to make it something that you can learn from (Hendricks, 2020; 41:21).

This idea of promoting the building as a self-exhibition of learning was carried throughout other elements within the centre. Notably, it is evident in the furniture, electronics, and signage. Custom teacher desks were made to resemble square root symbols. The electrical wiring in the ablution blocks is left visible within transparent perspex conduits, allowing learners to see the coloured live, neutral and earth wires in a real-life setting. Electrical kiosks have transparent glass panels, with all their trip switches on display for learners. Signage has been inspired by the periodic table of elements.

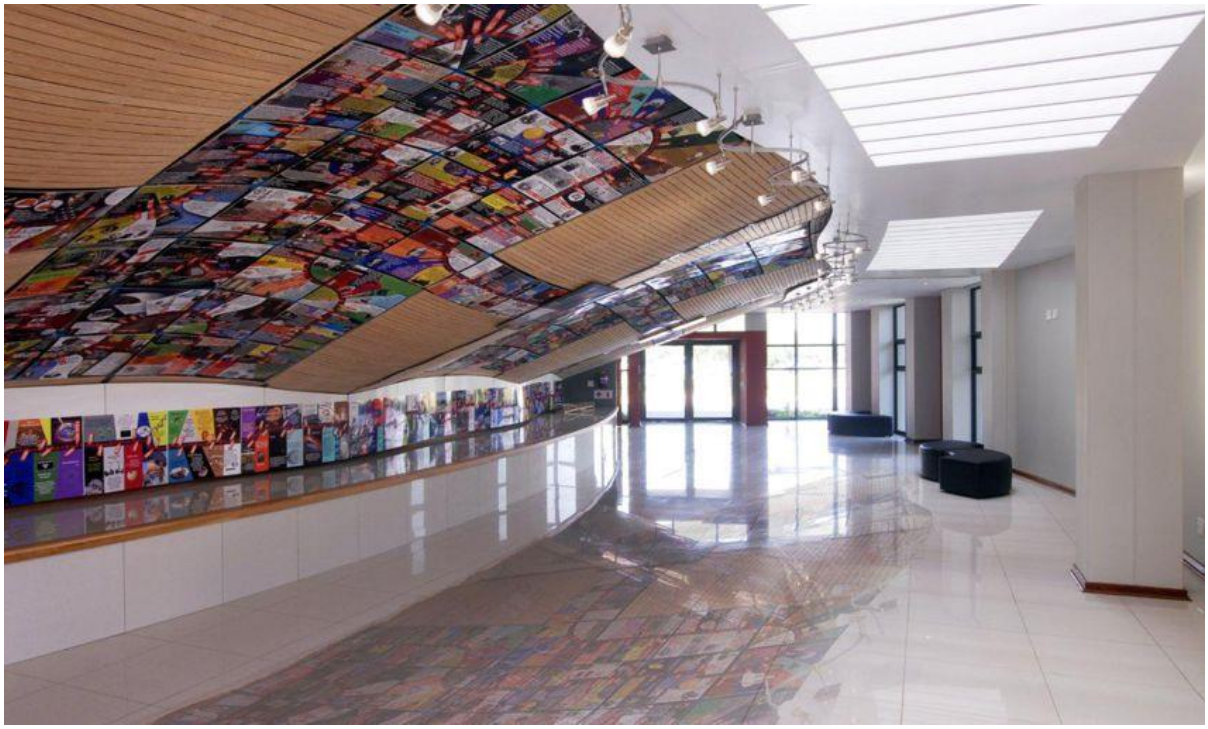


Figure 4.34 - Experiential entrance foyer (Leading Architecture and Design, 2013)

The enclosed courtyard, outdoor covered amphitheatre, and the science experiments room behind the latter amphitheatre, allow for interaction with the outdoors synonymous with contemporary learning ideas. Similarly, it puts learning on display to passers-by. In the case of science experiments room, the work is continually left on display as it progresses to its final stage (Hendricks, 2020).

Figure 4.36 - Custom teacher's desk (Theunissen_Jankowitz_Architects, 2013)

Figure 4.35 - Bathroom vanities (Theunissen_Jankowitz_Architects, 2013)

Figure 4.37 - Entrance porte cochere and signage (Leading Architecture and Design, 2013)

4.1.4 Francis Kéré's 2017 Serpentine Pavilion, Kensington Gardens, London, United Kingdom

Architects | Kéré Architecture

Typology | Temporary Pavilion

Area | 330m²

Year completed | 2017

Client | Serpentine Galleries

Figure 4.38 – Perspective (ArchDaily, 2017b)

4.1.4.1 Introduction

The Serpentine Gallery hosts an annual program where they commission an accomplished architect who has not done work in the United Kingdom in the past, to design and construct a temporary pavilion to be exhibited for a set period of time on the lawn of the gallery. Award-winning architect Diébédo Francis Kéré who hails from Gando, Burkina Faso was selected for the commission in 2017, where his installation was acclaimed for its unpretentiousness and cultural significance (Musca, 2017, Serpentine Galleries, 2017). The precedent selection is based on the abstract and contemporary intrinsic cultural representations expressed by the pavilion with modern and experimental construction techniques, as opposed to literal clichés

and superficially applied treatments. Therefore, pavilion aligns to the views of (Hertzberger, 2008) from the previous chapter three, with regards to culture and identity.

Figure 4.39 - Site context and roof plan (Kéré, 2017)

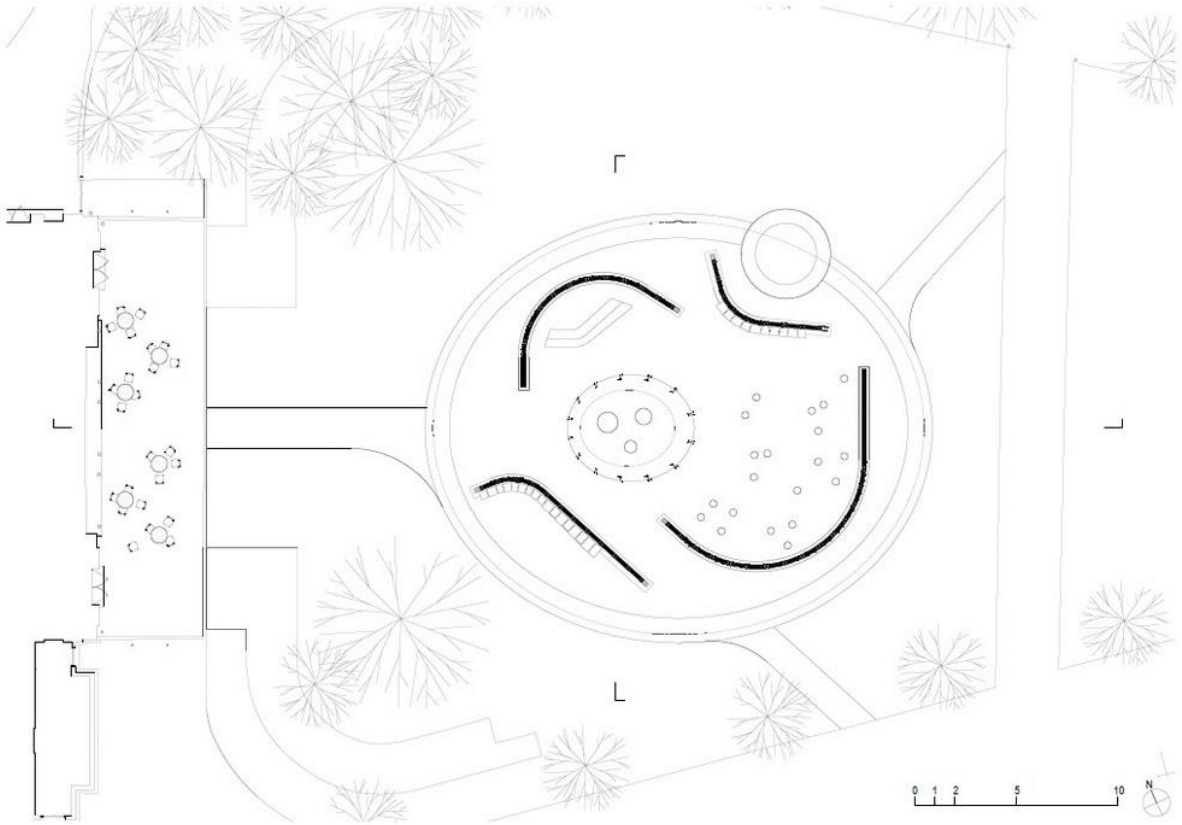


Figure 4.40 - Floor plan (ARQA, 2017)

4.1.4.2 Structure, Materials and Climatic Response

A translucent elliptical conical cantilevering polycarbonate roof which covers the entire pavilion is supported by a triangular lattice of lightweight steel framework. The roof underside is clad with timber slats in a way that forms a triangular motif, with some sections angled upwards.

This composition allows for diffused natural light to be transmitted through the space on sunny days, whilst protecting occupants from the sun, and shading provides interesting patterns and plays of shadows. During rainy days, the roof mimics a funnel, channelling the water to an opening in the centre of the roof, creating a waterfall feature. This water is harvested through a floor drain, and directed to a water storage tank, where it will be used to irrigate parts of the park.

The internal space of the pavilion is defined by four curving walls constructed of stacked indigo coloured timber in triangular modules with slight apertures between each module. The four wall segments do not meet, creating four entrances to access the internal courtyard of the pavilion. The walls are detached from the roof as well, leaving a clerestory opening along the perimeter of the structure.

These openings and appears provide the visitor with a constant visual connection with the outdoors, whilst permitting daylight and unrestricted circulation of air.

The longer one stays at the pavilion, the subtle yet intricate detail tends to slowly reveal, making for a more rewarding spatial experience (Musca, 2017, ArchDaily, 2017a, Kéré, 2017, Mairs, 2017, Serpentine Galleries, 2017).

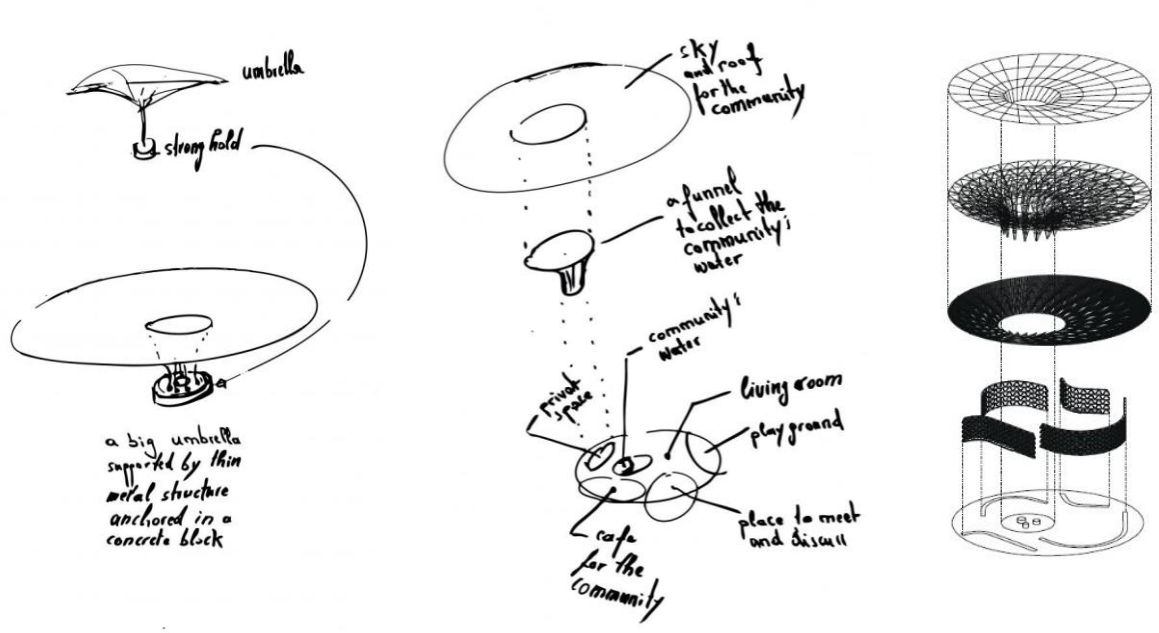


Figure 4.41 - Conceptual sketches (ARQA, 2017)

4.1.4.3 Culture and Identity

Kéré's cognisance of the cultural, social and sustainable implications of design are expressed in his structure. All the elements that constitute Kéré's pavilion embody meaning, representational of Kéré's identity and the culture of his people in his native town of Gando, and their values of community, and ecology.

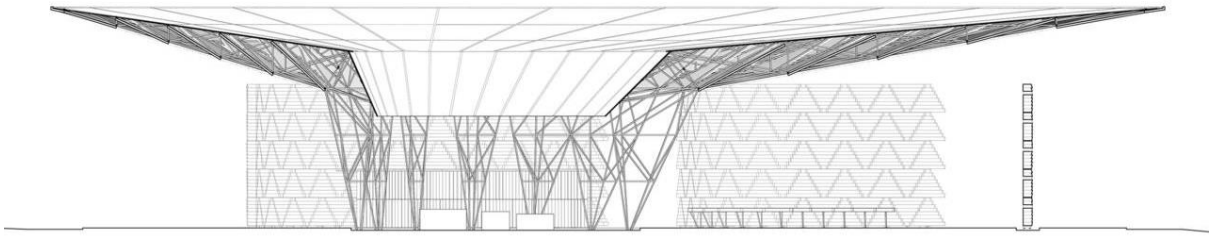


Figure 4.42 – Section (ARQA, 2017)

The concept for the pavilion's canopy structure is derived from a tree in Gando, where the community meets, interacts and engages in everyday activities. This suits the objectives for the pavilion as an inviting, tranquil social space where visitors can sit and relax in a congenial environment, engaging with nature, each other, and the work of architecture itself, whilst being shielded from the weather.

Figure 4.43 - Abstract tree representation (ArchDaily, 2017b)

Figure 4.44 - Meeting place in Gando under a tree (Fernández-Galiano, 2018)

The symbolism carries through to the triangular motifs created on the roofs shading slats and the perimeter walls. The triangular pattern is symbolic of textiles. The colour blue in Burkina Faso is worn on special occasions when the wearer wants to make an impression. The

intention then was to dress up his architecture in his best colour to represent himself well for this exhibition (Musca, 2017, ArchDaily, 2017a, Kéré, 2017, Mairs, 2017, Serpentine Galleries, 2017).

In the evening, the pavilion transforms into a glowing beacon of light. Kéré likens this to the lights visible at celebrations in the distance in Gando, at night (ArchDaily, 2017a, Kéré, 2017, Serpentine Galleries, 2017).

Figure 4.46 - Blue timber patterned walls (ArchDaily, 2017b)

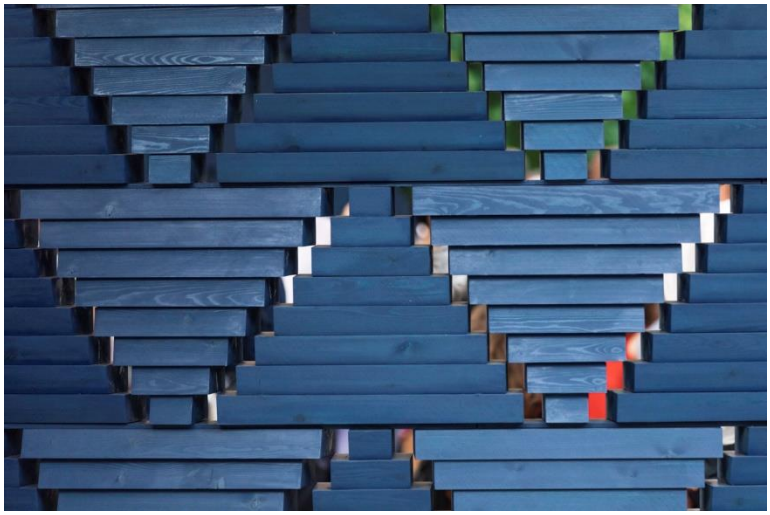


Figure 4.45 - Boubou attire (D29, 2020)

Figure 4.47 - Beacon of light in the evenings (ArchDaily, 2017b)

Figure 4.48 - Areas for pause and relaxation (Kéré, 2017)


Figure 4.49 – Interior space (Kéré, 2017)

Figure 4.50 - Social interaction (ArchDaily, 2017b)

Figure 4.51 - Interaction with the architecture (ArchDaily, 2017b)

4.2 CASE STUDY

4.2.1 Ubuntu Centre, 5 Qe Qe Street, Zwide, South Africa

Architects | Field Architecture

Typology | Community Centre

Area | 1950m²

Year completed | 2010

Client | Serpentine Galleries

Figure 4.52 – (Author, 2020)

4.2.1.1 Introduction

The Ubuntu Centre, now referred to as Ubuntu Pathways, is an award-winning community centre in the township of Zwide in the Eastern Cape that provides a holistic range of state-of-the-art services to guide vulnerable children and their families out of the generational cycle of poverty. The interventions comprise of paediatric HIV testing and treatment, counselling, education and community empowerment. Being locally operated and globally funded, the services are offered at no charge, making much needed services accessible for all people. Its sustainable development initiatives termed 'cradle to career' have garnered the support of international organisations such as the Clinton Global Initiative, the US President's Emergency Plan for AIDS Relief (PEPFAR), the Kresge Foundation, and others (Field Architecture, 2011, Findley, 2011, Laylin, 2011, Ubuntu Pathways, 2020b, a, Girap, 2018, Zonke, 2020).

Girap (2018) reveals that the Ubuntu Pathways, with its community-based sustainable development model that is culturally appropriate, has become a precent for other organisations globally.

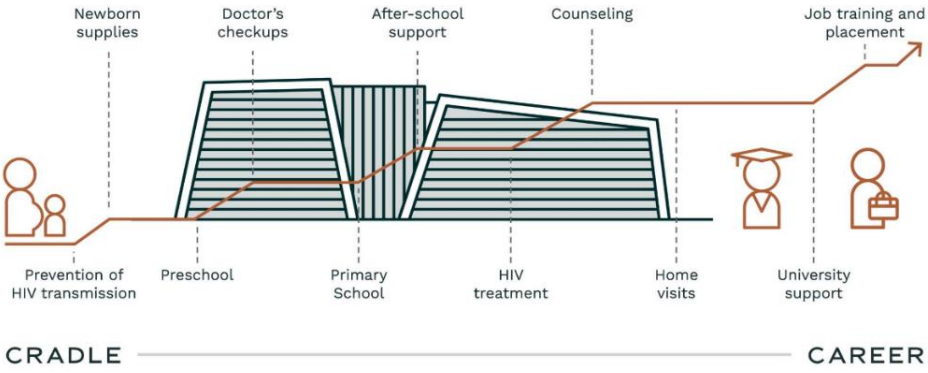


Figure 4.53 - Infographic (Ubuntu Pathways)

4.2.1.2 Justification of Case Study

The selection of the Ubuntu Pathways centre is based on the similarities of the context compared to that of the study area of Bridge City, where both are situated in a township, environments with similar socio-economic challenges and backgrounds. Secondly the objectives of the building relate to the objectives of this study in that it is responsive to its contextual conditions, the spatial programme responds to community requirements, and its architectural design seeks to inspire a sense of pride and stimulate community aspirations.

Considering these similarities, the researcher has consulted with literature sources, interviewed the building's design and lead architect Stan Field, the director of Field Architecture, and interviewed Gcobani Zonke, the deputy president of Ubuntu Pathways. Zonke was interviewed parallel to undertaking on-site observations of the building and the organisation's historical timeline. The objective was to obtain an in-depth review and understanding of the Centre.

It is to be noted the empirical data collection occurred during the COVID19 pandemic, during South Africa's level two lockdown restrictions. Therefore, the centre operations were limited due to regulations of the time. Hence only the Clinic is in full operation. All other operations have been suspended, and spaces within the centre have been adapted for activities to provide relief to community during the pandemic.

4.2.1.3 Participatory Planning

All the Ubuntu Pathways programs, initiatives, and curricula are community-driven from inception. The building design process followed these methods through a participatory planning process. According to Zonke (2020) it is paramount that the community feels that they own the building, as that encourages them to protect and care for it.

> So you just run literally 100% by the by the community. So from building and also we even employ people within the community with the building and all that, because it's theirs. The same thing of what I said earlier on, ownership is very important. So people could understand that we're own by them. And you find there's no boundary wall for that building, because the community is looking after it because it's theirs (Zonke, 2020; 44:24).

The staff, clients and community were engaged throughout the process and their contributions made for an appropriate resultant environment (Findley, 2011, Ubuntu Pathways, 2004, Zonke, 2020, Field and Field).

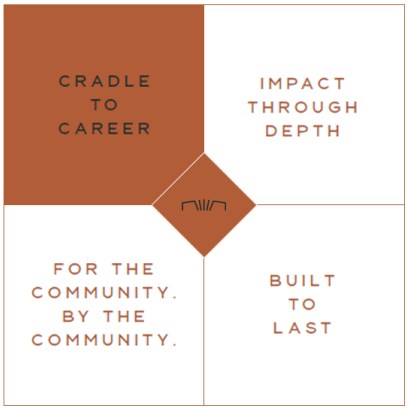


Figure 4.54 - Ubuntu Pathways philosophy (Ubuntu Pathways)

4.2.1.4 Context

The centre is situated in the middle of the Zwide township which is predominantly residential in nature. The centre is located in what can be considered an educational precinct, where five other schools, including the new Ubuntu Primary school across the road, can be found. In the vicinity are other services and amenities including the Zwide Public Library, Zwide Post Office, informal trading, retail, and small to medium sized businesses.

Ubuntu pathways is bordered by three streets on the north, west, and south respectively. Qeqe Street in the north is frequented by public transport. Just 160m west along Qeqe Street are the main roads that traverse the township.

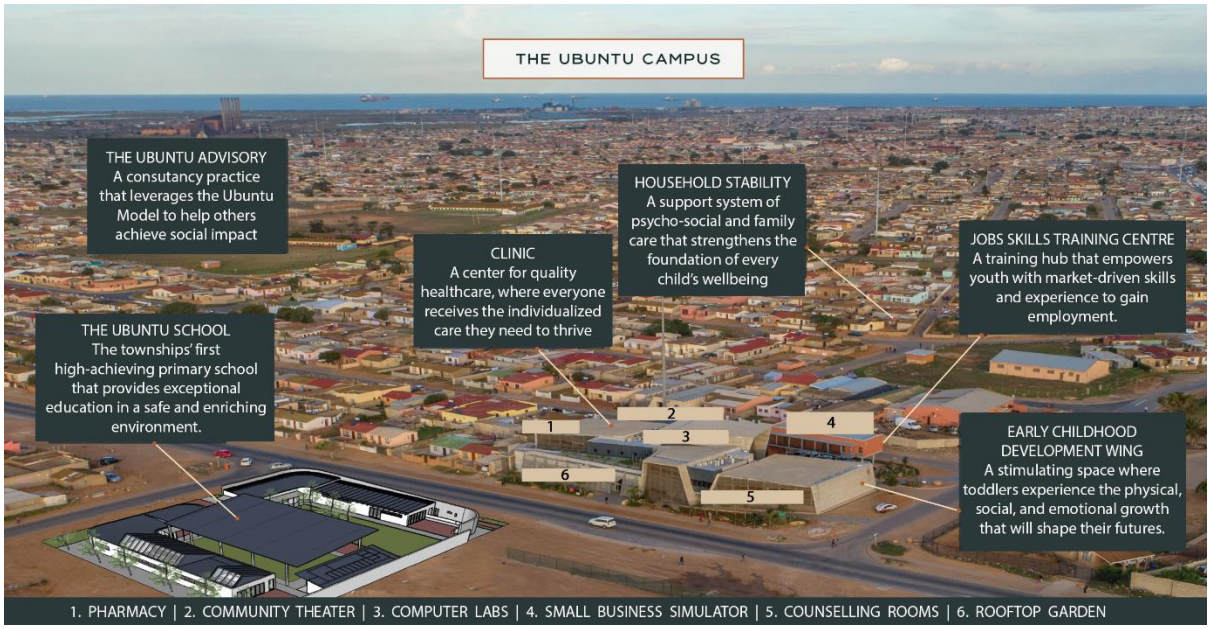


Figure 4.55 - Ubuntu Pathways campus (Ubuntu Pathways, 2018)

Field noted the pedestrian movements in the area as well. He discovered that residents of the township traversed along informal paths that were the shortest distance between shops, transport stops, and other prominent destinations, therefore requiring the least energy consumption. He convinced the organisation to abandon the use of exclusionary boundary walls, to realise a pathway that traverses through the building, passed the entrances of the community spaces, and reflecting the existing site conditions of the context. This 'shortcut' and the combination of community activities allows for the stigmatized HIV test to be taken without the fear of being judged by those who witness you enter the building.

> So, I realized that if we followed the footsteps, and created pathways along those lines, where the people walk, and then I realized that this needed to be a building to go to. No. To go through, not a building to go to. It wasn't a destination, because the minute it's a destination, everybody could see that somebody's going there to be tested. You see. But if it is a building to go through, they could be going to a computer centre or a library or something, and nobody would know, you know.

> So, the pathways really became the whole design that went through the building. And the building was built around the pathways rather than the other way around. And, and so that was the...and it worked. Because people were being tested (Field, 2020; 12:46).

This pedestrian street also allows for chance encounters, which encourage social interaction, social exchange and the sharing of information.

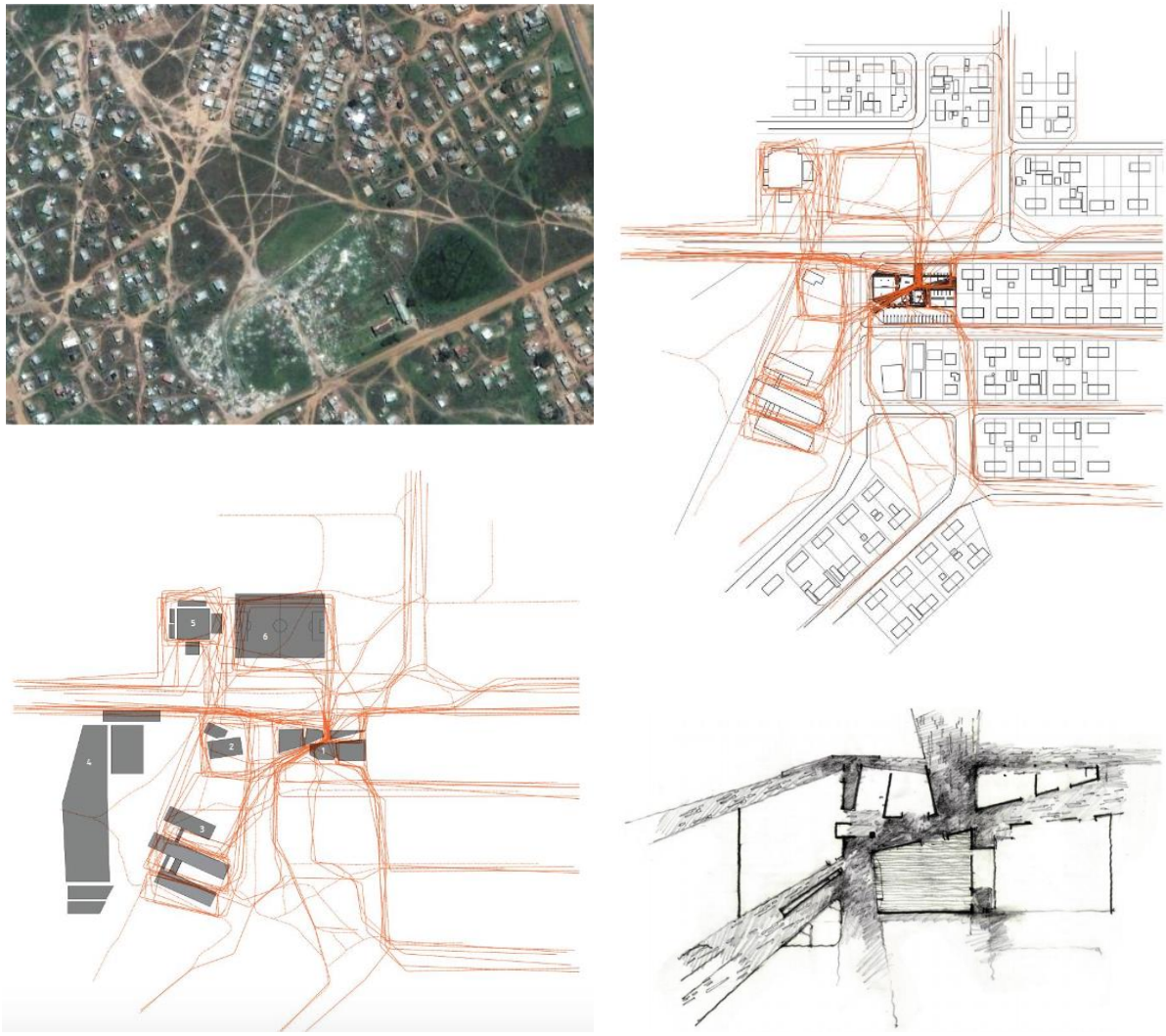


Figure 4.56 - Pedestrian movement patterns (Field and Field, 2012)

The residential nature of the surroundings was considered in the scale of the building, to ensure the building is not overwhelming to its visitors and neighbours. A view that (Zonke, 2020) concurs with when he says,

> If it's a community center, people should be able to access it and feel comfortable and all that, you know (Zonke, 2020; 38:45).

As a result, it was it was separated into three main masses. The efficacy of the exercise is evident on approach, as you cannot spot the building from a distance, above the roofs of others (Findley, 2011, Field Architecture, 2011, 2019, Laylin, 2011, Field and Field).

Figure 4.57 - Approaching Ubuntu building from the street (Author, 2020)

4.2.1.5 Structure and Finishes

The architect has filled this building with symbolic gestures. The underpinning gesture is the entire building itself. It strengthens the self-worth and dignity of the community, eliminating doubts that they are deserving of world-class architectural environments (Findley, 2011, Field and Field).

The distinctive forms of the building are characterised by folded reinforced concrete planes, with all planes inclined towards each other in each form. These folded planes leaning on each other for stability are symbolic of people leaning on each other for support, a homage to the meaning of the term Ubuntu – derived from the Nguni ideom “umuntu ungumuntu ngabantu” which loosely translates to “I am who I am because of others.”

The building predominantly consists of an exposed smooth concrete finish which the architecture attributes as a metaphor of permanence, and a lasting commitment in a neighbourhood where not everything has been built to last.

> You know, they use concrete for the, for dams and bridges and things that last. And I didn't want, I wanted the people to feel that this was something for a long time, you know, that it would be there for 200 years. And, and it's got, a sense of

> permanence, because their lives were so temporary, you know, and they, that's what I wanted them to feel: the sense of permanence (Field, 2020; 26:40).

The solid statement of the concrete structure is contrasted by expansive sections of glazing to allow daylight to invigorate the interior spaces and create a sense of openness.

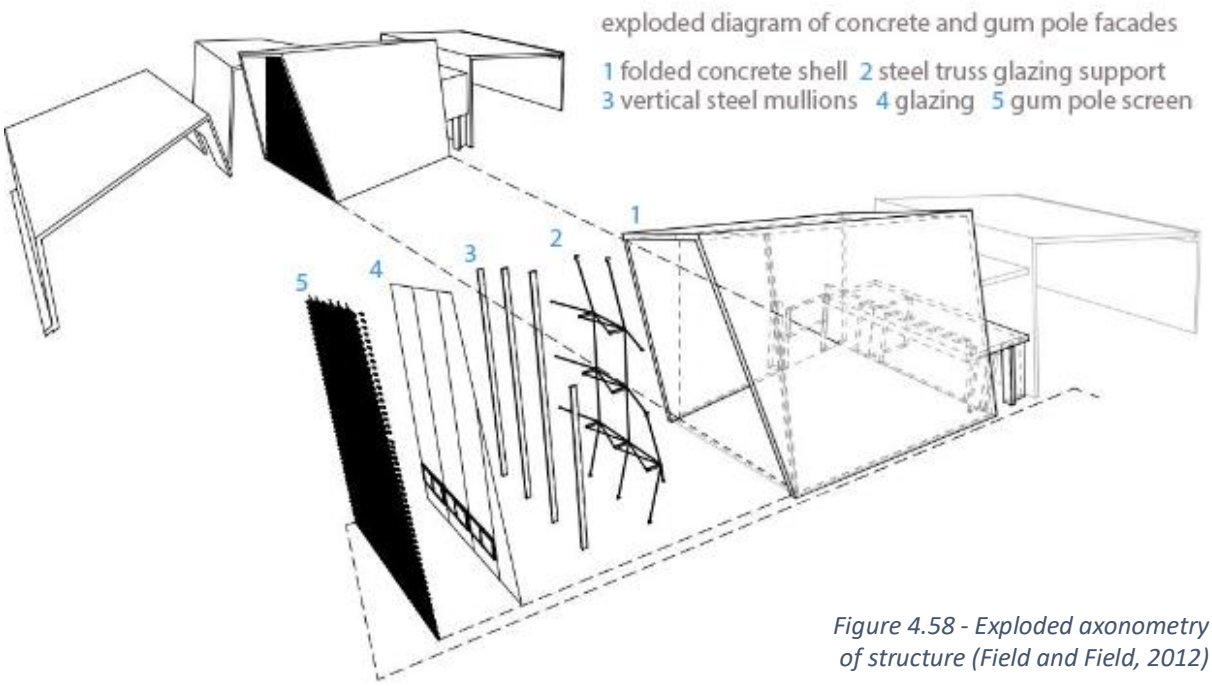


Figure 4.58 - Exploded axonometry of structure (Field and Field, 2012)

Treated timber elements add warmth, variety, and interest. In the case of the exterior glazing, gum poles are utilized in an unconventional but innovative manner as horizontal screens that provide solar shading, permit natural air circulation, and increase security.

Figure 4.59 - Gum pole screens (Author, 2020)

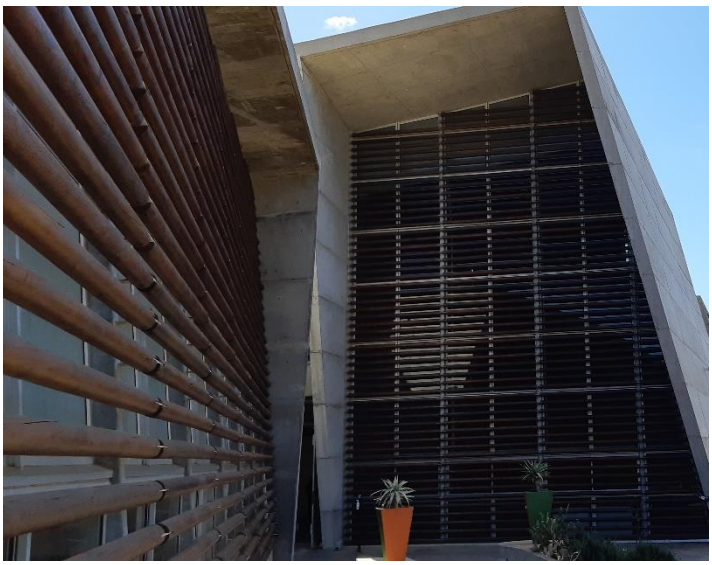
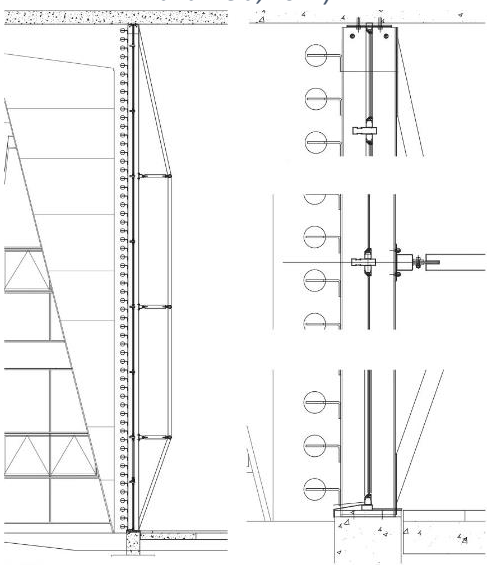


Figure 4.60 - Gum pole screen sections (Field and Field, 2012)



Handcrafted timber not only adds texture but emits a lofty aesthetic to the carpentry of the interior doors and furniture (Field Architecture, 2011, 2019, Zonke, 2020, Field, 2020, Field and Field).

Figure 4.61 - Hand-carved timber doors and furniture (Author, 2020)

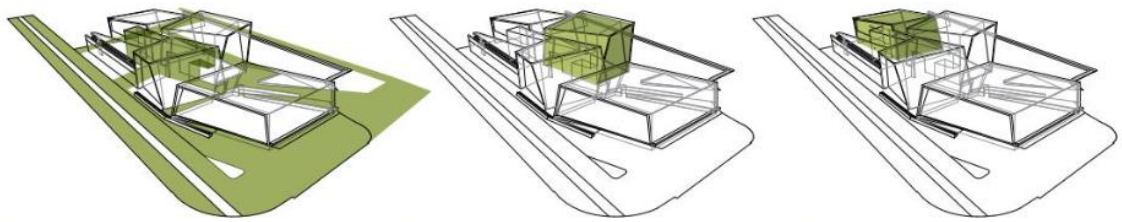
Figure 4.62 - Local mosaic artwork (Field and Field, 2012)

4.2.1.6 Spatial Programme

1 Resource/ Computer Learning Centre
2 Multi-Purpose Hall
3 Community Kitchen
4 Staff Lounge
5 Pediatric HIV/TB Clinic
6 Pharmacy
7 Reception/ Entrance Hall
8 Flexible/ Expandable Meeting Rooms
9 Parking
10 Garden Court/ to Rooftop Vegetable Garden

Figure 4.63 - Floor plan (Field Architecture, 2011)

An entrance foyer and reception, paediatric HIV/TB testing and counselling clinic, multi-purpose hall linked to a community kitchen, empowerment wing with career guidance and computer centre, administration offices, a staff lounge, flexible meeting rooms, and an organic rooftop garden all constitute the spatial programme of the original centre. Benches along the west side of the building, and seating along the concrete planters in the south courtyard garden space are a gesture for pause and interaction.



1 PEDESTRIAN CIRCULATION
- Non-congestive extension of pedestrian footpaths
- Connect major public facilities
- Accessible 24 hours

2 UBUNTU HALL
- Training space for schools, clinics and NGOs
- Meeting space for 250 people
- Theatre for after-school programming, holiday camps, and performances
- Cafeteria with catering facilities

3 HIV/TB CLINIC
- HIV & TB testing site and laboratory
- HIV management and support facility
- Family and child-friendly counselling rooms

Figure 4.64 - Spatial programme (Field and Field, 2012)

Figure 4.65 - Spatial programme (Field and Field, 2012)

Figure 4.66 - Seating areas for pause and interaction (Author, 2020)

Local artwork and crafts feature throughout the building, reinforcing the collaborative notion of a building 'by the community for the community' (Field Architecture, 2011, 2019, Laylin, 2011, Field and Field).

The success of the Ubuntu Pathways initiative has grown substantially over the years, however, so have the expectations from the community of the possibilities of quality education. The centre has since adapted to the changing needs of the community and the creation of polyvalent spaces have accommodated those changes. Early childhood development classes were introduced in the older building on the south east of the site. The empowerment wing has incorporated foundation phase grades one to three, of which the learners are engaged in a Montessori inspired curriculum. The visual stimuli has been suitably changed to suit this purpose.

> You know, when you build something it should be friendly. If you have people who have have disabilities it should be disability friendly. If it's for the kids, it should be stimulating for the kids. So the way this is actually designed, it's designed in such a way that it stimulates the learners themselves. Also the curriculum that we're using, it's one of the morals of Montessori, which is a play-based curriculum, which actually allows a lot of skills and also for kids to play, because kids can only learn by playing - it's through playing. But as a teacher, you have to design and make sure that every play has a learning benefit as it is. So it's how it's actually designed (Zonke, 2020; 59:51).

Figure 4.67 - Foundation phase learning spaces (Author, 2020)

Vocational training has been included in the older building and in a new block above the existing parking.

Figure 4.68 - Vocational skills training spaces (Author, 2020)

4.2.1.7 Environmental Stimuli

All the spaces within the building are of a unique shape. The compositions and propositions are visually stimulating and awe-spiring. It is a spatial experience like no other in the community of Zwide.

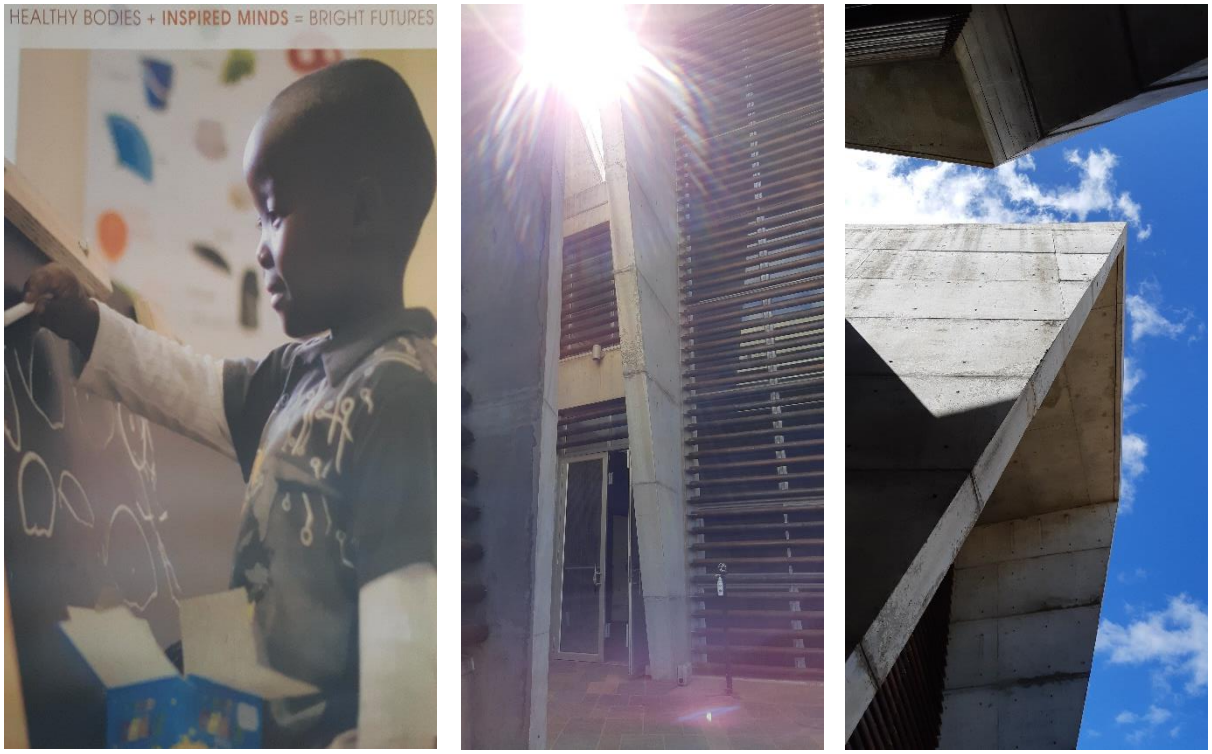


Figure 4.69 - Environmental stimuli in building: graphics, daylight, form (Author, 2020)

Daylight is introduced to all habitable spaces through the large sections of curtain walls, and the large skylights on the roof. Translucent partitions are specified as widely as possible to ensure the transmittance of daylight to common areas as well. Solar panels are also employed to take collect light and convert it to electricity.

Air quality and ventilation is regulated through openable window sections that promote natural ventilation and reduce reliance on mechanical systems. Thermal comfort is ensured by the placement of the openable sections to create a stack effect. Together with the building's thick thermal mass, passive heating and cooling comes into effect. The roof garden also contributes insulation properties. The irrigation is undertaken with the use of grey water from the building (Laylin, 2011).

Acoustic considerations are most evident in the multi-purpose hall. Here the design language of the gum pole screens is continued with timbe of a smaller dimension to create wall and ceiling baffles that cover strategically placed acoustic tiles. The considered surface treatments of this space ensure it is fit for its purpose and does not impede on other activities (Field and Field).

Figure 4.70 - Daylighting introduced in spaces (Author, 2020)

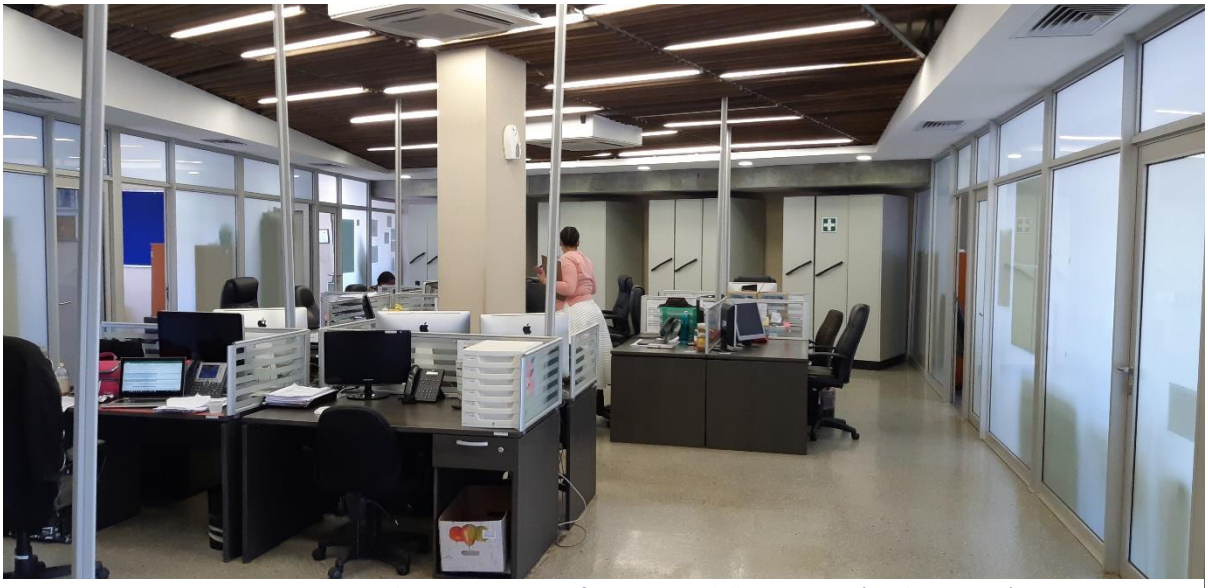


Figure 4.72 - Translucent partitions for increased illumination (Author, 2020)

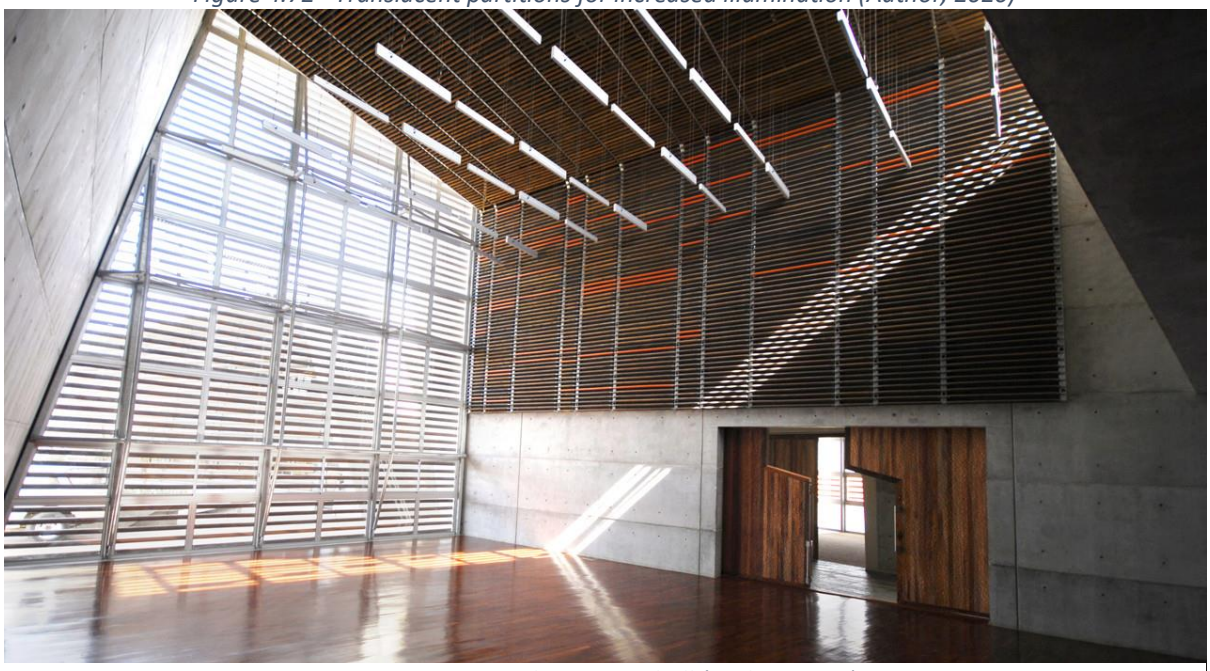


Figure 4.71 - Multi-purpose hall (Author, 2020)

Figure 4.73 - Classroom utilised for storage COVID-19 relief parcels (Author, 2020)

4.2.1.8 Conclusion

The precedents and case studies were explored. Insight into built scenarios where the themes revealed in the literature review of chapter three have been implemented has been gained. The spatial arrangement of community spaces for development, and how they connect and respond to the context was expressed. The precedent and case studies affirm the importance of participatory planning to achieve contextually appropriate design solutions. In the following section of chapter four, the researcher will analyse and discuss the primary data collected for this study in the form of questionnaires and interviews.

4.3 QUESTIONNAIRE DATA

4.3.1 Introduction

The questionnaires and interviews introduced in section 1.5 of chapter one, were conducted at two Community Education and Training Centres. The centres are located within the Department of Higher Education's KwaMashu Circuit, situated in the Pinetown District. Only centres located within 10km of the Bridge City Precinct were considered.

The best and worst performing centres were identified, based on their pass rates of their level 4 students in the year range of 2017 to 2019. To protect the identity of the centres, they have been identified as 'Centre A' for the best performing centre and 'Centre B' for the least performing centre, respectively. It is worth noting that the Centre B, has a satellite centre. The main centre had recently been refurbished. This may have obscured responses in relation to results.

A total of 25 students participated in the survey, 10 from Centre A and 15 from Centre B. The questionnaire is primarily presented in a Likert scale, except for sections related to demographics and background. The findings in the form of comparative frequency counts are displayed below in relation to each question in the questionnaire.

The questionnaire aimed to test literature assertions regarding environmental stimuli that influence learning, ascertain a consensus on the student's perceptions of the existing learning spaces, and determine how these perceptions may have affected the centre's results. Lastly it is to determine a general idea of ideal learning environments and facilities for level four students.

4.3.2 Findings

Do you live or work within 30min walking distance of your Community Education and Training (CET) Centre?

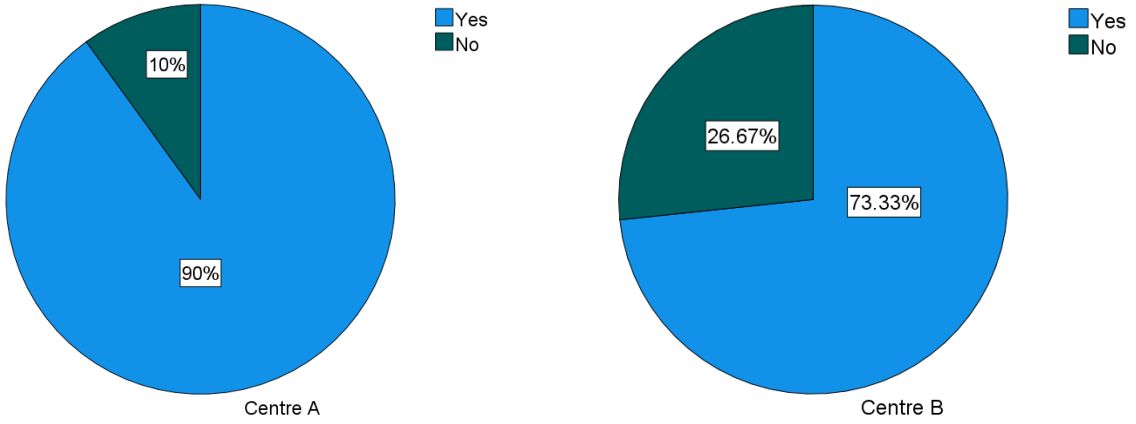


Figure 4.74 - (Author, 2021)

Interpretation:

Students from both centres are predominantly from the local community. Centre B consists of a larger proportion who travel longer distances to reach the centre. Travel fatigue may be experienced by such students, affecting concentration in the classroom.

How do you commute to the centre?

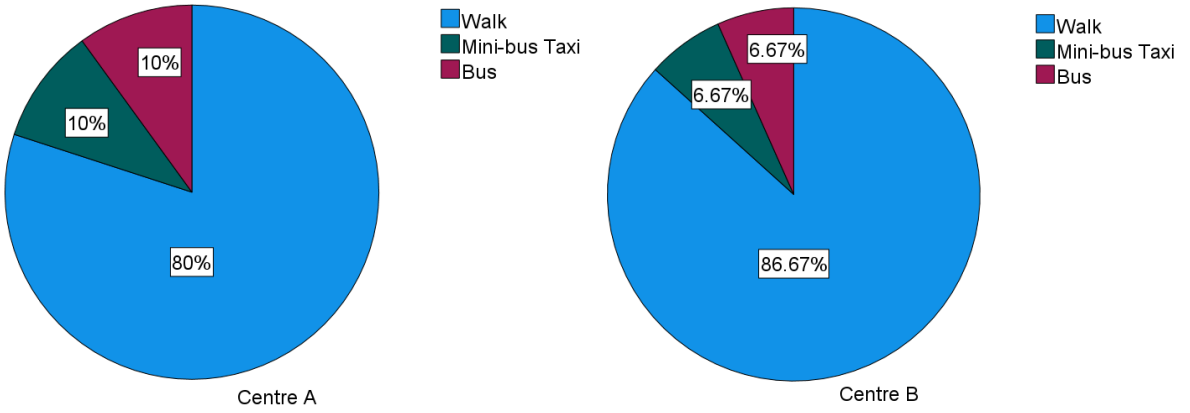


Figure 4.75 - (Author, 2021)

Interpretation:

Most students walk to their centres, with the rest reliant on public transport specifically buses and mini-bus taxis. This suggests that community education centres need to be highly accessible to pedestrians and close to public transport routes and stops.

How many times do you have to link commutes on a one-way trip?

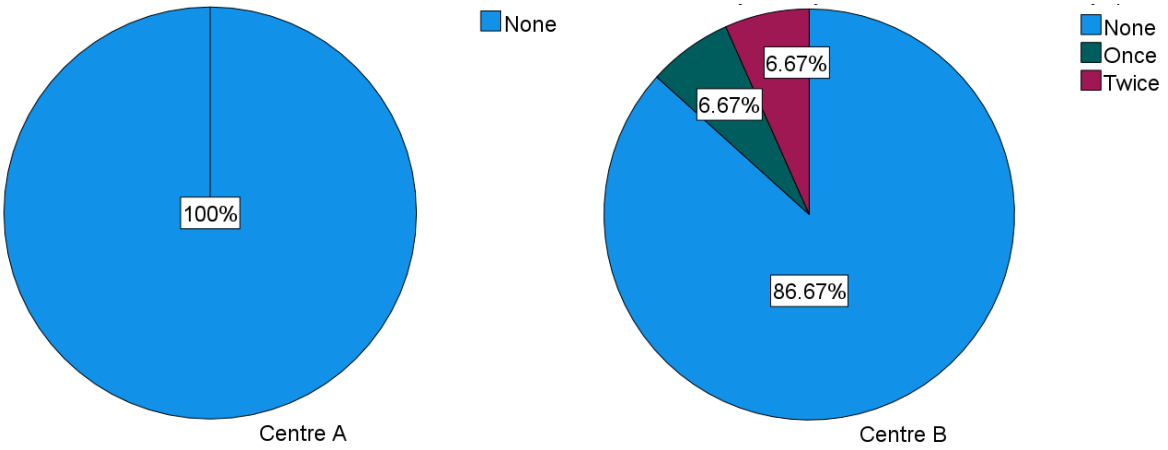


Figure 4.76 - (Author, 2021)

Interpretation:

Linked commutes suggest longer travel journeys, or lack of direct public transport to centres. It is note-worthy that all the public transport cases of Centre B link their commutes. It may be that this occurrence exists from the students residing in remote locations.

What contributed to you not being able to complete your studies earlier?

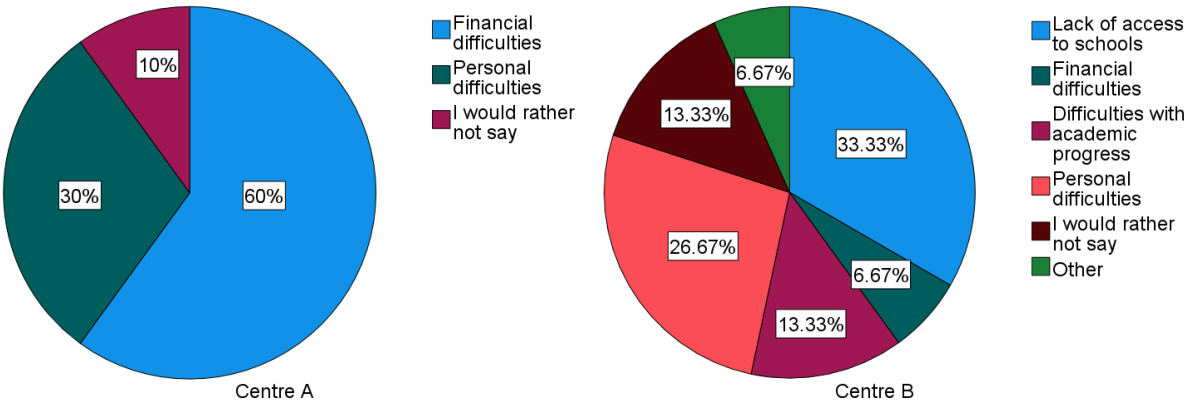


Figure 4.77 - (Author, 2021)

Interpretation:

The variety of responses to this question is consistent with the discoveries of Barer-Stein and Draper (1988), indeed several factors contribute to adults not completing their formal education. In the case of Centre B, the factors are more diverse than Centre A. Students of Centre A were most affected by financial difficulties. In contrast, at Centre B, financial difficulties are one of the least selected factors.

Why did you decide to come back and study?

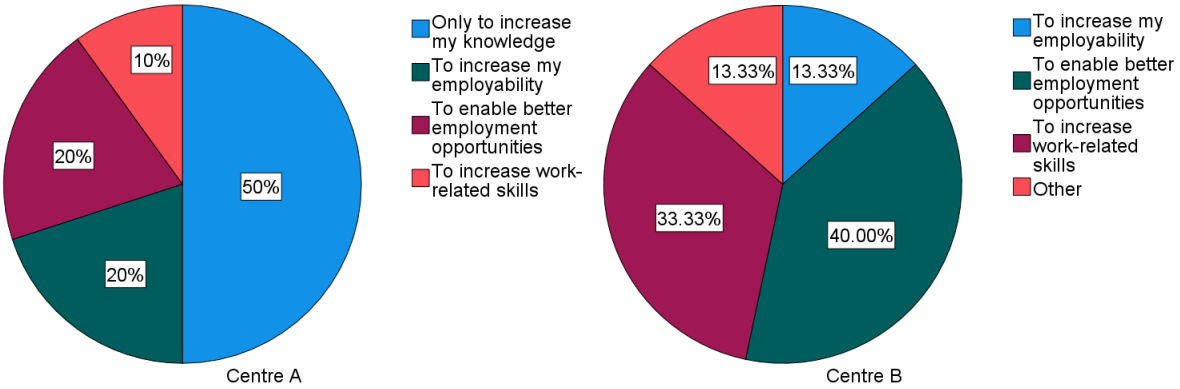


Figure 4.78 - (Author, 2021)

Interpretation:

The responses vary between the two centres. There are no similar patterns. Only half of the students at Centre A are studying towards a financial gain, in contrast to Centre B where most of the responses are linked to financial gain in terms of employability and work skills. The 50% of students of Centre A, may reflect students who are elderly, and have either exited or close to retiring, but wish to complete their formal schooling. The results show that the motivation for learning varies.

The shape of the classroom affects my learning.

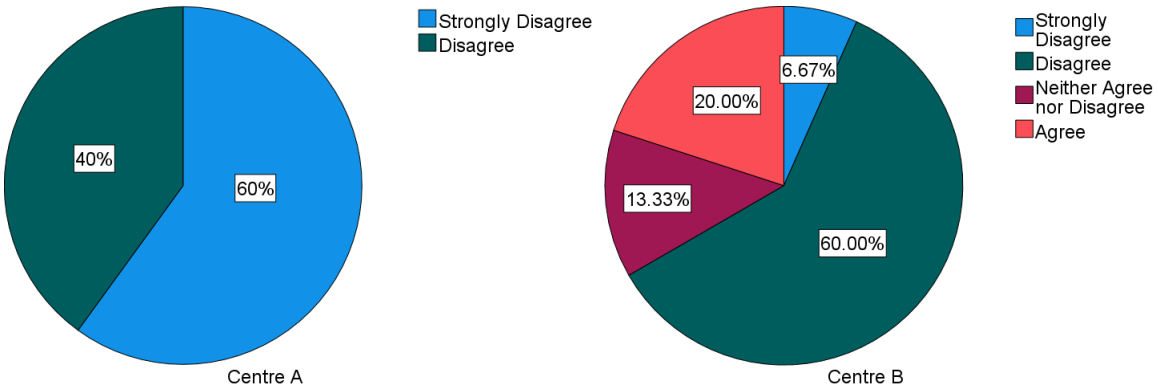


Figure 4.79 - (Author, 2021)

Interpretation:

In Centre A, all respondents disagree with this view. In Centre B, most respondents disagree. The results are consistent with the views of Durlak and Lehman (1974) who note that there are people who believe the design and the layout of a learning environment is irrelevant. Day

(2002), and Boddington and Boys (2011) attribute this to the insidious nature of environments.

The colour of the classroom affects my concentration or energy levels.

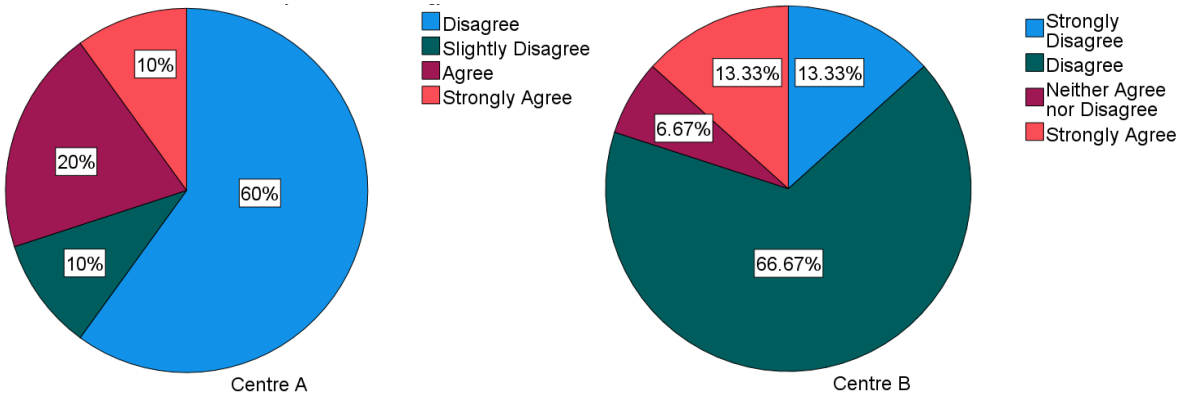


Figure 4.80 - (Author, 2021)

Interpretation:

A large proportion of participants in both Centre A and B disagree with the effects of colour, which is inconsistent with the views of Enns (2005), Day and Midbjer (2007) and Day (2002). However, there has been a significant increase of those effected by this factor of the environment in Centre A when compared to shape, from 0% to 30%. In Centre B, the figure remains at 20% for the same comparison. This suggests colour may have a greater influence than shape.

I am more alert when there is daylight from the sun than I am with just electrical light.

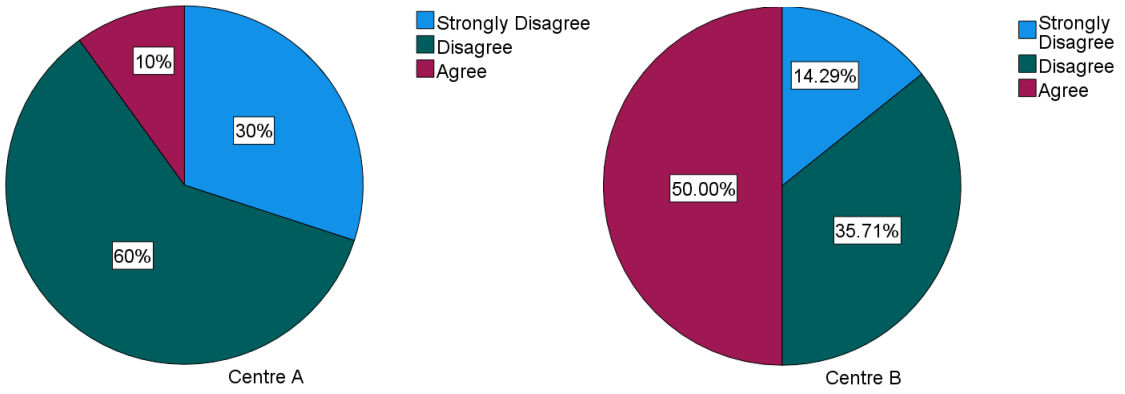


Figure 4.81 - (Author, 2021)

Interpretation:

Sentiments regarding daylighting vary between the two centres, with the perception of daylighting effects being insignificant in Centre A. In Centre B, 50% of students recognise the effects of daylighting. The negative responses may suggest that these students have been exposed to environments which insufficiently lit with daylight, where the quality and distribution of daylight is poor, and often must be supplemented with electrical light.

Electrical lighting makes me stressed, moody, hyperactive, or tired.

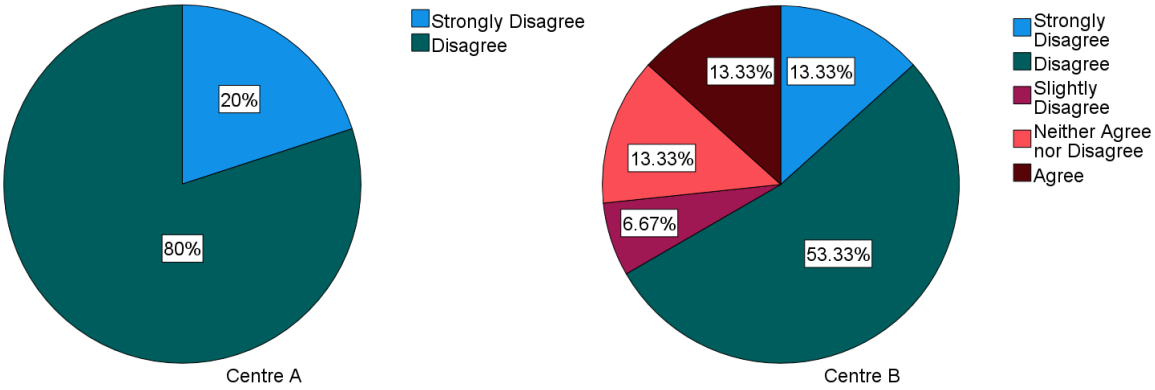


Figure 4.82 - (Author, 2021)

Interpretation:

The responses are inconsistent with the claims of Nair et al. (2009) for environments that lack the full spectrum light synonymous with daylight. They do not offer insight into any divergence of this claim.

I am more alert when the classroom windows are open, to allow air to pass through the space.

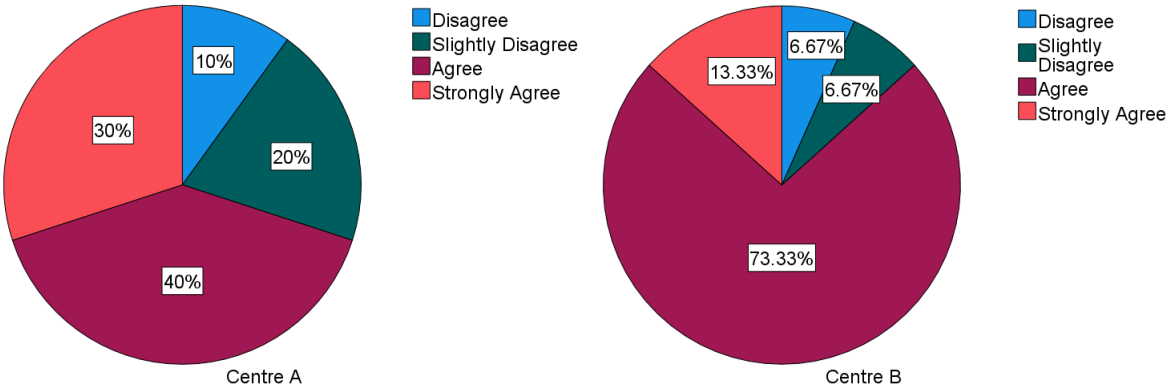


Figure 4.83 - (Author, 2021)

Interpretation:

Most of the findings support the writings of König (1989), O'Donnell Wicklund et al. (2010), Day and Midbjer (2007), Taylor and Enggass (2009). Fresh air encourages concentration, alertness, and healthier environments. However, when windows are open, noise from activities outside the classroom may be audible, and distractive. Such noises were more prevalent on visits to Centre A, which may account for the higher number of disagreements. This may influence the responses which are inconsistent with literature.

My ability to learn or study is better in quiet places.

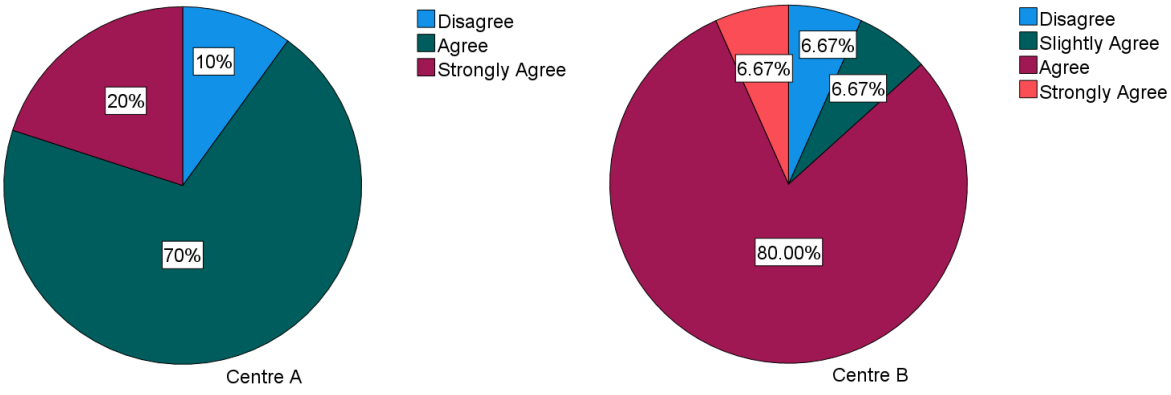


Figure 4.84 - (Author, 2021)

Interpretation:

Almost all the respondents prefer quiet learning environments. The findings are consistent with the views of Day and Midbjer (2007), Day (2002), Taylor and Enggass (2009) across both centres.

When associated with learning, noise reduces concentration and reading ability, negatively affecting academic progress.

I learn better when interacting with other students during group work.

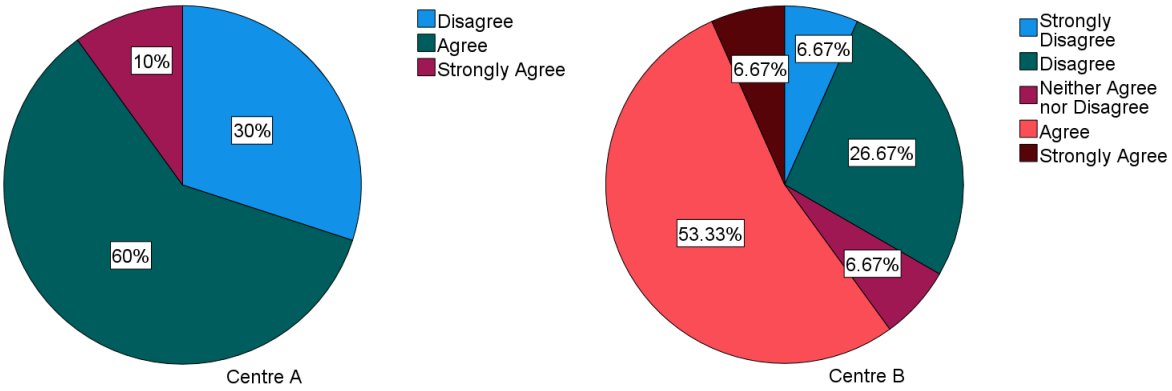


Figure 4.85 - (Author, 2021)

Interpretation:

The majority of respondents feel that interactive learning environments are beneficial for their learning processes, with both centres having 60% of their level four students relaying that sentiment. Collaborative environments are less intimidating, allowing for improved participation, that may increase learning.

The learning spaces cater for disabled students.

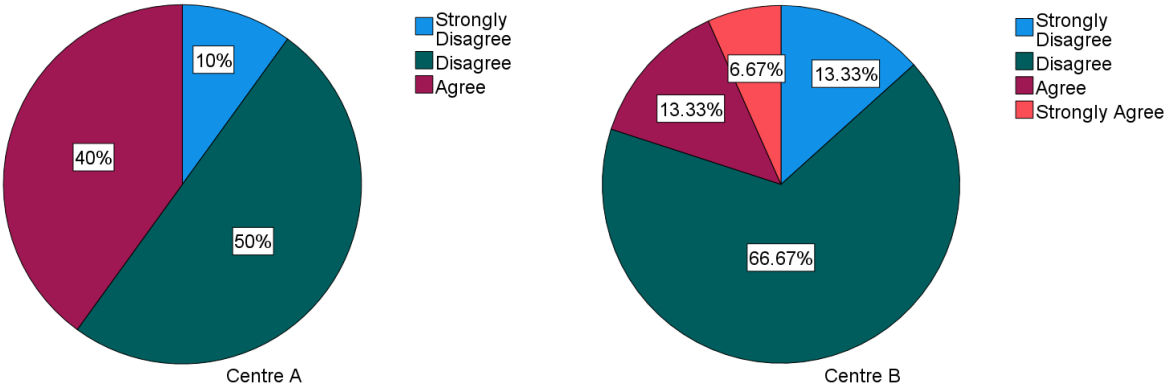


Figure 4.86 - (Author, 2021)

Interpretation:

Most of the students in both centres believe that disabled students are not catered for. This view is supported by the lack of paraplegic ramps and furniture suitable for wheelchairs. There may be no available disabled toilets as well. Arguably divergent responses may be attributed to the interpretation of the word 'cater' as an acceptance of the centre of students of all physical abilities, as opposed to the rendering of an appropriate setting for such students.

The classroom is age appropriate.

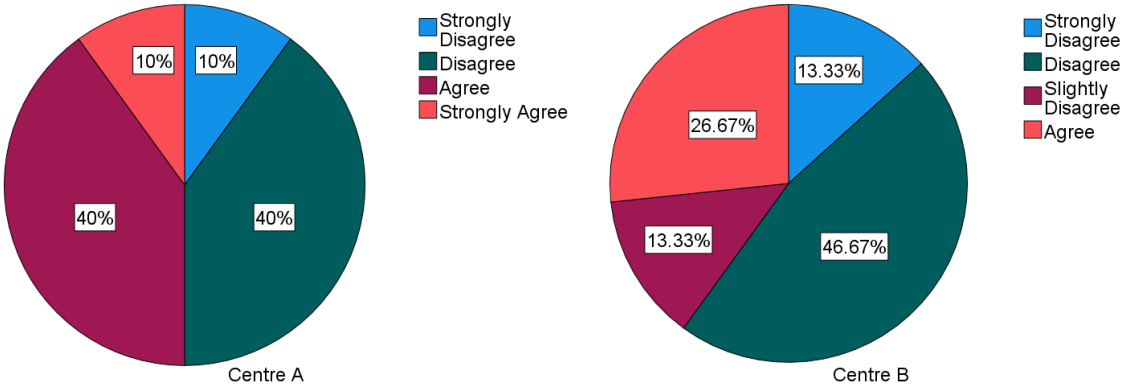


Figure 4.87 - (Author, 2021)

Interpretation:

Respondents of Centre A are divided in their view. This suggests that individuals have different standards for what they regard as appropriate for their age. There may also be the factor of there being varying age groups within the centres – anything from 18 to 65 years of age. Centre B primarily reflects a consensus that their environment is not age appropriate for adults.

My CET centre looks attractive and inviting.

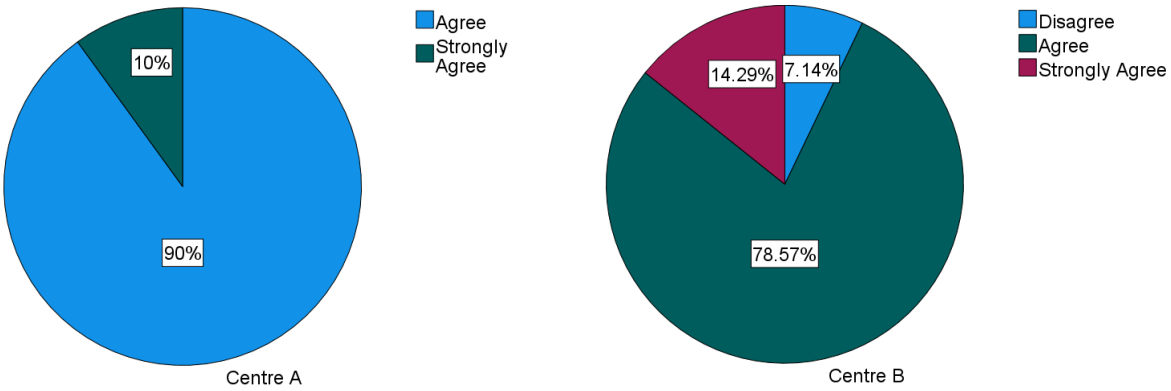


Figure 4.88 - (Author, 2021)

Interpretation:

Aesthetics is subjective. Centre A is hosted by a public school which is still in a decent condition. Centre B has recently been refurbished and consists of new classrooms. The satellite centre of Centre B, however, is still in an undesirable condition. This may explain the results.

The CET centre is clean and well maintained.

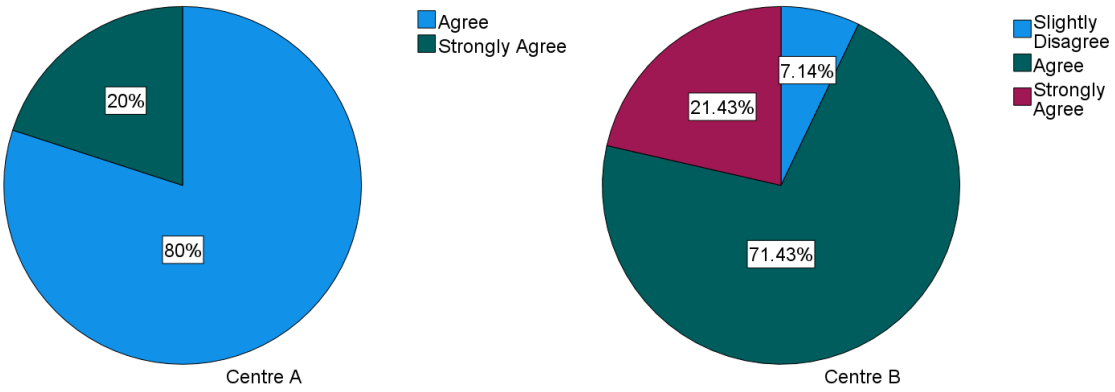


Figure 4.89 - (Author, 2021)

Interpretation:

The findings of Centre A are inconsistent with interviews, and observations. The cleanliness is acceptable, however, there are areas which were requiring maintenance. Centre B's divergent responses may be attributed to its satellite centre, as the main centre is relatively new or refurbished.

I feel my work, identity or culture is represented in elements of the building.

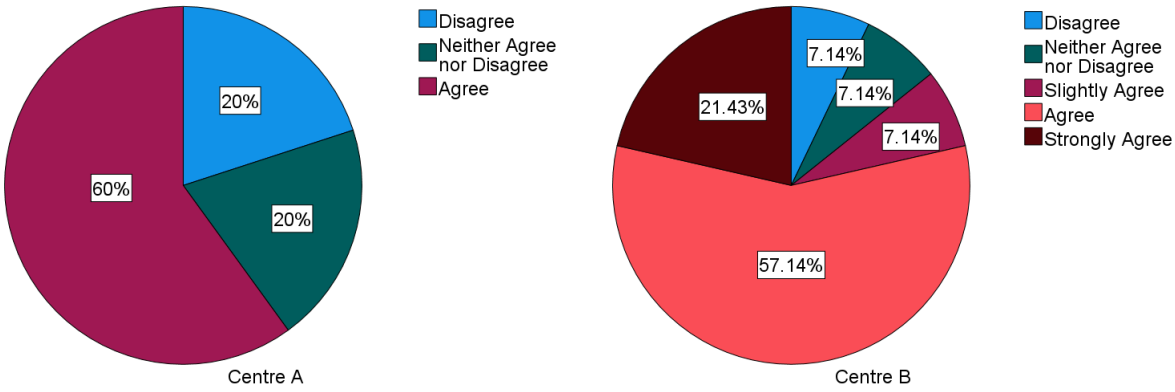


Figure 4.90 - (Author, 2021)

Interpretation:

Centre A's findings is inconsistent to observations. There are no cultural references in the building. The work of the students or their identity is not displayed in the school, as they are temporary occupants of the spaces. Centre B, however, expresses brightly coloured African geometric patterns on some prominent walls. Though the occupants too are temporary, these permanent links are inclusive for both the children of the school, and the adults of the hosted Community Education Centre.

The CET centre's computers and printers are well located.

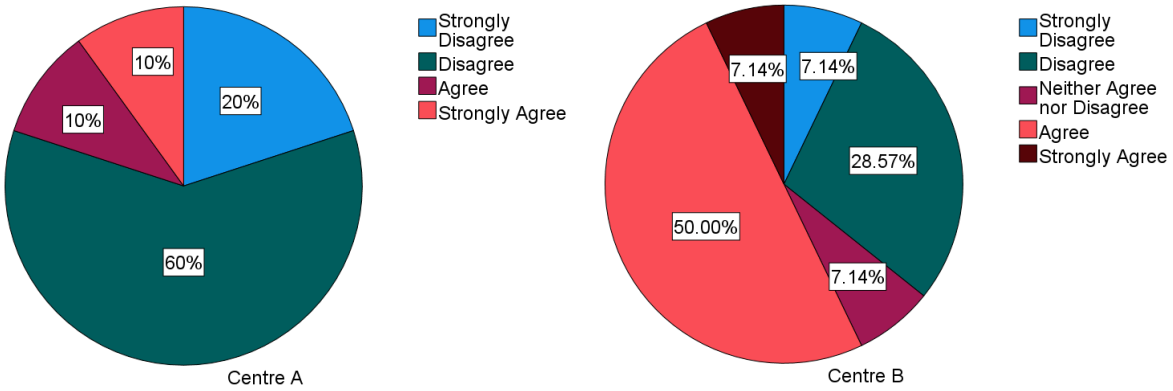


Figure 4.91 - (Author, 2021)

Interpretation:

Interviews revealed that none of the centres have access to computer or printing facilities. Therefore, the divergent responses are inconsistent with the reality of the unavailability of these resources.

There are enough toilet facilities available for both students and lecturers.

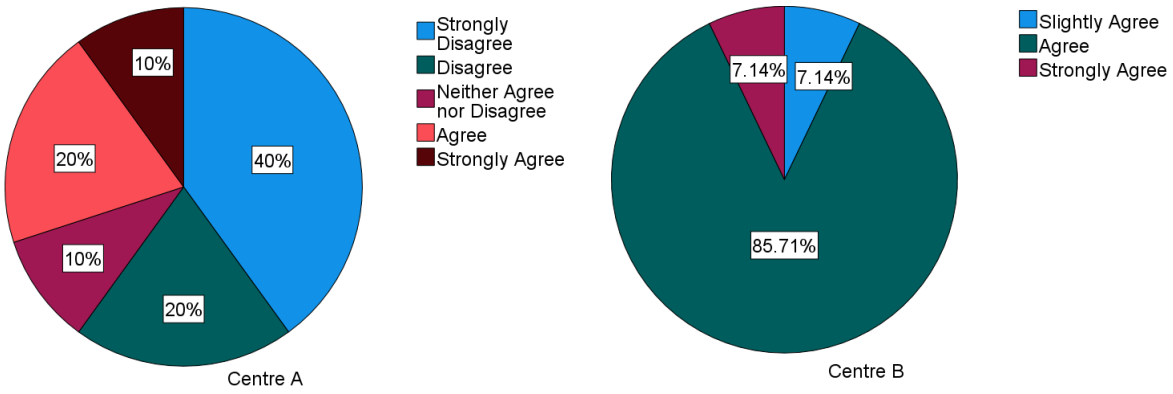


Figure 4.92 - (Author, 2021)

Interpretation:

Interviews reveal that students and staff of Centre A experience difficulties with accessing the centre's toilet facilities, due to them being locked by the host school after normal schooling hours. Centre B is void of such problems.

There are out-of-sight places in the centre which I find unsafe.

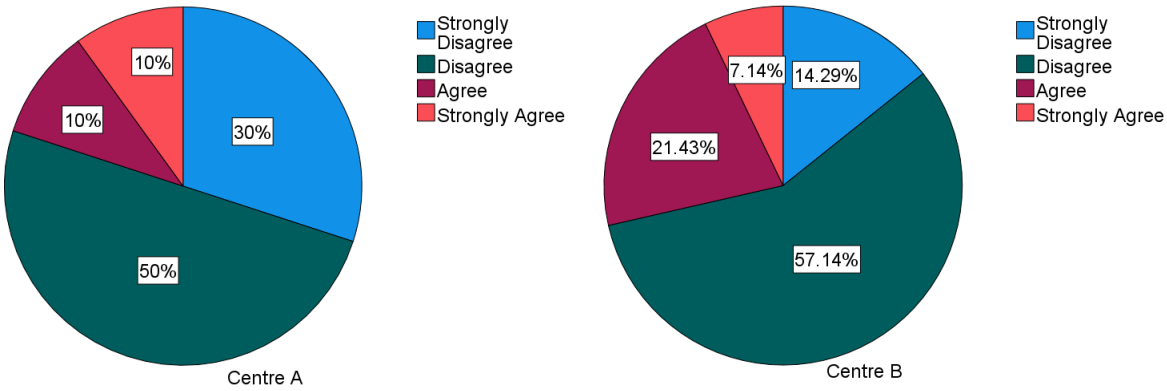


Figure 4.93 - (Author, 2021)

Interpretation:

According to the findings, the Centre A and the main centre of Centre B are relatively safe. The increased number of safety concerns in Centre B, may be attributed to the satellite centre being situated in a hostile environment within the township. However, all students need to feel safe in their learning environment. Safety is linked to comfort, which is important for learning.

I feel comfortable and 'at home' when I am at college.

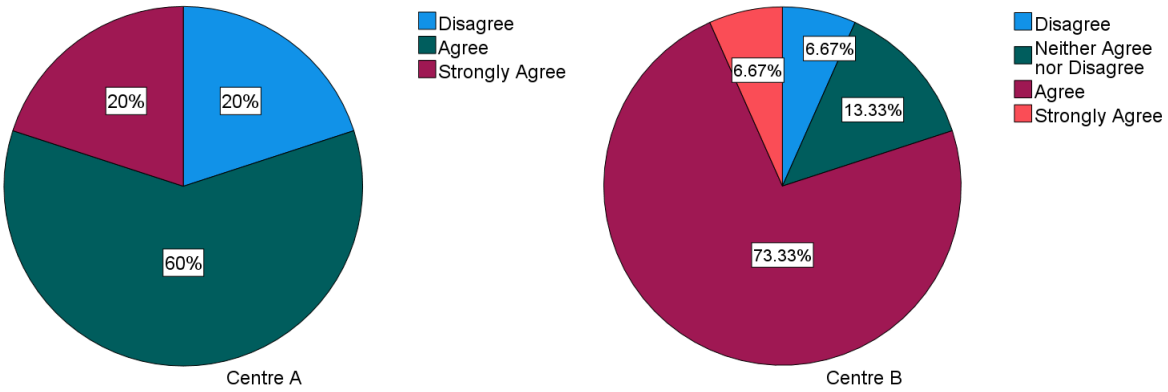


Figure 4.94 - (Author, 2021)

Interpretation:

Feeling at home is linked to comfort and place-making, which is essential for participation in learning. Most respondents feel at home. This may suggest that the small class sizes within their subject groups, allows a greater social connection, synonymous of a close-knit community.

The furniture in the classrooms is comfortable.

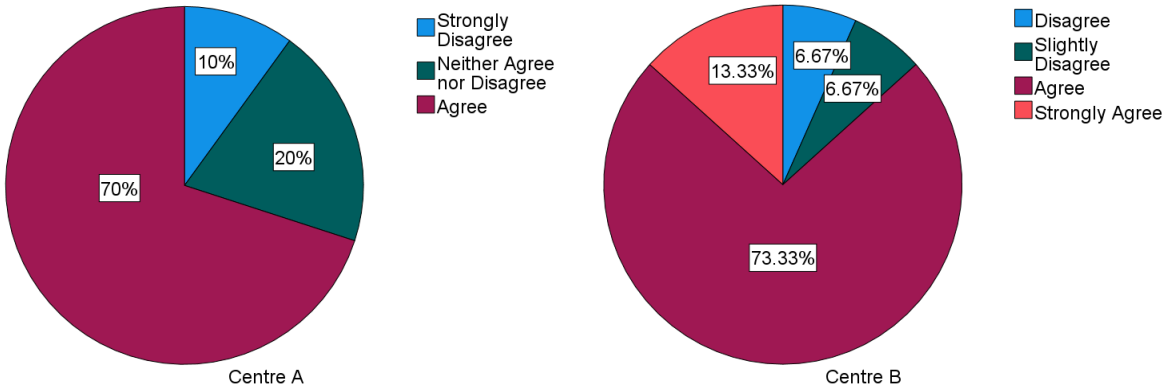


Figure 4.95 - (Author, 2021)

Interpretation:

The data suggests the furniture is comfortable for most students. However, the hard, old-fashioned, and unmaintained timber furniture is inconsistent with the views of Nair et al. (2009), O'Donnell Wicklund et al. (2010), Taylor and Enggass (2009), who believe school furniture should be soft and ergonomic, as specified in offices for comfort and productivity. Comfort is, however, is subjective and relative. Hence there are diverging views in both centres.

The furniture in the classrooms is adjustable to suit my height.

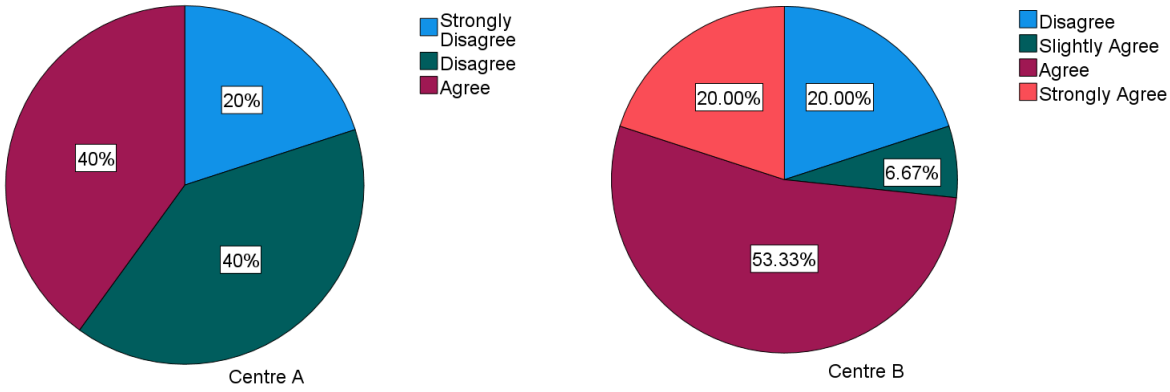


Figure 4.96 - (Author, 2021)

Interpretation:

Some of the responses are inconsistent with observations at both centres, as none of the classroom furniture is adjustable. Arguably, some of the fixed heights of the furniture may be appropriate for some of the adult students, and they have thus based their selection on that.

In that case, Centre B would satisfy the height requirements of most of its students, and at Centre A, that would occur at a lesser extent.

What seating arrangement do you find easiest to learn in?

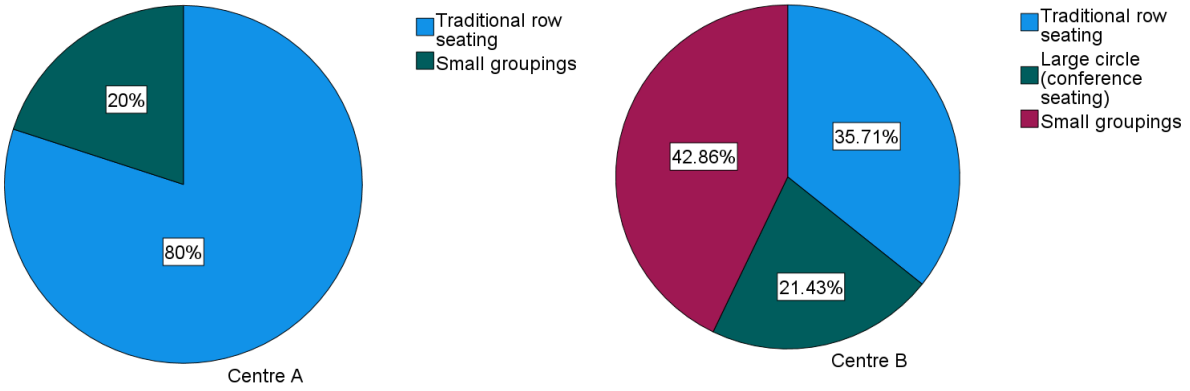


Figure 4.97 - (Author, 2021)

Interpretation:

The mixed responses are consistent with the views of Jos Boys (2009) who advocates for mix of individual and group activity learning environments, a combination of formal and informal. Such a combination will respond to the different learning preferences of students. In the case of Centre B, there is greater diversity of preferred learning and seating configurations.

Apart from the classroom, I learn best in the following spaces: (you may select as many as are applicable)

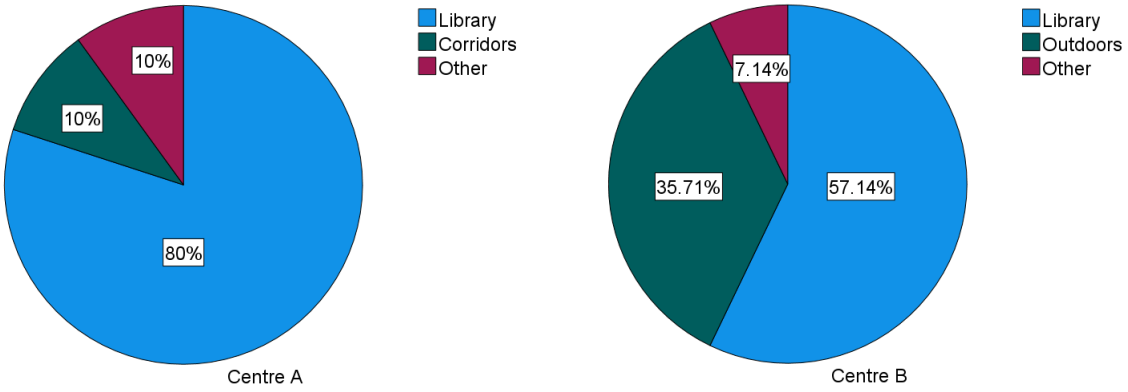


Figure 4.98 - (Author, 2021)

Interpretation:

Both Centre A and Centre B respondents prefer libraries and the outdoors as alternative learning environments at varying degrees. From observations, Centre B has a greater number and variety of places to sit outdoors, where students congregate before, during and after classes. This exposure may suggest a link to the findings. Students who selected 'other' did not specify their alternative learning environment.

What facilities do you wish to be available at the community education centre, or in the areas nearby? Select all that are applicable to you.

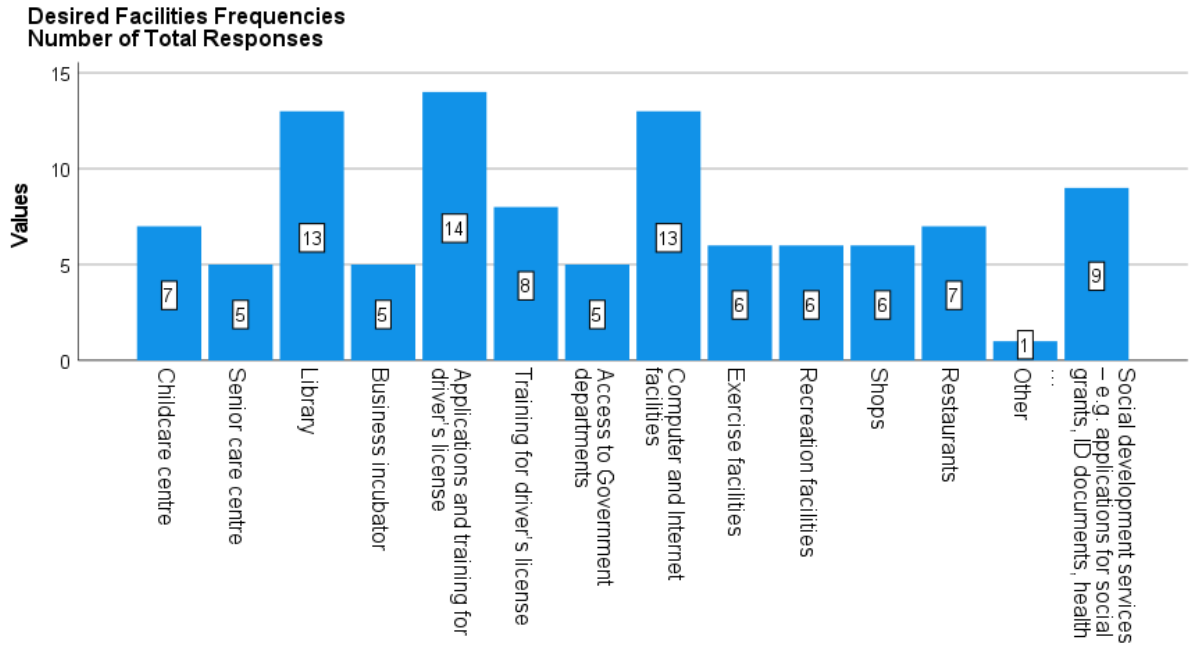


Figure 4.99 - (Author, 2021)

Interpretation:

The most desired facilities by level four students of the two Centres A and B are those of the applications and training for driver's licences, computer and internet resources, and a library, scoring 14, 13 and 13 responses, respectively. None of these services are currently offered at any of the CET institutions, or in close proximity to the two centres. The data suggests that linkages to these resources, or the incorporation within the CET centres would render facilities and services that are more appropriate to their student's needs.

4.3.3 Conclusion

The responses of the questionnaire were tabulated, and analysed utilizing frequency counts. The findings were mostly inconsistent with the literature with the exception of natural ventilation and quiet spaces.

When comparing student's perceptions of the existing learning spaces, Centre A scored the highest in terms of its frequency count. Though it was indeed the highest performing centre in the year range of 2017-2019 statistics, some responses were inconsistent with the researcher's observations and interviews. This may suggest that if there is a link between the academic performance of a centre and its built environment, the success of that centre will be determined by the student's perception of that environment. Lastly, preferred classroom seating configurations, preferred alternative learning spaces, and desired learning facilities have been identified in their order of preference.

Implementation of this data collection tool on a larger sample across more centres would determine its efficacy. Considering some responses when facilitating the questionnaire at Centre A, it is recommended that the questionnaire or any other research instrument be available in both English and IsiZulu.

Further research into divergent findings that are not explained or supported by the literature is recommended. This may increase the knowledge body of learning environments and may be utilized to further substantiate the design of various diverse learning environments.

In the next section the qualitative data of the interviews was reviewed, and the findings relayed and analysed.

4.4 INTERVIEW DATA

4.4.1 Introduction

This section of chapter four sets out the findings of the interviews conducted with the respondents identified in section 1.5.2 of chapter one. The interviews allowed the researcher to gain insight into the respondents' feelings, perspectives, and beliefs regarding the learning environments, to understand the spatial requirements of CET centres better; how their current learning environment affected them and the changes they perceived to have a positive impact in the way they teach/learn. They also allowed for triangulation in the study, where the literature and responses from the questionnaires were further compared.

The data is presented with reference to the three sub-questions of the study and linked to the key question.

All Centre staff and students bear a pseudo names to protect their anonymity. These names are marked with an asterisk (*).

4.4.2 Context

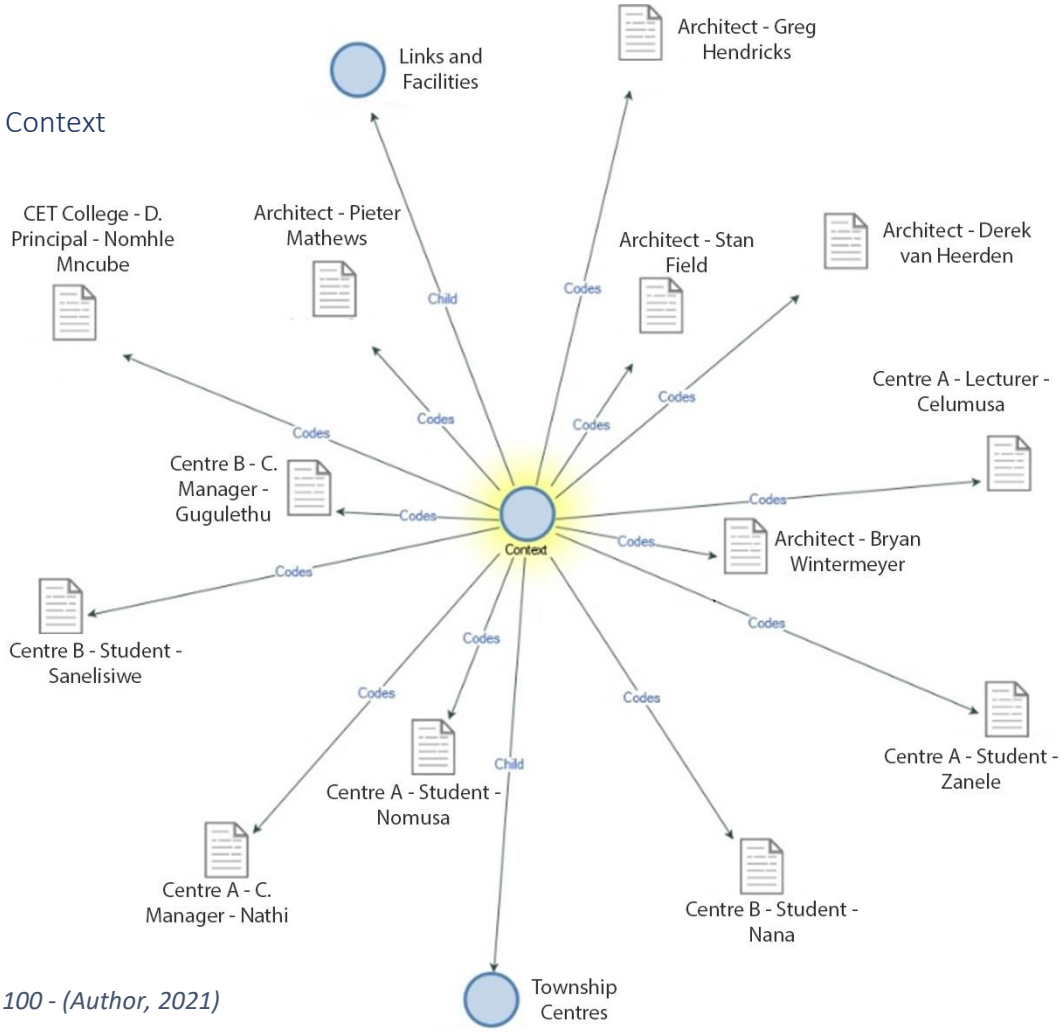


Figure 4.100 - (Author, 2021)

All the participants agree on the on the importance of acknowledging the context when locating an education building and being responsive to it. Stan Field, the architect of Ubuntu Centre, and director of Field Architecture states:

> That is the most one of the most important aspects, just the very siting, and the location, and, and the environment that it's in.

He continues to say,

> Very important, you see, a building has to - especially a building of having more of a public nature, you know, like a community centre or a institution of learning. It has to have context. So, you know, you have to understand the site first, you know, the ground.

Bryan Wintermeyer, architect and director of The Workspace Agency made similar comments.

> I think it is very important. I think there is evidence to show that buildings, certainly educational buildings that are poorly integrated into, into settlements or buildings that are out of sight around the corner, are often vandalized and often not well looked after. And that's just the that's, that's the nature of thinking of things. That's not just South Africa or educational buildings. That idea of an education building being well located, I think is important. But it's becoming in a lot of cases it's like a civic building. Perhaps school is a civic building, in many places, it's the biggest building. So the idea of it being well located is an important issue. And something that needs to be considered.

Derek van Heerden, director of East Coast Architects proclaims that the physical context is not the only important aspect to acknowledge in the context, the very people of the community need to be considered.

> So, yes, I mean, context, I think is important, but I think it is, it's a broader sense of context, you know, you would like your your learning institution to refer to have some reflection of the kind of people that you are attracting.

Centre A centre manager, Nathi* concurs. He feels the centre should respond to the realities of the community, where most residents walk or take public transport. Such a facility is most

beneficial if it is located as close to communities as possible, as elderly people battle to walk long distances.

> What importance? Important in with regard to planning and location? It is very important. Uma ukhuluma ngama-centres, ama-centres they are-. They are there to benefit our communities. So certainly, they should be very close to the communities. More especially reasons being abantu abadala, they cannot walk long distances. […] So it's very important ukuthi zibe close we proximity to the areas where they reside.

Zanele*, a student from Centre A relates to this issue of proximity, as she walks more than 30 minutes to get to the centre, as there is no direct transport from her place of employment.

> Ya. kumele kube khona i-transport, kodwa manje ayikho. Manje yingakho ngi-travel-a uma ngiza lana.
>
> *'Yes. There should be access to transport, but there is none. Now that is why I have to walk when I come here.'*

As classes are in the evening, with average times between 4pm to 6pm, the issue of distance, is met with those of safety, especially during winter. Proximity becomes even more paramount.

4.4.2.1 Township

According to Van Heerden, the characteristics of a township are unique, apart from being mono-cultural, especially in African townships, they possess distinct contextual experiences and issues which differs from township to township.

> You talk about township communities as if township is, I mean, understand this idea of lokishini and all that kind of stuff, but my experience is that every township is completely unique. I mean, you know, if I were to go to Bhambhayi, or not even Bhambhayi, but if I were to go to New Town, it's a totally different experience to say, KwaMashu, you know, again, totally different experience to Umlazi - unique, you know, has its own special vibe, you know, and I think we, we must be careful of just of stereotyping, you know. I mean, I think that they are unique in the sense that they are probably mono-cultural. You know, mono-racial, you know, the

> African townships. […] Well, I think there you have, but there you have all your answers that obviously a school and that sort of context must now connect with all those [resource-hungry, lower socio-economic] issues. Whereas a school in the in the context of, say, Sydney road, or, you know, lower Umbilo, or, you know, even in the centre of town, they have different issues, there would be different stuff completely.

Responses from lecturers and students align to those of Van Heerden. Confirming the socio-economic status of residents in the township. Gabisile*, a lecturer at Centre B affirms:

> Because i-community esiyi-service-ayo, they migrate from rural areas beze la eThekwini. And i-most yabo abaqedanga esikoleni. They're drop-, ama-drop-out, due to ke izinto ezizehlukene. So and they come from a poor background yabo.
>
> *'Because the community we service migrates from rural areas to eThekwini. And most of them did not complete their schooling. They are drop-outs, due to different circumstances. So, and they come from a poor background, you see.'*

Sanelisiwe*, a student from Centre B confirms this when she says:

> Mina ngihlala emkhukhwini. Izingane zihlala le ekhaya eS****, ekhaya kithi. Mina ngihlala emqashweni.
>
> *'I stay in a shack. My children live back home in eS****, our family home. I stay in a rental accommodation.'*

Lecturers advise that the curriculum at the centres is determined by the local context. For instance, agricultural studies are offered in rural areas, where agricultural land is vastly available. This, however, does not consider opportunities for contemporary ideas of small-scale urban farming, which may of interest to township residents.

Another lecturer believes that learning resources in urban areas are more readily available. Libraries are more frequent, and host schools are most likely to have computers where learner may be engaged in computer literacy.

Bryan states that according to the building program, there is no difference, as South African public schools, which the classes are hosted at, are standardised. Ms Nomhle Mncube the Deputy Principal of the KZN CET College agrees with Wintermeyer.

Arguably, both views may be right. The existing building programs may be the same, however, this may not be appropriate for unique contexts. This alludes that a centre must be designed to respond to the specific challenges and requirements of a township when located in a township environment.

4.4.2.2 Links

The responses reveal community links based on the proximity of other activities. Centre B hosts free learner license classes to the members of the community to attract them to the CET learning facilities. Centre A shares the host school with an aerobics class who occupies a courtyard. One of the classrooms becomes a karate dojo after hours. Some students attend a church on the neighbouring property as well. Though these activities are driven by community interests, the case study of Ubuntu Centre, together with interview responses suggests an increase in complimentary activities relevant to the developmental goals of the CET centres, and the needs of the community may increase linkages in the community, whilst creating a direct links to the centre.

Facilities that were frequently mentioned more than once in the interviews were libraries, skills training centres, sports facilities, health services, and access to informal traders/tuck. shops.

4.4.3 Learning Stimulus

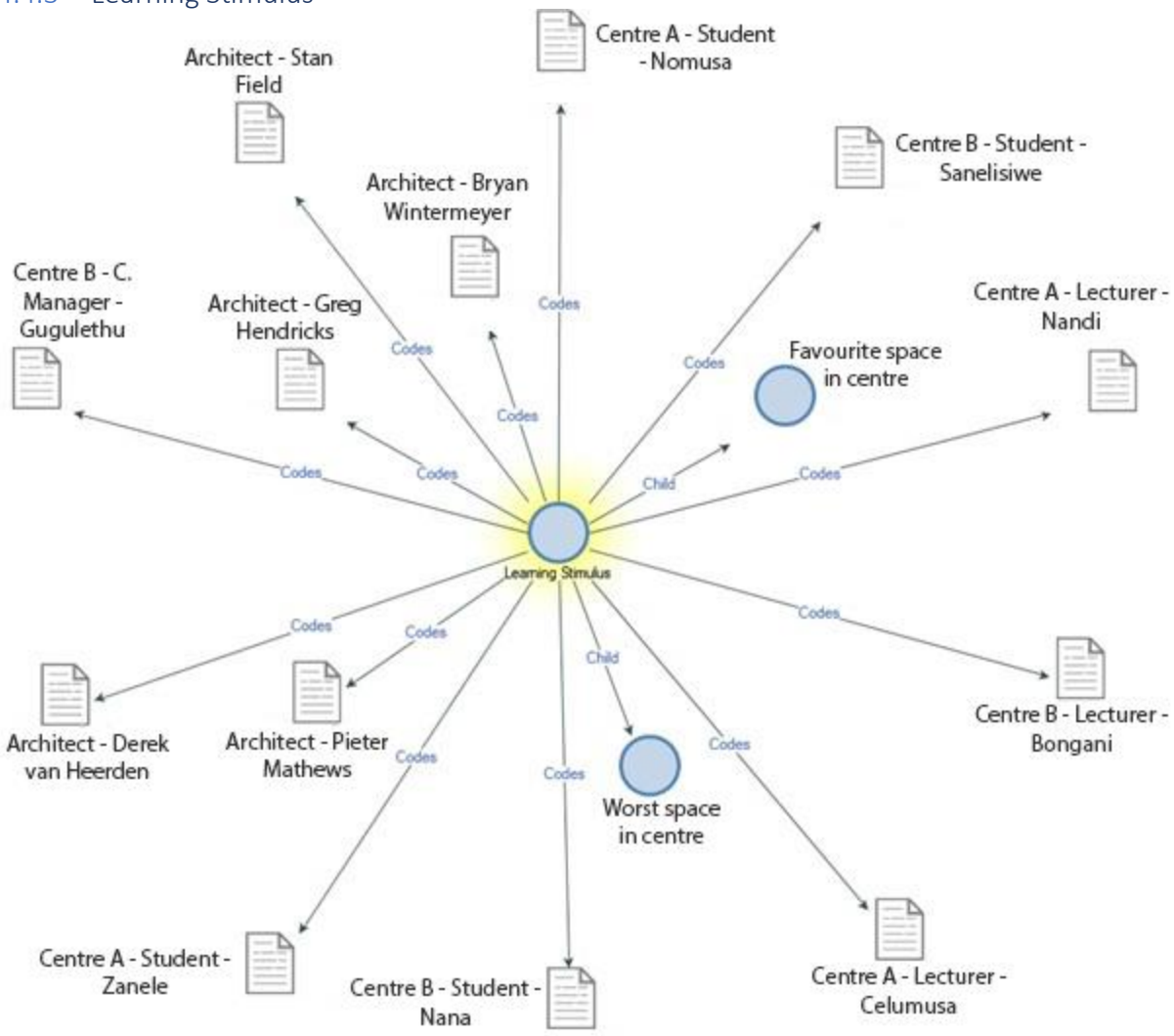


Figure 4.101 - (Author, 2021)

All students feel that there is nothing in their current physical learning environments that inspires them to learn. Pieter Mathews, director of Mathews and Associates Architects agrees:

> Well, it's very difficult, adult learning spaces they use schools etc. - they use existing buildings, and they are all, they're not inspiring, so they're all-. It's called sameness.

The only inspiration they receive is during prize-giving events where accomplished alumni are invited as guest speakers to share their educational journey. Otherwise, the success of

learning abilities is placed on the educators, as per the postulations of Durlak and Lehman (1974). Sanelisiwe* suggests aspirational graphics with messages of motivation and encouragement may assist in this regard.

> Mhlawumbe ukube bekukhona like lezithombe ezibakhona emadongweni, like ukuthi, "education is the key to success." Yabo lezinto ezikanjalo. manje ku-plain nje. Akukho lokhu okuthi ngisesikoleni, kufanele ngizimisele - ibhodi nje ne-chalk.
>
> *'Maybe if there was like pictures that are on the wall, like saying, "education is the key to success." You see, things like that. Now it is just plain. There is nothing that indicates that I am at a school, that I must be ambitious – it's just a blackboard and chalk.'*

Her comments relate to those of Stan Field, who advocates for learning environments more blatant in nature, that express their purpose through built form.

> The first thing you have to understand is that that space, or the architecture has to have a sense of purpose. And that purpose needs to be felt in the structure that needs to be a learning place of architecture. […] So you need to identify the purpose of the space, its intention and that the student can then relate to that and immediately tune into into that purpose. Because they need to have a sense of a goal what what it is that they're learning, not even what they're learning about, it's what they're learning for. And there they can start honing in what. After they understand that, "Hey, man, I'm getting such a valuable knowledge, you know, that I can use for this and for that," it becomes real. That's the point.

Most students claim an increase in concentration, or learning is accelerated in quiet spaces of isolation, with some referencing libraries. Nandi*, a lecturer at Centre A confirms this when she says, "*Umuntu omdala esikhathini esiningi uyaphazamiseka uma ukuthi kunomsinjwana*." Which translates to, "*most of the time, elderly people are distracted whenever there is noise."* Of which her colleague Celumusa* concurs. In contrast, Sanelisiwe* had divergent preferences. She prefers to hear the sounds of a radio in the background whilst engaged in her studies.

Architects views of stimulating environments, are all mostly aligned with the literature, ranging from considerations of daylighting, connections to the outdoors to air quality, ventilation and thermal comfort. Van Heerden claims that,

> All of these things get in the way of learning. So, you know, if you can design the perfect learning space with all of the right sort of conditions as it were, you then start to crack the learning and teaching code through architecture.

He also advocates for a variety of learning environments.

> You're an architect, you're not, you're not, you know, you're not an educationalist, so we're not expecting you to sort of reinvent the whole idea of education, but an idea of, of, of places of teaching and learning or architecture that supports teaching and learning, it really should allow for the broadest range of possible learning experiences.

Field makes contributions to where the literature speaks to creating opportunities for discovery in learning environments. He believes, there has to be curiosity, environments of intrigue to led to discovery, and facilitate learning.

> But it's, it's my ideal space would be something that that is different. I think it needs to do sort of *pause* there, there should be curiosity, because curiosity leads to learning, you know, because it's about asking questions, rather than getting answers, it is the questions that you have to focus on because the, within the question is an intrigue, you know, “woah, what?” Something's fascinating somebody, and you want to find out what it is, you know.

4.4.4 Spatial Needs of Adults

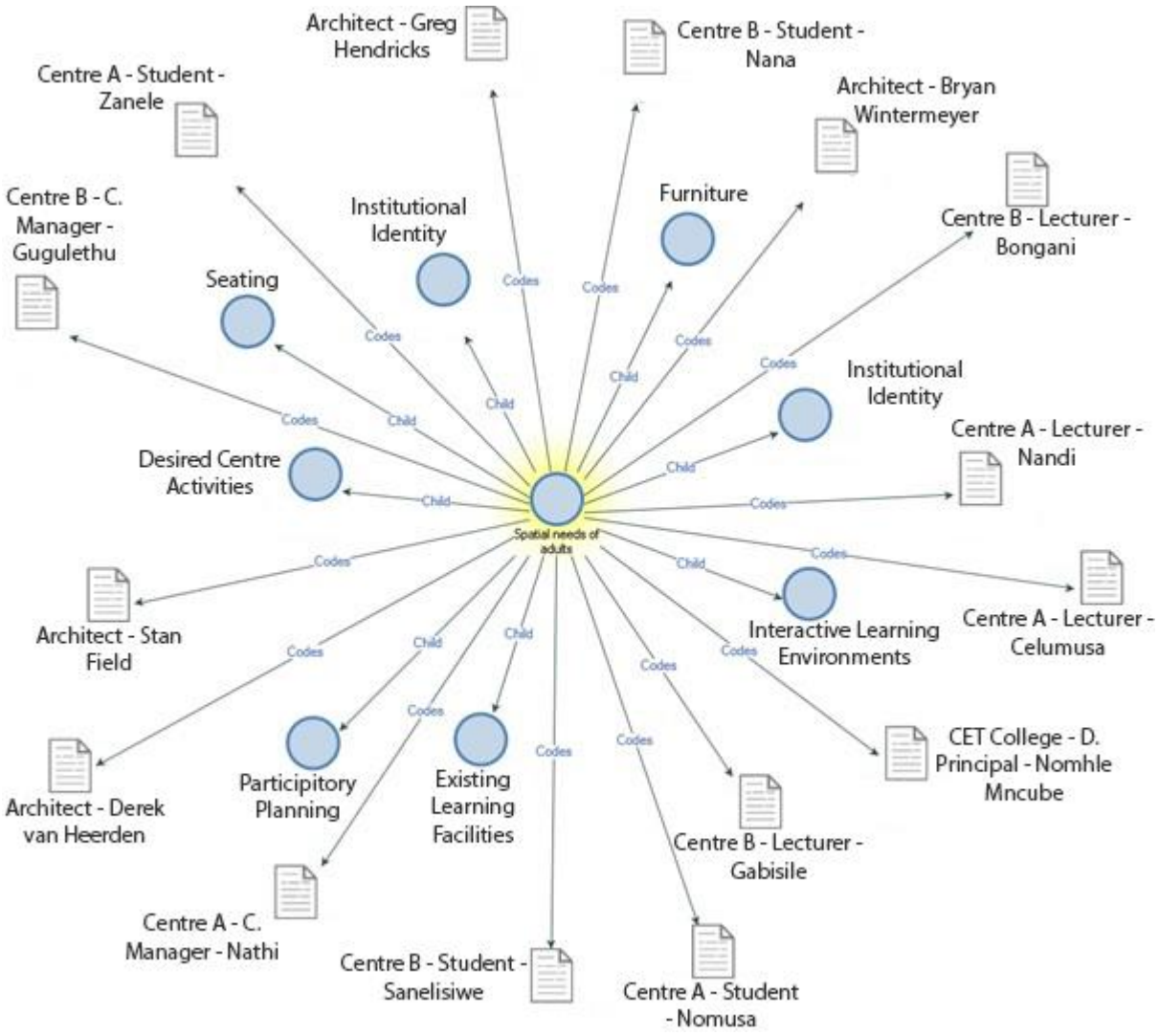


Figure 4.102 - (Author, 2021)

Recurring in responses is the notion of institutional independence and identity. Adults require dedicated learning environments for the benefit of their learning processes. Mncube state:

> To improve our education, we really have to go on our own. We don't have to be hosted by the Department of Education, Department of Education. We need to have our own special sites, our own special infrastructure which will be specific for the adult learners. They're much more different than the day students - very different.

Celumusa* notes specific considerations for adult learning environments:

> Kube nogesi yabo. Kube nezitebhisi ezingabi zinde kakhulu. Ama-toilet abe eseduze.
>
> *'There must be lighting. Steps must not be too high. Toilets must be close-by.'*

He continues to note:

> In terms of the learners with special needs, it's like, I think the government should put more money or more specific time for those who are slow learners in writing, or they can, or they can't see properly and the blackboard you see. Even the time should be more or should be now given to teachers or employ more teachers in order to have that process to to fast or to fast track that process.

This suggests well-lit environments, especially for the elderly with visual challenges. Universal access principles must be incorporated into the design and allow students to easily navigate within the building. Toilets blocks are inappropriate. Toilets can be shared by a pair or clusters of classrooms, allowing for greater accessibility and monitoring. Classrooms are to be articulated to enable students to engage in varied tasks in the same environment without disturbing each other, which allows slower students to engage in the learning process without being distracted by their quicker counterparts.

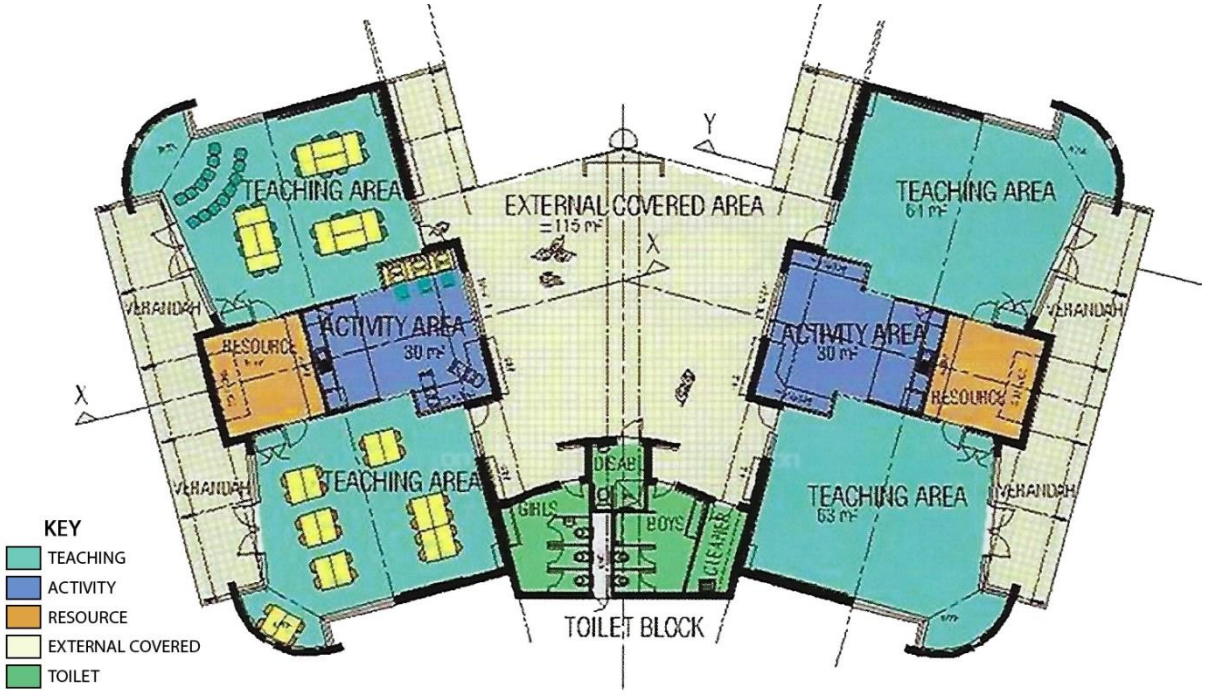


Figure 4.103 - Articulated classroom cluster (Nair et al., 2009; pg 35)

Adult learners need comfortable furniture appropriate for their size. Students seem unperturbed by the scale and quality of the child-sized furniture of their host schools. Nandi* provides insight to this phenomenon:

> I-furniture-ke ikhona kodwa futhi ekubeni khona kwayo ayigculisi. Umuntu omdala phela nawe uyamazi. Akathandi ukuhlala esihlalweni esiqinile. Ufuna uthole izihlalo ezi-comfortable. Netafula ngeke umfake kuleli elikanje ufuna lawa akanje. Kanti i-most yamakilasi amanye uthola ukuthi kunalama desk enihlala nga-2 kuwona. So kubuye kuthande ukuba nzima-ke. Kodwa ngenxa yokuthi basuke bephokophele phambili abayinaka-naki izinto ezikanjalo kodwa ukubone as uthisha ukuthi, kukhona izingqinaba la ezibakhonyana - kukuthi abaphimiseli.
>
> '*There is furniture [in the classroom], however, it is unsatisfactory. You also know how an elderly person is [like]. They do not like sitting on hard seating. They want you to avail comfortable seating. With regards to tables as well, you can not seat them at these [desks], they want these [tables]. However, in most of the other classroom you find there are desks where seating occurs in pairs. So, it can be quite challenging. However, due to their determination to persevere, they don't dwell on those things, but as an educator I often see that there are difficulties that exist – it is just that they don't voice them.*

Bongani* and Nathi* agree with Nandi* that the furniture must suit the students, not only those who are abled but also who are disabled.

All participants advocated for vocational skills to be made available at the centres. However, since the CET College lacks adequate infrastructure and resources, such aspirations have not been realised at Centres A and B. Mncube affirms this specialised space.

> We need workshops. Yeah, equipped workshops. That's the space that's currently doesn't exist. It's just a classroom. But a classroom isn't enough for skills training. Yeah. So, a workshop should be equipped for a program. If it's an electrical workshop, it must have all the electrical tools that I need in order to be able to leave the centre and go and wire a house.

There are students, staff and architects who feel that learning environments of children and adults should not differ. The literature in chapter three indicates that adults and children are affected by the same stimuli, however, at varying degrees. Certain stimuli have far greater effects on children. This suggests there will be common spatial programmes, seating configurations, and opportunities for interactive learning as per the responses in the interviews, but their articulation must represent and identify with the adults of that particular community.

4.4.4.1 Participatory Planning

Architects and centre managers agree on the importance of participatory planning and community involvement in general. Van Heerden affirms the claims of the literature in chapter three which cites the benefits utilizing this process to uncover appropriate solutions for distinct community characteristics, as opposed to imposing foreign ideals:

> And it's amazing what, what comes out when you actually ask with your local community. So, a lot of these things are unique from one community to the next, you know.

Nathi* also affirms the benefits of appropriate CET centres. He alludes that responsive centres lead to a sense of ownership:

> The community, the centre is for the community. It belongs to the community. So, it's very, you know, if people-, the-, in order to support that particular Centre, the centre needs to try to offer the things that is quite relevant, things that are going to change their lives. Things that are irrelevant [*Sic*] to the community, things that will change their lives for the better. So, at the moment, it's very important. The centre is very important. As long as, if the centre is relevant to the community, I think the community will play a bigger role. Not in sustaining, in protecting, in sustaining, in developing, making sure that the centre is well up to standard. So, the centre, the centre without a community is not existent. So, we need the community.

Van Heerden echoes the words of Nathi*, emphasises the role of the architect's design and design process has to play when designing community projects.

> We have to actually make people feel a sense of ownership of buildings, you know. And then, and that, and that's been our experience once we started to kind of invite people to become owners.

Such a process will build on the uncovered general spatial needs of adult learners of CET colleges in townships, to ensure increased alignment to aims of responsive learning environments.

4.4.5 Conclusion

The findings of the interviews with all the participants, that depict perspectives that relate to the study were coded into parent-nodes and child-nodes, to align with the sub-questions of the study. The literature of chapter three was referred to, to derive meaning to the perspectives, with consideration for divergent perspectives. The data was interpreted in a composite form, relaying the experiences of students and staff of CET colleges in townships, and the experiences of architects of learning environments.

In the following chapter, conclusions, and recommendations of what the data of the preceding chapters three and four suggest as answers to the research question, "What are the unique requirements and architectural qualities that could enhance adult learning whilst being contextually responsive?"

5 CHAPTER 5

5.1 CONCLUSIONS AND RECOMMENDATIONS

This chapter sets out conclusions and recommendations derived from the preceding chapters of this study. The key question and sub-questions defined in chapter one are answered in relation to the findings.

5.1.1 Conclusions

The primary issue involved learning environments which are unresponsive to the needs of Community Education and Training students, staff, and the community. The exploration of the problem was guided by the Environmental Psychology field, Place Theory, Critical Regionalism and Social Cognitive Theory.

The theories suggest that environment does have an influence on people, and people in-turn affect the environment, and the environment has the ability to teach in subtle ways.

The first sub-question was, “What impact does location and urban planning have when siting an educational facility?” The literature, precent studies, case studies and interviews has revealed that the location of an educational facility has paramount importance, as it needs to link the community to the facility and the facility to the community. an understanding of the unique parameters of the site, the context, movement patterns, client, desired uses, culture, ethnicity, and the vernacular elements of that community, develops the best architectural design solutions for educational facilities.

The second sub-question was, “What are the spatial needs of adult learners?” The student questionnaires, and interviews with key informants reveal that adult learners require dedicated learning environments that possess an institutional identity and are independent of the mainstream children’s education. These environments must be articulated, universally accessible, well lit, well ventilated, and offer quiet spaces for individual study. Adult learners require workshops suitable for vocational skills, libraries and outdoor learning environments designed with an educational value. Toilets are to be located in close proximity to all learning spaces. All learning spaces are to be specified with comfortable and ergonomic furniture, at a suitable scale.

The third sub-question was, “How can architecture and the built environment stimulate learning?” The findings from the student questionnaires suggest that students’ perception of their environment stimulates learning. The literature, precedents and case study suggest that shape, form, colour, daylight, acoustics, air quality, ventilation, didactic architectural expressions, soft nurturing environments, and environments of curiosity and discovery stimulate learning. The inconsistencies of some of these claims when compared to questionnaire results are suggestive of the subtle nature of some of the stimuli.

The combination of abovementioned conclusions therefore answers the key research question, “What are the unique requirements and architectural qualities that could enhance adult learning whilst being contextually responsive?”

5.1.2 Recommendations

As mentioned in chapter four, this study recommends for further research into the learning spaces for students of Community Education and Training Colleges, to increase the body of knowledge in the research field. Further research should include imagery to assist participants to visualise architectural concepts or phenomena. All instruments are recommended to be translated to the participants home language. All language in such instruments is to be written in its simplest expression, with reference to imagery.

This study further recommends as per findings in chapter three and four that the design process of a CET centre in a township location must include for a participatory process to ensure that the learning environments proposed will be the most appropriate for its users and context.

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APPENDICES

APPENDIX A

STUDENTS QUESTIONNAIRE

APPENDIX A
Community Education and Training Centres

Students | QUESTIONNAIRE

"Facilitating Adult Learning Through Responsive Architecture: The Design of a Community Education & Training Centre in Bridge City Town Centre, Durban."

From the list of questions below, tick (✓) the box (□) with the answer that most applies to you:

1) Do you live or work within 30min walking distance of your Community Education and Training (CET) Centre?
   - □ **Yes**
   - □ **No**
   - □ **I do not know**

---

2) How do you commute to the centre? *Choose as many as applicable.*
   - □ **Walk**
   - □ **Cycle**
   - □ **Personal Vehicle**
   - □ **Mini-bus Taxi**
   - □ **Bus**
   - □ **Train**
   - □ **Uber**
   - □ **Other:** *Please specify*……

---

3) How many times do you have to link commutes on a one-way trip?
   - □ **None**
   - □ **Once**
   - □ **Twice**
   - □ **More than twice**

---

4) What contributed to you not being able to complete your studies earlier? *Choose as many as applicable.*
   - □ **Lack of Access to Schools**
   - □ **Financial Difficulties**
   - □ **Difficulties with Academic progress**
   - □ **Personal Difficulties**
   - □ **I would rather not say**
   - □ **Other:** *Please specify*……

---

5) Why did you decide to come back and study?
   - □ **Only to increase my knowledge**
   - □ **To increase my employability**
   - □ **To enable better employment opportunities**
   - □ **To increase work-related skills**
   - □ **Other:** *Please specify*……

From the statements below, tick (✓) the box (□) with the answer that best describes how you feel about the Community Education & Training Centre you currently attend:

6) The shape of the classroom affects my learning.
   - □ **Strongly Disagree**
   - □ **Disagree**
   - □ **Slightly Disagree**
   - □ **Neither Agree nor Disagree**
   - □ **Slightly Agree**
   - □ **Agree**
   - □ **Strongly Agree**

---

7) The colour of the classroom affects my concentration or energy levels.
   - □ **Strongly Agree**
   - □ **Agree**
   - □ **Slightly Agree**
   - □ **Neither Agree nor Disagree**
   - □ **Slightly Disagree**
   - □ **Disagree**
   - □ **Strongly Disagree**

---

8) I am more alert when there is daylight from the sun than I am with just electrical light.
   - □ **Strongly Disagree**
   - □ **Disagree**
   - □ **Slightly Disagree**
   - □ **Neither Agree nor Disagree**
   - □ **Slightly Agree**
   - □ **Agree**
   - □ **Strongly Agree**

---

9) Electrical lighting makes me stressed, moody, hyperactive, or tired.
   - □ **Strongly Disagree**
   - □ **Disagree**
   - □ **Slightly Disagree**
   - □ **Neither Agree nor Disagree**
   - □ **Slightly Agree**
   - □ **Agree**
   - □ **Strongly Agree**

---

10) I am more alert when the classroom windows are open, to allow air to pass through the space.
   - □ **Strongly Agree**
   - □ **Agree**
   - □ **Slightly Agree**
   - □ **Neither Agree nor Disagree**
   - □ **Slightly Disagree**
   - □ **Disagree**
   - □ **Strongly Disagree**

---

11) My ability to learn or study is better in quiet places.
- □ **Strongly Agree**
- □ **Agree**
- □ **Slightly Agree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Disagree**
- □ **Disagree**
- □ **Strongly Disagree**

---

12) I learn better when interacting with other students during group work.
- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

---

13) The learning spaces cater for disabled students.
- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

---

14) The classroom is age appropriate.
- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

---

15) My CET centre looks attractive and inviting.
- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

---

16) The CET centre is clean and well maintained.
- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

---

17) I feel my work, identity or culture is represented in elements of the building.
- □ **Strongly Agree**
- □ **Agree**
- □ **Slightly Agree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Disagree**
- □ **Disagree**
- □ **Strongly Disagree**

---

18) The CET centre's computers and printers are well located.
- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

---

19) There are enough toilet facilities available for both students and lecturers.
- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

---

20) There are out-of-sight places in the centre which I find unsafe.
- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

---

21) I feel comfortable and 'at home' when I am at college.

- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

---

22) The furniture in the classrooms is comfortable.

- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

---

23) The furniture in the classrooms is adjustable to suit my height.

- □ **Strongly Disagree**
- □ **Disagree**
- □ **Slightly Disagree**
- □ **Neither Agree nor Disagree**
- □ **Slightly Agree**
- □ **Agree**
- □ **Strongly Agree**

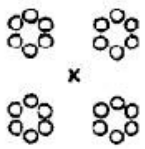
From the list of questions below, tick (✓) the box (□) with the answer that most applies to you:

24) What seating arrangement do you find easiest to learn in?

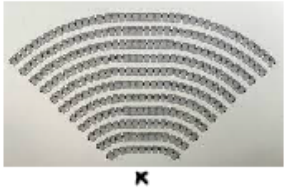
- □ **Traditional row seating**

- □ **Large circle (conference seating)**

- □ **Small groupings**



- □ **Raked auditorium**



- □ **Other:** *Please specify*.....

---

25) Apart from the classroom, I learn best in the following spaces: (you may select as many as are applicable)
- □ **Library**
- □ **Outdoors**
- □ **Corridors**
- □ **Other:** *Please specify*……

---

26) What facilities do you wish to be available at the community education centre, or in the areas nearby? Select all that are applicable to you.
- □ **Childcare centre**
- □ **Senior care centre**
- □ **Library**
- □ **Business incubator**
- □ **Social development services – e.g. applications for social grants, ID documents, health care, etc.**
- □ **Applications and training for driver's license**
- □ **Training for driver's license**
- □ **Access to Government departments**
- □ **Computer and Internet facilities**
- □ **Exercise facilities**
- □ **Recreation facilities**
- □ **Shops**
- □ **Restaurants**
- □ **Other:** *Please specify*……

---

27) If you have any comments or suggestions for your college learning spaces, you may comment below:

……

……

……

……

……

6

APPENDIX B

INTERVIEW SCHEDULE | Students

APPENDIX B

INTERVIEW SCHEDULE | Students

Main Question
What are the unique requirements and architectural qualities that could enhance adult learning, whilst being contextually responsive?

Sub-questions:

What impact does location and urban planning have when siting an educational facility?

1. How do you travel to the centre?
2. How long does it take you to get to college from home/work?
3. What facilities or services do you utilize en-route to the CET centre?
4. When and at what time are your classes?

What are the spatial needs of adult learners?

5. What are the spatial needs of adult learners?
6. What is your definition of a learning space?
7. In your opinion, how should learning spaces for adults differ from those of children?
8. What facilities do you have access to at the centre?
9. What activities/skills do you wish were available at this CETC?

How can architectural forms, and spaces stimulate learning?

10. Describe the type of space you concentrate best in?
11. Describe the type of space you learn best in?
12. Which is your favourite space at the CETC?
13. Which is your least favourite space?
14. In what way does the space you are in inspire you to learn?
15. What affects your ability to learn in a school environment?
16. Do you prefer *individual* or *group* activities/ learning or *both*?
17. Which type of lecture seating do you prefer? Row/amphitheatre/circular/random/other?
18. 'Informal learning' means learning that results from daily activities related to paid or unpaid work, family or community life, or leisure, including incidental learning. What has contributed to your 'informal learning'?
19. What are your thoughts of the current infrastructure and learning spaces?
20. Apart from what you've been exposed to, what other ways would you like to learn?
21. What would you change about your learning environment?

APPENDIX C

INTERVIEW SCHEDULE | Lecturers

APPENDIX C

INTERVIEW SCHEDULE | Lecturers

Main Question
What are the unique requirements and architectural qualities that could enhance adult learning, whilst being contextually responsive?

Sub-Questions:

What impact does location and urban planning have when siting an educational facility?

1. What facilities / activities around a Community Education & Training Centre (CETC) enhance the urban fabric?
2. What elements link this centre to the community?
3. What are the differences between CETC's located in townships and other areas?
4. How does your ideal learning environment relate to its community and wider context?

What are the spatial needs of adult learners?

5. What is your definition of a learning space?
6. What are the spatial needs of adult learners?
7. In your opinion, how should learning spaces for adults differ from those of children?
8. What facilities do you have access to at the centre?
9. What activities/skills do you wish were available at this CETC?
10. The Continuing Education and Training Act 16 of 2006 Preamble states:
    The colleges must respond to the needs of the republic, the labour market and the communities served by the colleges. Provide optimal opportunities for learning, the creation of knowledge and the development of intermediate to high skills on keeping with international standards of academic and technical quality.
    What type of spaces would suit the above objectives at a CETC located in a township?

How can architectural forms, and spaces stimulate learning?

11. How can architectural forms, and spaces stimulate learning?
12. What are your thoughts of the current infrastructure and learning spaces?
13. Apart from what you've been exposed to, what other ways would you like to teach?
14. What forms and spaces have proven to be successful in stimulating learning?
15. What forms and spaces have proven to be unsuccessful in stimulating learning?
16. What would you change about your current teaching environment?

APPENDIX D

INTERVIEW SCHEDULE | Centre Managers

APPENDIX D

INTERVIEW SCHEDULE | Centre Managers

Main Question
What are the unique requirements and architectural qualities that could enhance adult learning, whilst being contextually responsive?

Sub-Questions:

What impact does location and urban planning have when siting an educational facility?

17. What impact does location and urban planning have when siting an educational facility?
18. What facilities / activities around a Community Education & Training Centre (CETC) enhance the urban fabric?
19. What elements link this centre to the community?
20. How does your ideal learning environment relate to its community and wider context?

What are the spatial needs of adult learners?

21. What is your definition of a learning space?
22. What are the spatial needs of adult learners?
23. In your opinion, how should learning spaces for adults differ from those of children?
24. What facilities do you have access to at the centre?
25. What activities/skills do you wish were available at this CETC?
26. The Continuing Education and Training Act 16 of 2006 Preamble states:
    The colleges must respond to the needs of the republic, the labour market and the communities served by the colleges. Provide optimal opportunities for learning, the creation of knowledge and the development of intermediate to high skills on keeping with international standards of academic and technical quality.
    What type of spaces would suit the above objectives at a CETC located in a township?

How can architectural forms, and spaces stimulate learning?

27. How can architectural forms, and spaces stimulate learning?
28. What would you change about your learning environment?
29. What are your thoughts of the current infrastructure and learning spaces?
30. What forms and spaces have proven to be successful in stimulating learning?
31. What forms and spaces have proven to be unsuccessful in stimulating learning?
32. At what times of the day are the adult classes held?

APPENDIX E

INTERVIEW SCHEDULE | Deputy Principal (Academic Services)

APPENDIX E

INTERVIEW SCHEDULE | Deputy Principal (Academic Services)

Main Question
What are the unique requirements and architectural qualities that could enhance adult learning, whilst being contextually responsive?

Sub-Questions:

What impact does location and urban planning have when siting an educational facility?

33. What are the differences between Community Education & Training Centres (CETCs) located in townships and other areas?
34. Which are the best and worst performing CETC's in the KwaMashu Circuit, Pinetown District?
35. What factors contribute to this result?
36. What lies in the future for CETC's?
37. How does your ideal learning environment relate to its community and wider context?
38. What role does participatory planning play in the design process of centres for adult education.

What are the spatial needs of adult learners?

39. What is your definition of a learning space?
40. In your opinion, how should learning spaces for adults differ from those of children?
41. Which of the CETC's were designed for its purpose?
42. What entrepreneurial skills are offered at the centres?
43. The Continuing Education and Training Act 16 of 2006 Preamble states:
    The colleges must respond to the needs of the republic, the labour market and the communities served by the colleges.
    Provide optimal opportunities for learning, the creation of knowledge and the development of intermediate to high skills on keeping with international standards of academic and technical quality.
    What type of spaces would suit the above objectives at a CETC located in a township?

How can architectural forms, and spaces stimulate learning?

44. What are your thoughts of the current infrastructure and learning spaces?
45. What forms and spaces have proven to be successful in stimulating learning?
46. What forms and spaces have proven to be unsuccessful in stimulating learning?
47. What is the drop-out rate at the centres?

APPENDIX F

INTERVIEW SCHEDULE | Architects

APPENDIX F

INTERVIEW SCHEDULE | Architects

Main Question
What are the unique requirements and architectural qualities that could enhance adult learning, whilst being contextually responsive?

Sub-Questions:

What impact does location and urban planning have when siting an educational facility?

48. What impact does location and urban planning have when siting an educational facility?
49. What facilities / activities around a Community Education & Training Centre (CETC) enhance the urban fabric?
50. What elements link learning centres to the community?
51. What are the differences between CETC's located in townships and other areas?
52. How does your ideal learning environment relate to its community and wider context?
53. What role does participatory planning play in the design process of centres for adult education?

What are the spatial needs of adult learners?

54. What is your definition of a learning space?
55. What are the spatial needs of adult learners?
56. In your opinion, how should learning spaces for adults differ from those of children?

How can architectural forms, and spaces stimulate learning?

57. How can architectural forms, and spaces stimulate learning?
58. How does the space students are in inspire them?
59. Describe a space that inspires students to learn.
60. What forms and spaces have proven to be successful in stimulating learning?
61. What forms and spaces have proven to be unsuccessful in stimulating learning?
62. What affects a student's ability to learn in a school environment?
63. How is incident/ unconscious learning taken into consideration?
64. How have you taken contemporary ideas on education and translated it into spatial form?
65. What are your thoughts of the current infrastructure and learning spaces in CETCs?
66. What would you change about a learning environment you have designed in the past?

PART TWO

DESIGN REPORT | Report and Resolution

LIST OF ILLUSTRATIONS

Table of Contents

1 CHAPTER 1: DESIGN REPORT

1.1 Introduction

The dissertation document aimed to investigate how didactic architecture could be applied to develop a contextually responsive design for adult education, within a township condition, utilising three research objectives. The research objectives of this study were, firstly, to investigate the impact of location and urban planning when siting an educational facility in the Bridge City precinct, secondly, to understand the diverse spatial needs of adult learners, and lastly, to investigate architecture and built environments that stimulate learning.
The research findings have been carried forth to formulate this design report and resolution for the associated design project.

In this chapter, the design project is described, and the notional client is introduced, along with detailed client requirements. In succeeding chapters, the site selection processes, and site background are described, and the site survey and analysis undertaken is relayed.

The final chapter indicates the design resolution and the design development process undertaken to achieve it.

1.2 Project Description

The Community Education and Training (CET) Centre typology emanated from the research findings which required a provision of ideal opportunities for flexible lifelong learning and skills development through appropriate learning environments that afford second-chance opportunities for adults to complete their schooling.

The findings suggest that environments have an influence on people, and people in-turn affect the environment, and the environment has the ability to teach in subtle ways. The CET centre was therefore designed with shape, form, colour, daylight, acoustics, air quality, ventilation, didactic architectural expressions, soft nurturing environments, and environments of curiosity and discovery in mind to facilitate learning stimulation.

A diversity of varied learning environments, which consciously respond to contextual needs and conditions provide an allowance for multiple individual perceptions for learning

stimulation. The learning environments include articulated universally accessible classrooms, quiet spaces for group and individual study, workshops suitable for vocational skills, libraries, exhibition spaces and outdoor learning environments designed with an educational value. All learning spaces are specified with comfortable and ergonomic furniture, at a suitable scale to ensure soft nurturing environments.

1.3 The Notional Client

1.3.1 The Client's Organisation

It is envisioned that the Department of Higher Education and Training (DHET) is the notional client – working together with the Department of Public Works (DPW). The DHET is charged to focus on post-school education and training in a holistic manner (Department of Higher Education and Training).

higher education & training
Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

+

public works
Department:
Public Works
PROVINCE OF KWAZULU-NATAL

The College of Community Education and Training (CET) falls within this particular jurisdiction and mandate of the DHET, as the CET College is aimed at post-school youth and adults who aspire to raise the base for further learning, improve their skills for employability and/or progression to opportunities in the TVET colleges and university education (Department of Higher Education and Training).

The Department of Public Works is the manager and custodian of all national governments' immovable assets. The DPW provides specialised built environment services to client departments in the acquisition of fixed assets, determination of accommodation requirements and strategies to align with demands of the users (Department of Public Works).

1.3.2 The Client's Requirements

The client requires a community education and training centre that is conducive for academic focused learning and skills training for adults of the Bridge City community and its immediate surrounds, in that it invites, stimulates, and supports learning. The facilities provided are to be diverse in spatial experiences and learning stimuli, whilst being appropriately aligned with the communities needs in terms of academic, economic, social, and skills development.

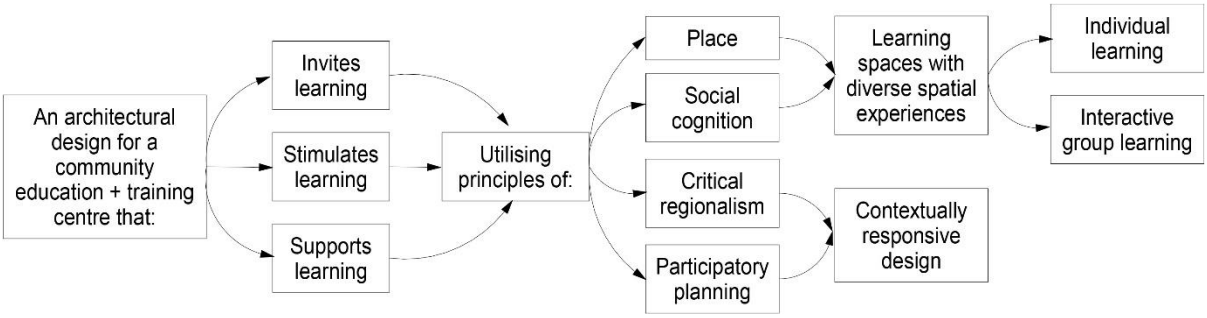


Figure 1.1 – Flow diagram of client brief (Author, 2021)

The proposal needs to provide improved access and linkages of existing communities to the Bridge City Town Centre, whilst linking both communities to education, and in-turn, education to the communities. A diversity of complimentary uses is to be established to ensure sustainability and community interaction.

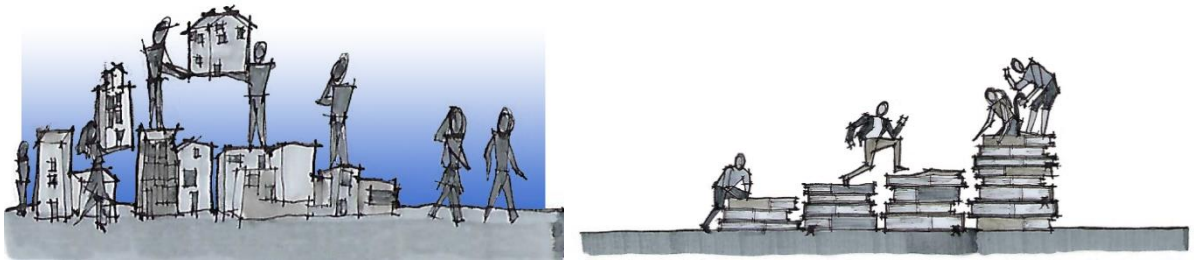


Figure 1.2 - Community interaction and development through education (Author, 2021)

The centre is to express an iconic / distinct character and institutional identity that is independent of mainstream education.

1.3.3 Detailed Client Brief

CET Centre				**2478**	
	Description	**Qty**	**Area (m^2)**	**Total Area (m^2)**	**Notes**
Formal Learning				358	
	Classroom – Level 1	1	58	58	▪ To include comfortable and adjustable furniture, all on castors for comfort and easy layout rearrangements. ▪ Include grid ceiling for increased flexibility. ▪ Easy access to main circulation, breakout rooms, and outdoor learning spaces. ▪ Well-lit and ventilated. ▪ Away from noisy areas ▪ Collapsible wall to allow for a larger multi-purpose space when required.
	Classroom – Level 2	1	60	60	
	Classroom – Level 3	1	62	62	
	Classroom – Level 4	1	61	61	
	Break Out	4	15	60	▪ For focus group activities
	Horticulture Classroom	1	57	57	▪ Formal learning space for horticulture related activities. ▪ Link to Horticulture Greenhouse.
Informal Learning				1230	
	Lobby + Exhibition	1	105	105	▪ To include comfortable lounge furniture. ▪ Walls and pedestals for exhibits of works created at the centre. ▪ Visibility into the skills trade areas ▪ Double volumes

	Description	**Qty**	**Area (m^2)**	**Total Area (m^2)**	**Notes**
	Learning Corridor	2	414 +427	841	▪ To include comfortable and adjustable furniture, all on castors for comfort and easy layout rearrangements. ▪ Includes pockets for group and individual learning
	Covered Outdoor Learning Landscape	1	59	59	▪ For larger outdoor classes, and recreation between classes.
	Outdoor Learning	1	78	78	▪ Shared outdoor learning space between classes, to allow for collaboration.
	Covered Balcony	1	147	147	▪ Outdoor recreation space at upper level.
Skills Learning				339	
	Culinary Classroom	1	43	43	▪ Link to café and exhibition spaces
	Skills Workshops	2	56+57	113	▪ Collapsible wall between workshops to allow for a larger multi-purpose space when required. ▪ Maximum visual access to public
	Mezzanine	1	52	52	▪ Breakout space for skills workshops
	Workshop Lobby	1	8	8	▪ Noise buffer
	Horticulture Greenhouse	1	123	123	▪ Linked to horticulture classroom space. ▪ Provide easily accessible storage for gardening tools and products.
Trade Spaces				87	
	Cafe	1	87	87	▪ Public interface and edge activation ▪ Link to culinary skills classroom ▪ Work opportunities for students

	Description	**Qty**	**Area (m^2)**	**Total Area (m^2)**	**Notes**
Administration + Offices				209	
	Reception	1	58	58	▪ Allow for two staff ▪ Controlled access ▪ Student storage facilities
	Workshop Office	1	10	10	▪ Workshop Manager
	Centre Manager Office	1	15	15	
	I.T. Office	1	15	15	
	Boardroom	1	41	41	
	Meeting Room	1	12	12	
	Teachers Room	1	58	58	
Other				255	
	Ablutions	2	76 +73	149	▪ Universally accessible, and centrally located to all learning spaces.
	Lift	1	5	5	
	Store	7	varies	68	
	Bins Yard	1	17	17	
	Gas Bottles	1	5	5	
	Service Yard	1	11	11	

Public Square				**1350**	
	Description	**Qty**	**Area (m^2)**	**Total Area (m^2)**	**Notes**
	Café Outdoor Seating	1	68	68	▪ Public interface and edge activation ▪ Linked to café.
	Trader Kiosks	1	57	57	▪ Trades space for products created at the centre.
	Public Square	1	1225	1225	▪ Public space for social interaction. ▪ Allow for flea markets.

Skills + Literacy Media Centre				1220	
	Description	**Qty**	**Area (m^2)**	**Total Area (m^2)**	**Notes**
Formal Learning				254	
	Individual Workstations	2	67 +49	116	▪ Cocooned and partitioned height adjustable workstations.
	Non-fiction + collaboration	1	49	49	▪ Comfortable and adjustable office furniture. ▪ Movable furniture and book stands for greater flexibility.
	Workstations	1	89	89	▪ Cocooned and partitioned height adjustable workstations.
Informal Learning				762	
	Lobby + Exhibition	1	117	117	▪ To include comfortable lounge furniture. ▪ Walls and pedestals for exhibits of works created at the CET centre. ▪ Double volumes
	Casual Reading	1	41	41	▪ Magazines, newspapers, e-content, wi-fi zone. ▪ Comfortable lounge furniture. ▪ Movable stands for greater flexibility.
	Outdoor Reading	1	140	140	▪ Comfortable outdoor lounge furniture. ▪ Landscaping ▪ Water features
	Children's Space	1	55	55	▪ Bean bags ▪ Story-telling corner ▪ Homework workstations

	Description	**Qty**	**Area (m^2)**	**Total Area (m^2)**	**Notes**
	Outdoor Playground	1	116	116	▪ Jungle gyms and outdoor play equipment. ▪ Access through children's space
	Balcony	1	177	177	▪ Outdoor reading space at upper level.
	Fiction	1	116	116	▪ Comfortable lounge furniture. ▪ Movable furniture and book stands for greater flexibility.
Trade Spaces				144	
	Cafe	1	52	52	▪ Public interface and edge activation ▪ Link to culinary skills classroom ▪ Work opportunities for students
	Trade	1	92	92	▪ Economic trade for local SMME's. ▪ Edge activation.
Other				60	
	Ablutions	1	30	30	
	Circulation	1	26	26	
	Lift	1	4	4	

1.4 Conclusion

This chapter has introduced the design project, its typology, and requirements of the notional client. The requirements of the client have been detailed in an accommodation schedule which highlights important aspects of certain spaces to be introduced into the project, which have emanated from the research findings. The following Chapter will focus on a selection of an appropriate site for a community education and training centre with such requirements, and the survey of the chosen site and its context.

2 CHAPTER 2: SITE SELECTION, SURVEY AND ANALYSIS

2.1 Introduction

The previous chapter outlined the project details for the proposed CET centre, and its associated brief. This chapter now looks at the site selection processes undertaken to determine a suitable site based on research findings, as well as a historical background of the chosen site. The chapter concludes with a survey and analysis of the selected site and its context.

The research indicates the undertaking mentioned above is key as the location of an educational facility has paramount importance, as it needs to link the community to the facility and the facility to the community. An understanding of the unique parameters of the site, the context, movement patterns, client, desired uses, culture, ethnicity, and the vernacular elements of that community, develops the best architectural design solutions for educational facilities.

2.2 Site Selection

The site selection criteria for the CET centre in Bridge City was selected based on principles of place. These principles are indicated in the diagram below:

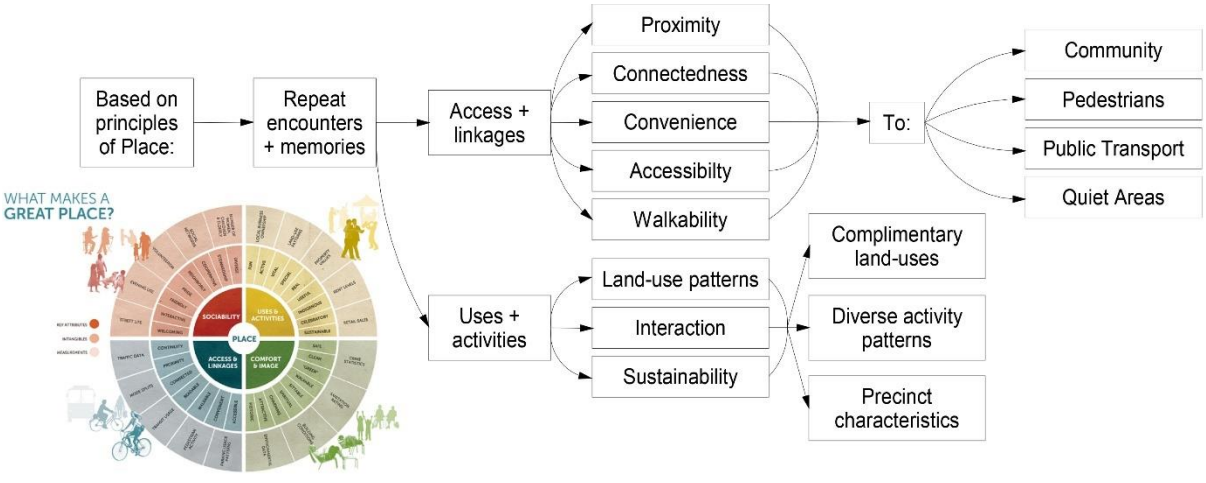


Figure 2.1 - Site selection criteria diagram adapted from (Projects for Public Spaces)

Based on the above principles, two sites were shortlisted and considered for the location of the proposal. The two site include the following:

1. **Site 1:** A lost site consisting of:
    a. 12 Nkunzana Road, Bridge City
    b. 16 Nkunzana Road, Bridge City
2. **Site 2:** A corner site consisting of:
    a. 329 Bhejane Street, Bridge City
    b. 325 Bhejane Street, Bridge City
    c. 321 Bhejane Street, Bridge City
    d. 33 Nogwaja Street, Bridge City
    e. 12 Inqe Close, Bridge City
    f. 16 Inqe Close, Bridge City

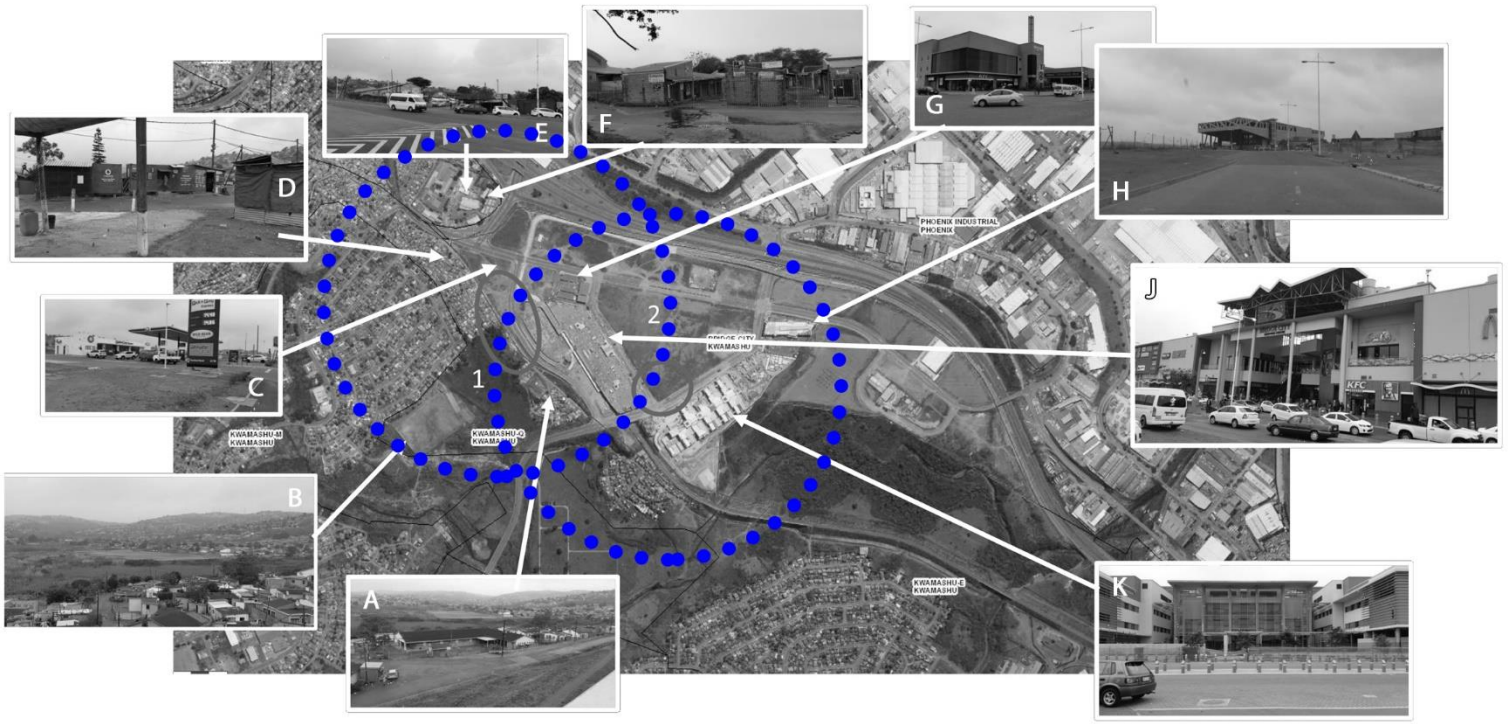


Figure 2.2 - Amenities and services adapted from Google Maps

A - HEALTH CLINIC
B - SPORTS GROUND
C - PETROL STATION + CONVENIENCE STORE
D - INFORMAL TRADING
E - INFORMAL TRADING
E - CULTURAL | MUNICIPAL HALL
E - SERVICES | MUNICIPAL ELECTRICITY SERVICE CENTRE + POST OFFICE BOXES
E - EDUCATIONAL | LIBRARY + DRIVING SCHOOL + HIGH SCHOOL + COMBINED SCHOOL
F - MICRO + SMALL BUSINESS HUB / MARKET
G - FORMAL TRADE | MIXED-USE SHOPS + OFFICES
H - MAGISTRATE COURT + POLICE STATION
J - FORMAL TRADE | BRIDGE CITY SHOPPING CENTRE
J - INTERMODAL TRANSPORT HUB | TRAINS + TAXIS + BRT
K - REGIONAL HOSPITAL

Site 1 enjoys a greater number of amenities and services within 500 meters walking distance, as opposed to Site 2. The amenities are in-line with the primary requirements of the adult learners and staff who participated in the primary research. The positioning allows for the centre building to form part of an educational / cultural precinct.

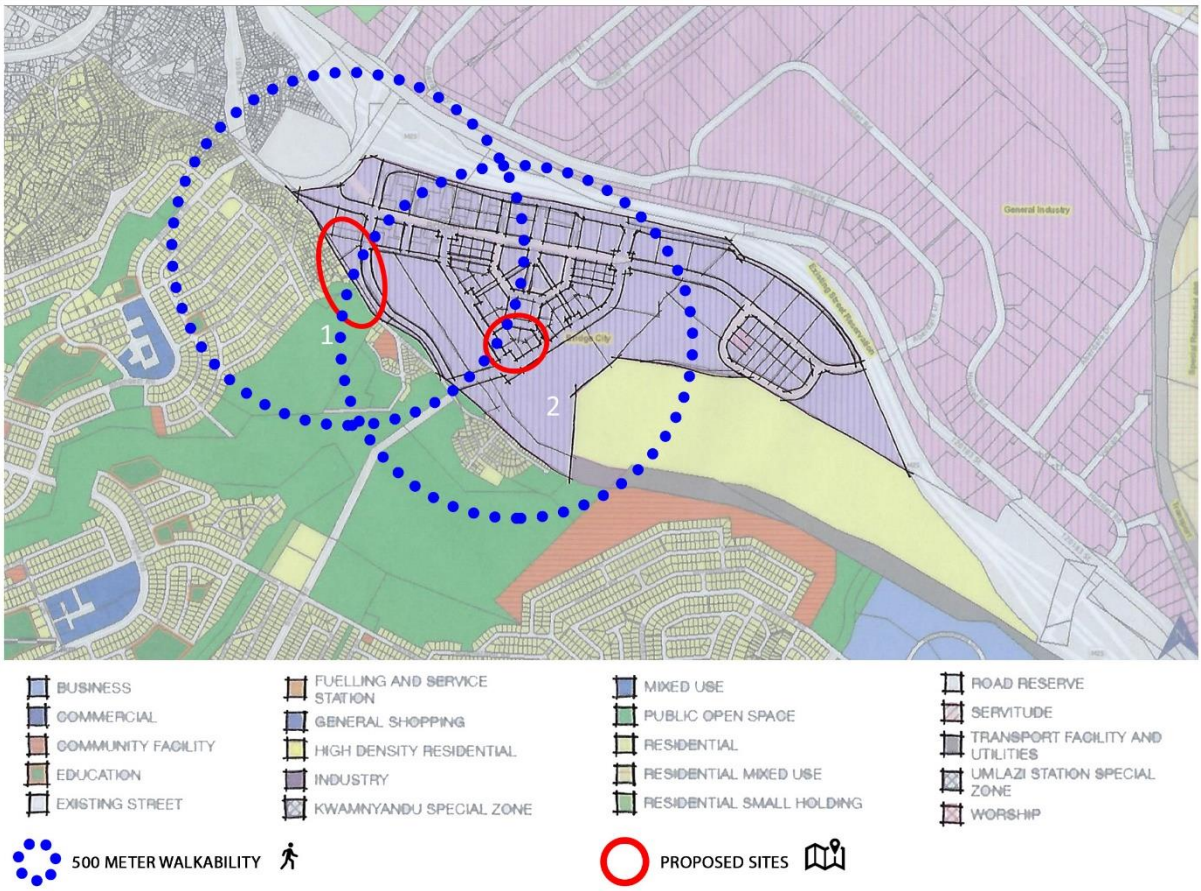


Figure 2.3 – Zoning (Author, 2021)

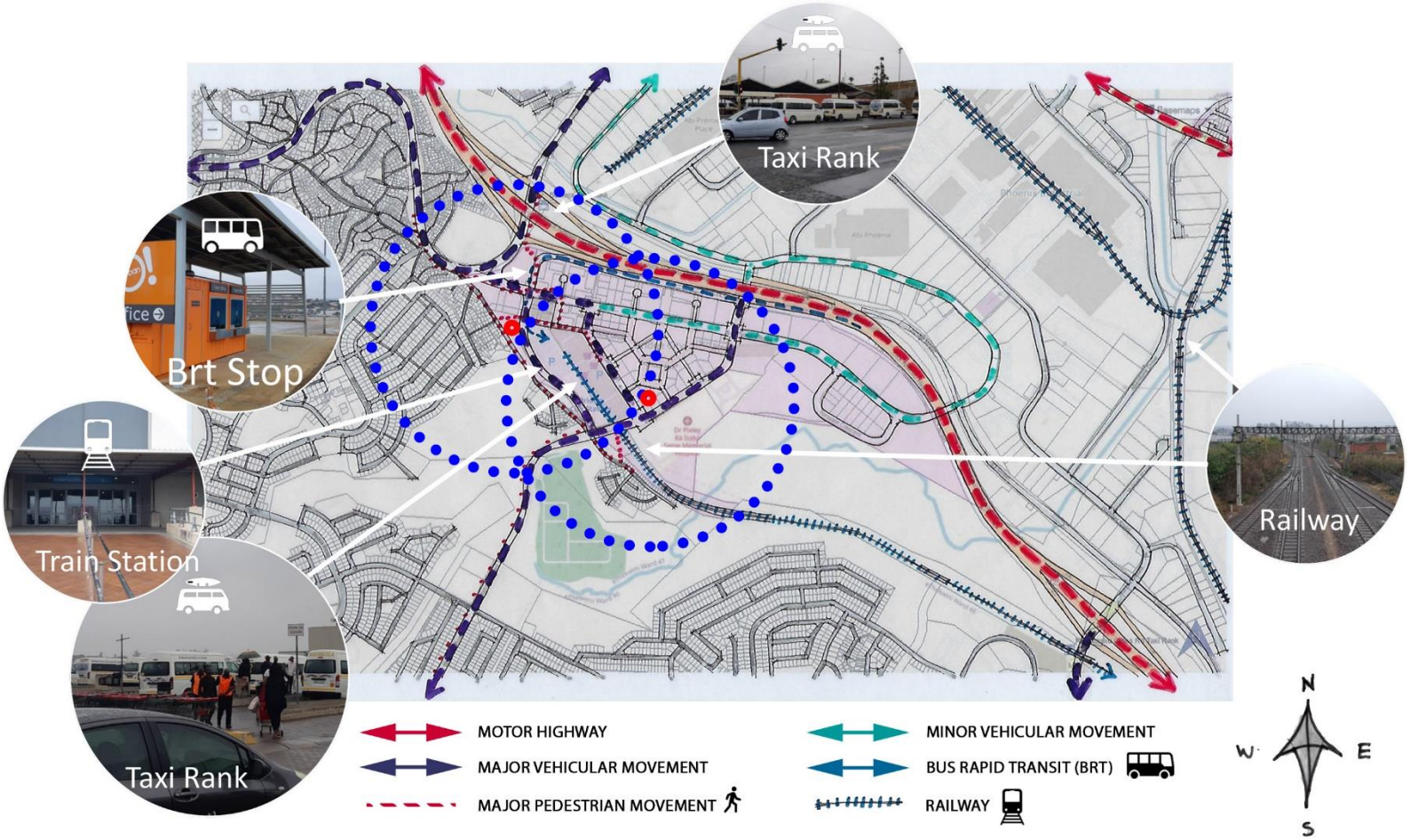


Figure 2.4 – Vehicular and pedestrian movement (Author, 2021)

Site 1 offers greater proportionate variety of zoning. It offers far greater residential density. Site 1 has access to a greater number of access routes and movement patterns - both vehicular and pedestrian. Site 1 also enjoys easier access to more public transport.
After consideration of the above conditions of both sites, in alignment to principles of place, Site 1 characteristics outweighed those of Site 2. Therefore, Site 1 was selected for the design proposal.

2.3 Historical Background of the Selected Site

2.3.1 History

The selected site is located within the Bridge City Town Centre Precinct. Bridge City Town Centre was established in 2007, with the intentions of creating a thriving mixed-use precinct serving the surrounding communities as a new town centre (Kroeger, 2010, Tongaat Hulett Developments, 2017). These existing communities adjacent to the centre include Inanda, Ntuzuma, KwaMashu and Phoenix, established in the 19th century, 1970s, 1958 and 1904 respectively (Dlamini and Mbonambi, 2009, South African History Online, 2018a, b).

The developments in the fairly new mixed-use precinct were realised through an initiative by Tongaat Hulett and the eThekwini Municipality. The precinct was to become a hub consisting of municipal services which include a regional magistrate's court, a regional government hospital, and in the near future, a government services mall (with departments such as home affairs). The development currently includes retail and commercial offerings, which together with the adjacent industrial park, and surrounding residential areas, complete the mixed-use objective. Public transport had also been taken into consideration; patrons have access to a taxi rank on the roof of the Bridge City Mall, a train station below the mall, as well a bus-rapid-transport (BRT) system currently under construction (Tongaat Hulett Developments, 2017, Kroeger, 2010).

2.3.2 Location

Address: 12 and 16 Nkunzana Road, Bridge City

Property Description: Ptn125 and 126 of Erf 8, Bridge City

The site is located in the furthest western boundary of the Bridge City Town Centre Precinct situated 20 kilometres north of the Durban CBD in KwaZulu-Natal, South Africa. It is bordered by the Besters Camp Settlement of KwaMashu-Q on the west, a petrol station on the north, and Bridge City Shopping Centre on the other side of Nkunzana Road on the west.

Figure 2.5 - Locality maps (Author, 2021)

2.4 Description of Existing Site Conditions

The site is a vacant greenfield site which is fairly wide and flat on the Northern side, and narrows and drops along the South, forming an irregular, triangular left-over space. The main axis is North-east facing. It is severed in two perpendicularly to this axis by a 3m wide sewer servitude which also runs along the Western boundary of the Northern half.

No trees or shrubbery are present on site. However, it does enjoy large volumes of pedestrian foot traffic as it serves as a shortcut and a link between the existing community and the new precinct.

2.5 Site Analysis

An analysis of the existing site and it's surrounds was undertaken to gain an understanding of the context, looking at factors pertaining to built mass, natural features, site controls, communal services, trade, Public transport and movement patterns, and climatic conditions in order to provide an appropriate design response to the context.

Figure Ground

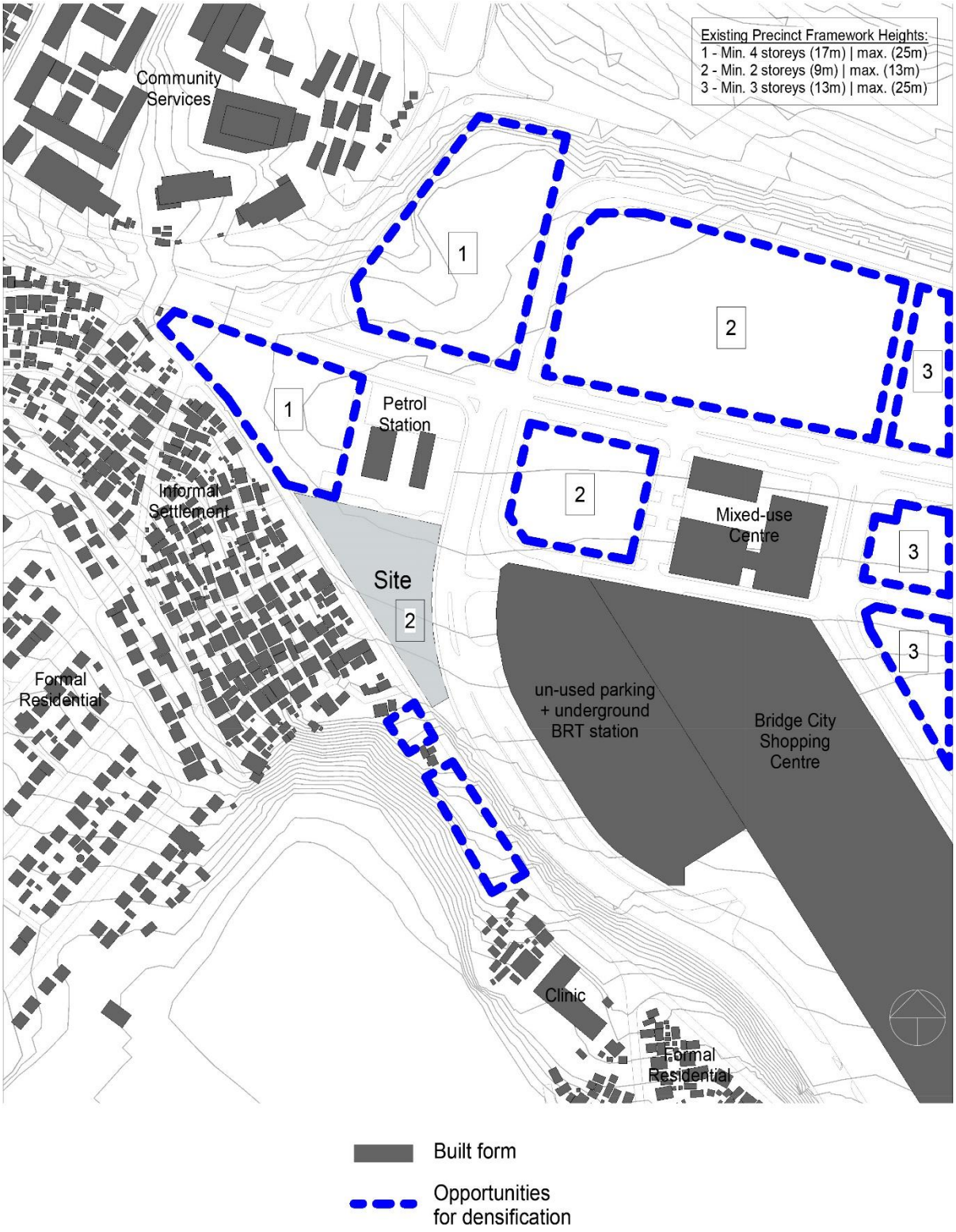


Figure 2.6 - Analysis of figure ground (Author, 2021)

Natural Features and Controls

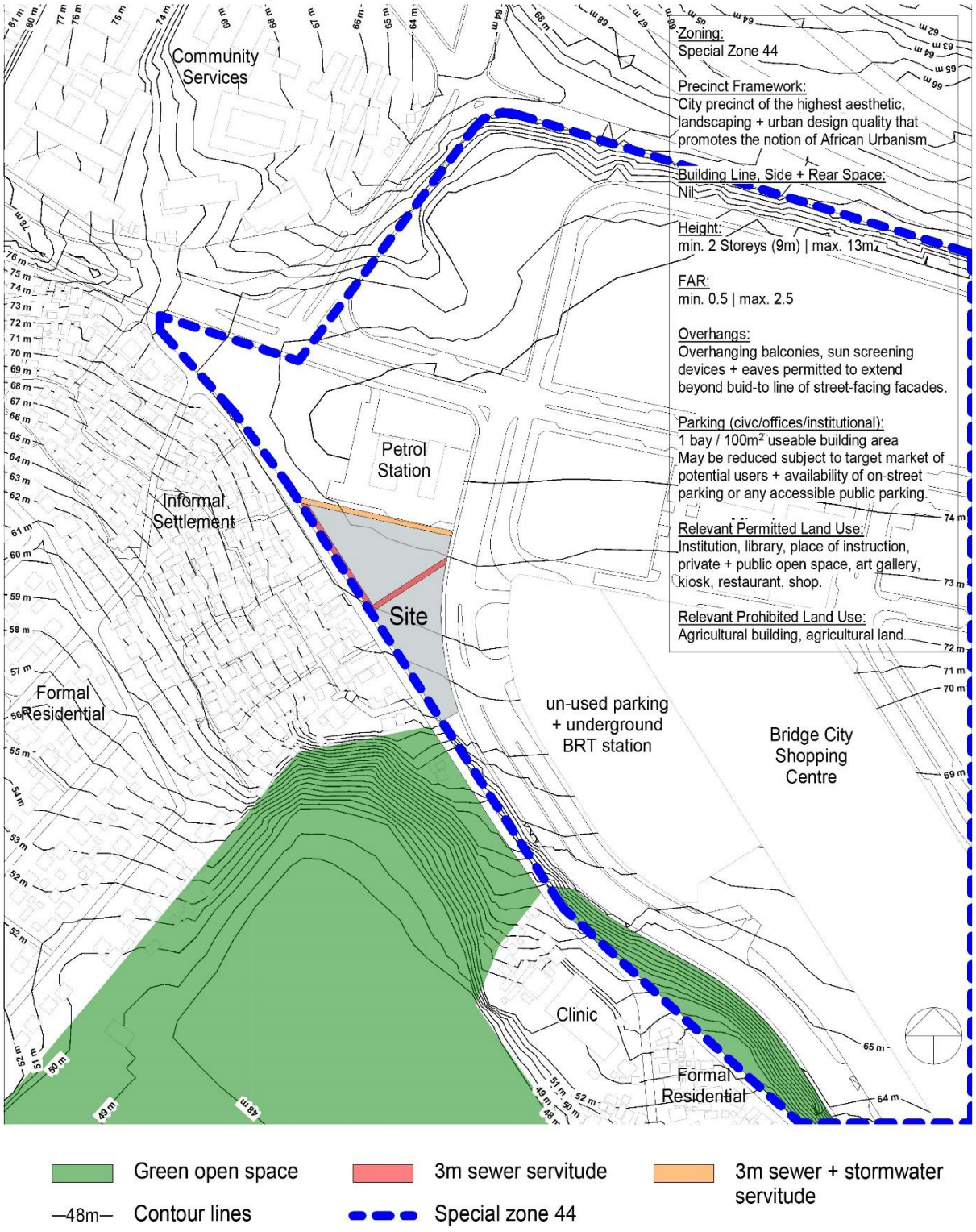


Figure 2.7 - Analysis of natural site features and site controls (Author, 2021)

Communal Services

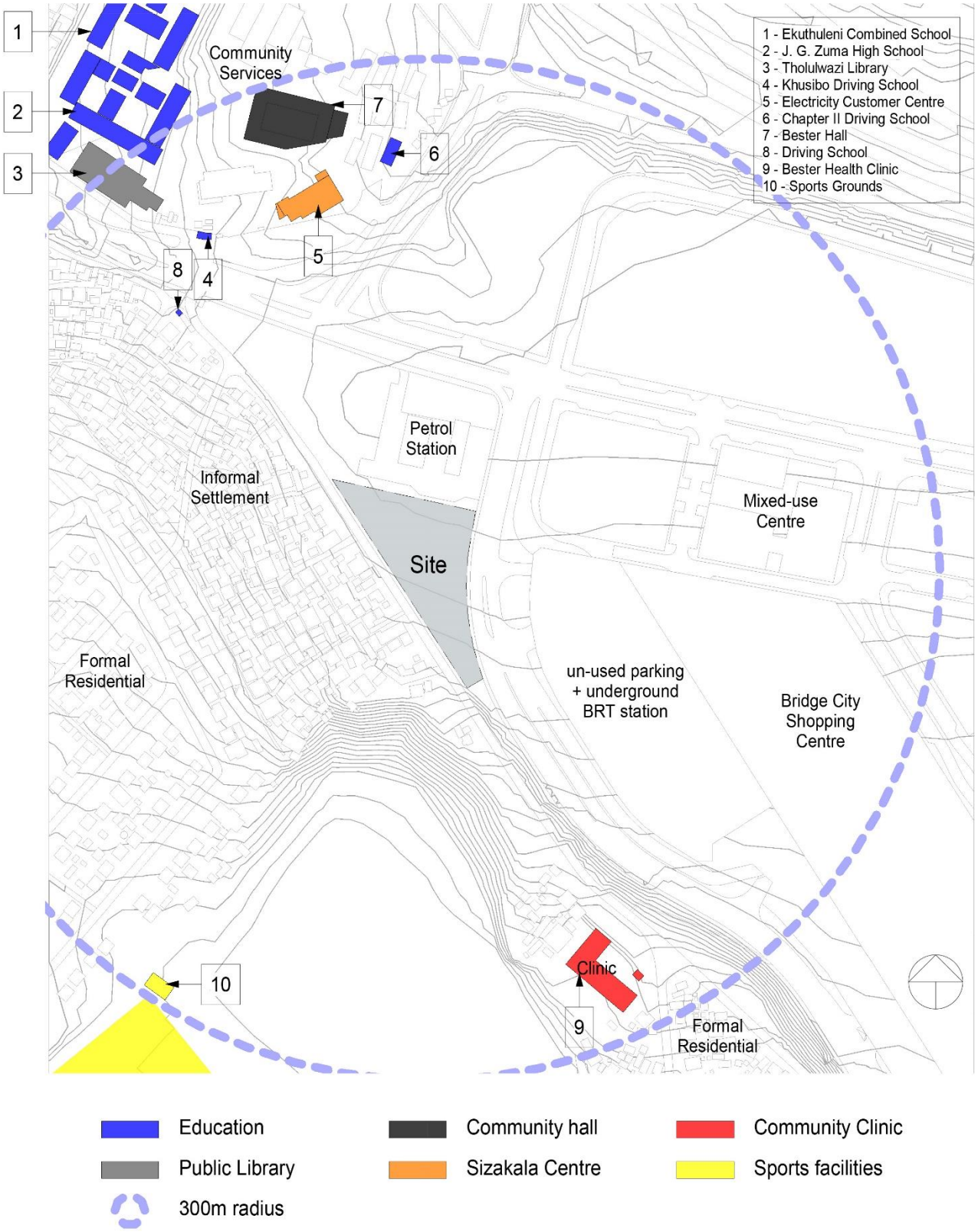


Figure 2.8 - Analysis of existing communal services (Author, 2021)

Trade

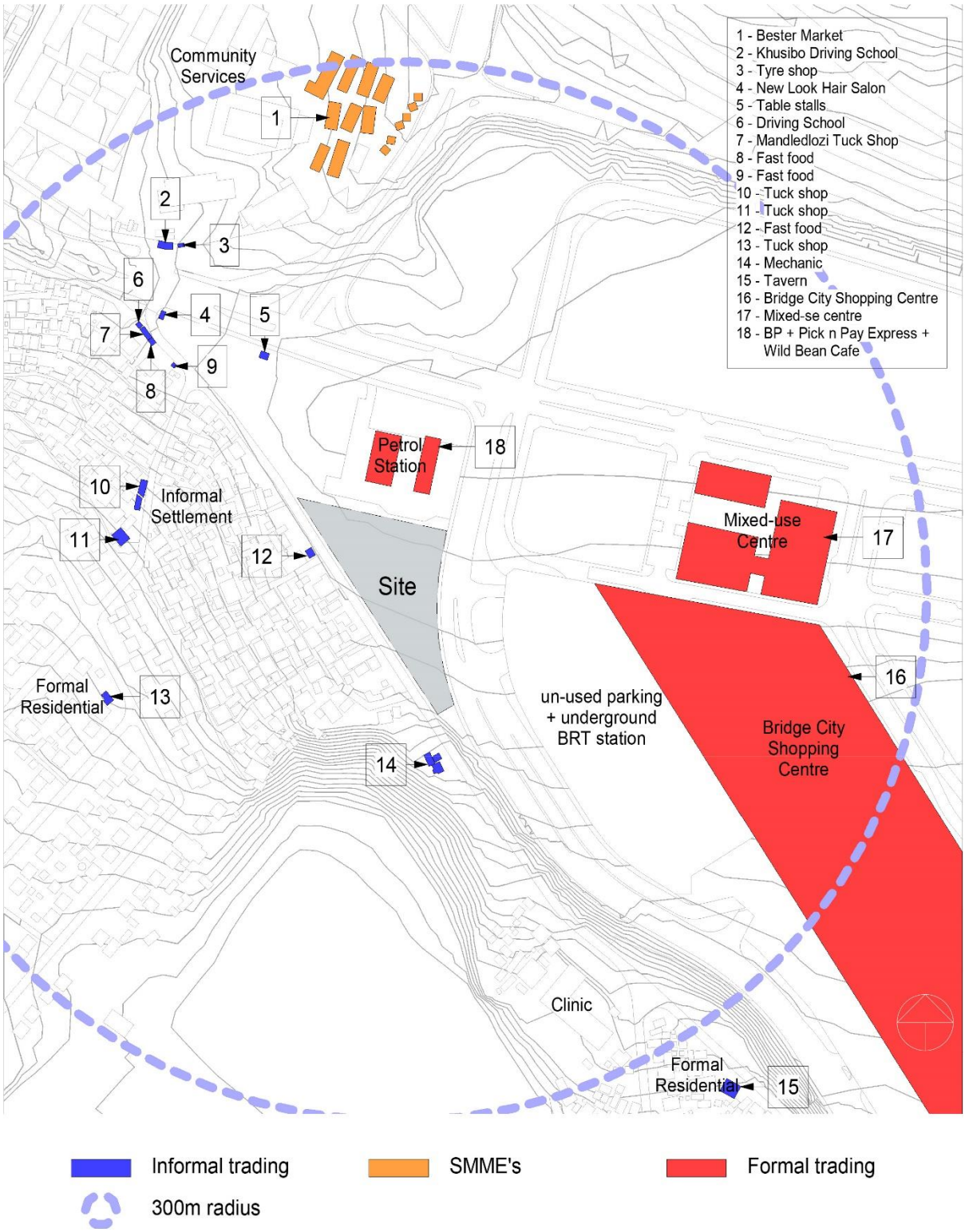


Figure 2.9 - Analysis of Trade

Access and Public Transport

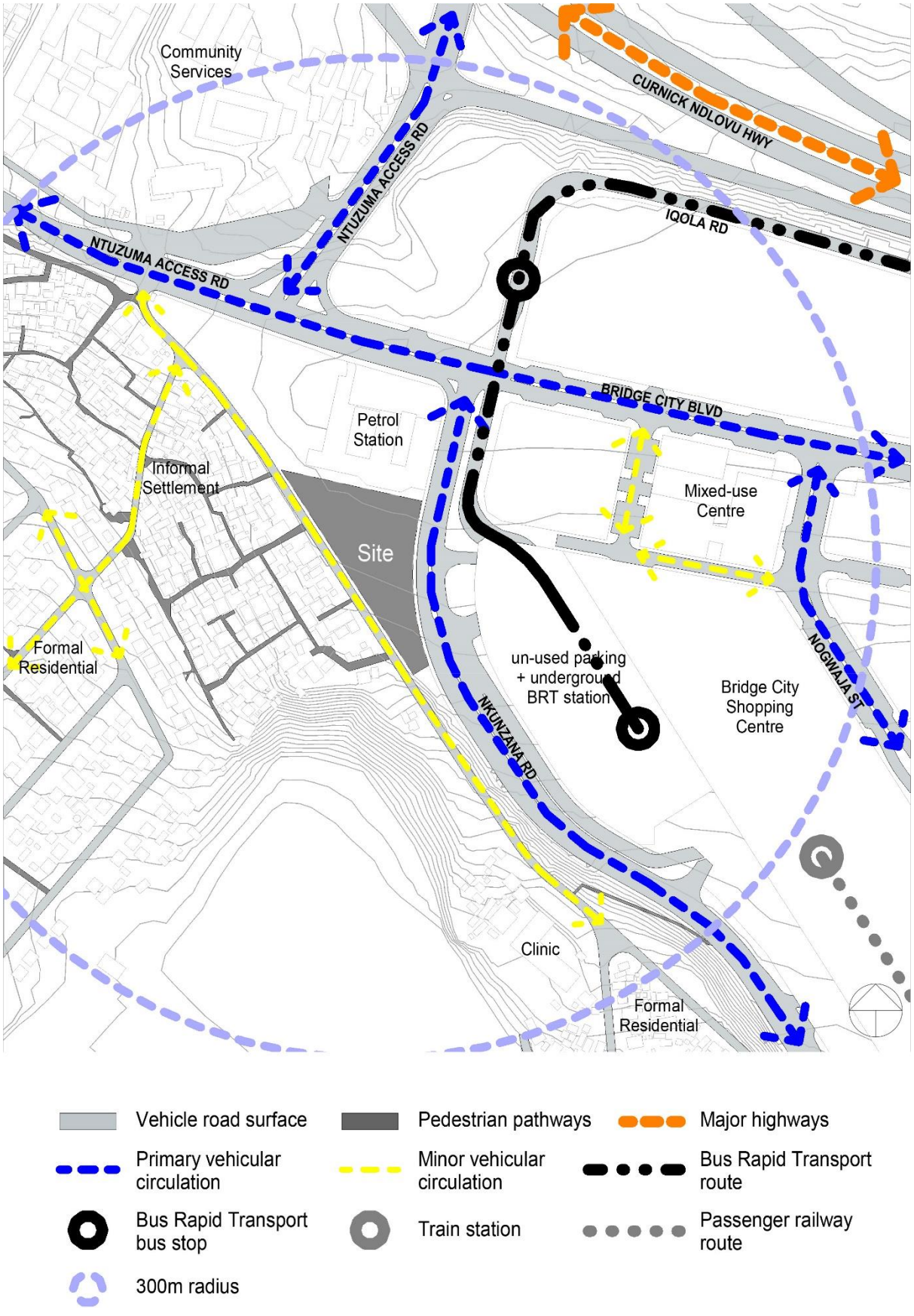


Figure 2.10 - Analysis of access routes and public transportation (Author, 2021)

Pedestrian Patterns

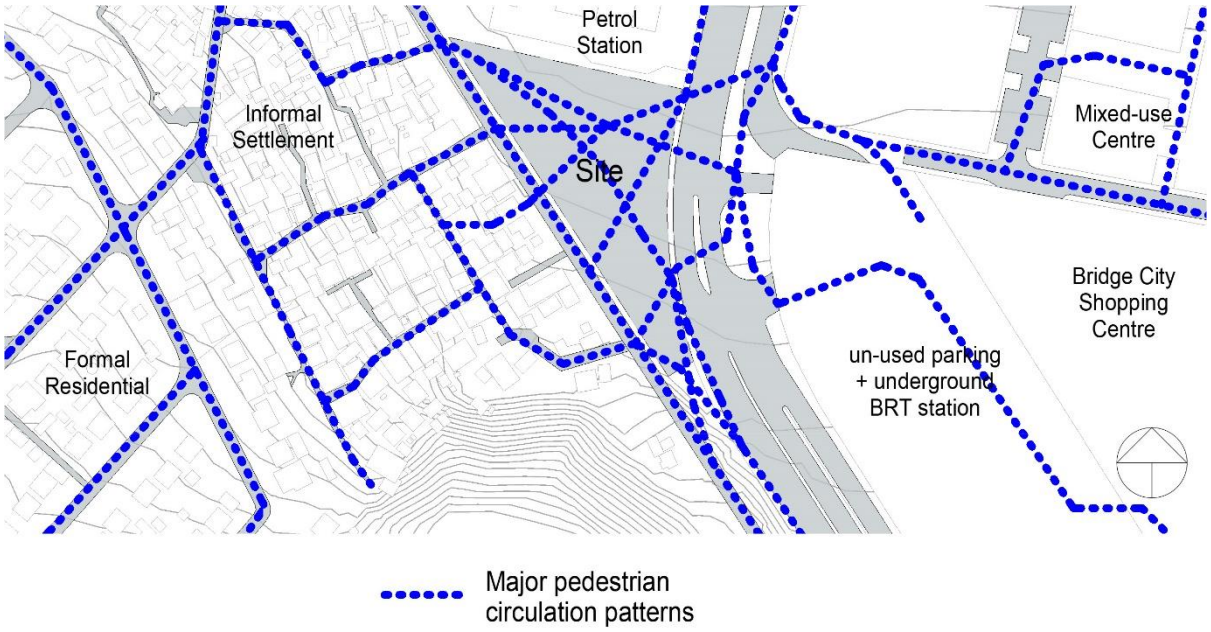


Figure 2.11 - Analysis of pedestrian circulation patterns (Author, 2021)

Climate, Views and Noise

Figure 2.12 - Analysis of Climate, views and noise (Author, 2021)

Site Response Considerations

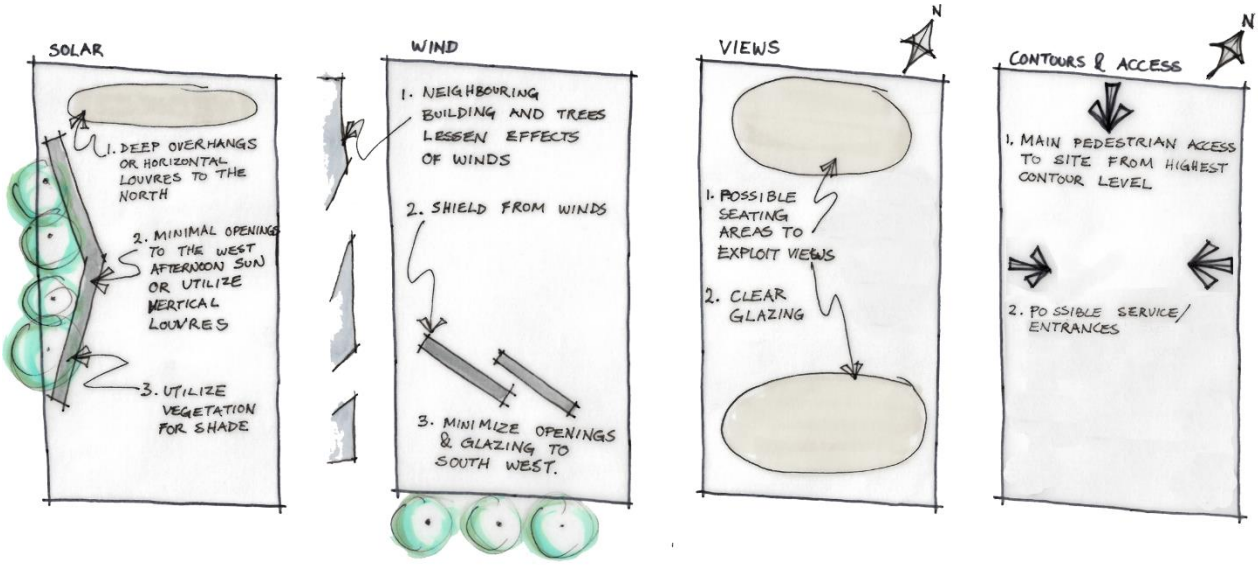


Figure 2.13 - Site response considerations (Author, 2021)

2.6 Conclusion

The site selection process has been discussed, indicating the characteristics that determined the selection of Site 1 as the proposed site for the CET centre. The historical background and location of the site was stipulated. A survey and analysis of the existing site and contextual conditions have been documented and displayed. All these undertakings have assisted to further the understanding of the unique parameters of the site, the context of the community, in order to develop the most appropriate architectural design solutions for the design proposal.

The following chapter expresses the design development process and the resolution of the CET centre proposal.

3 CHAPTER 3: DESIGN DEVELOPMENT AND RESOLUTION

3.1 Introduction

This chapter considers the unique parameters of the selected site and its context which was expressed in the previous chapter. This information together with the research findings was used to advance the development of the design project to the stage of resolution.

The chapter summaries the characteristics of the theories used to guide the design process. Five design drivers were derived and unpacked. The urban and architectural design and concepts are expressed, leading on from the drivers. The design developments are then indicated and the chapter concludes with the design resolution presentation.

3.2 Theoretical Framework

The three selected research theories: Place Theory, Critical Regionalism and Social Cognitive/Learning Theory which all fall under the field of Environmental Psychology are summarised below in terms of their characteristics that informed the design.

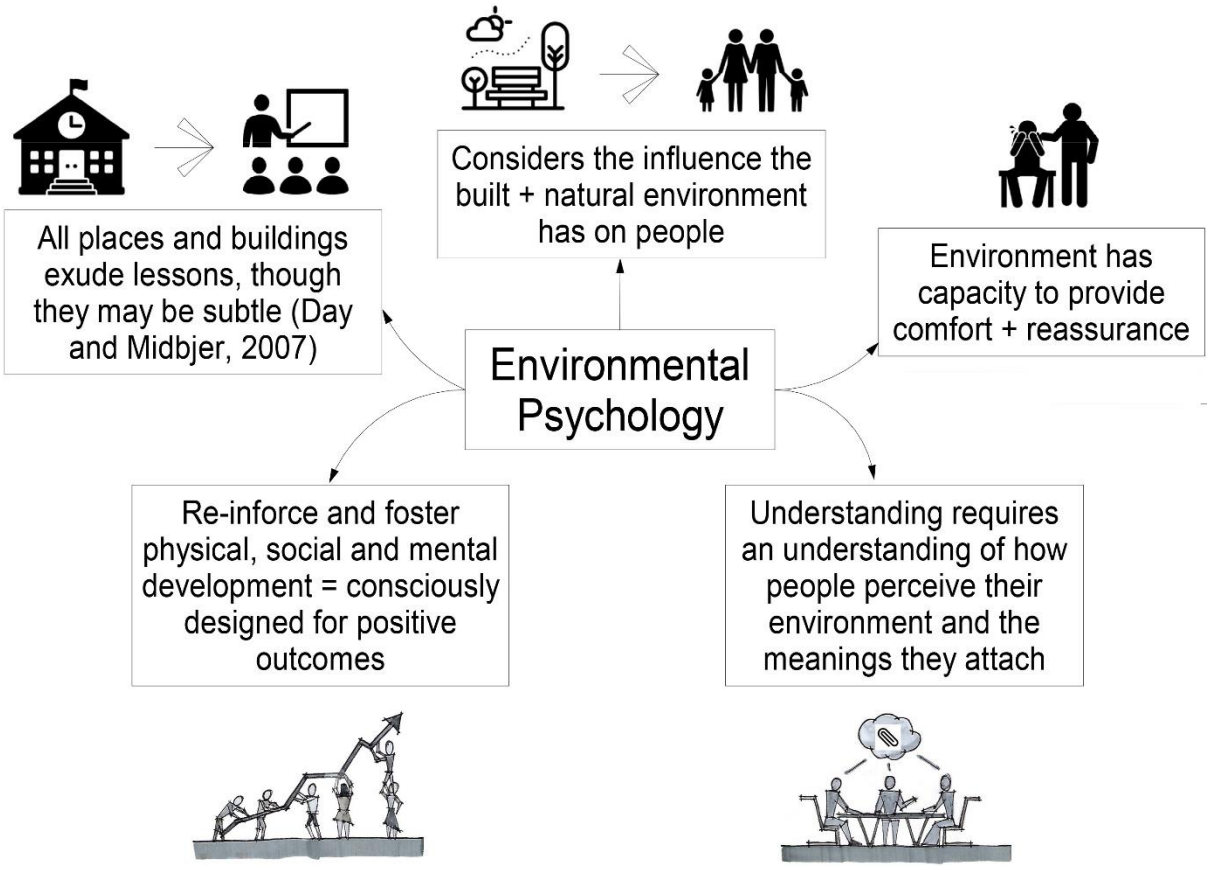


Figure 3.1 - Characteristics of environmental psychology (Author, 2021)

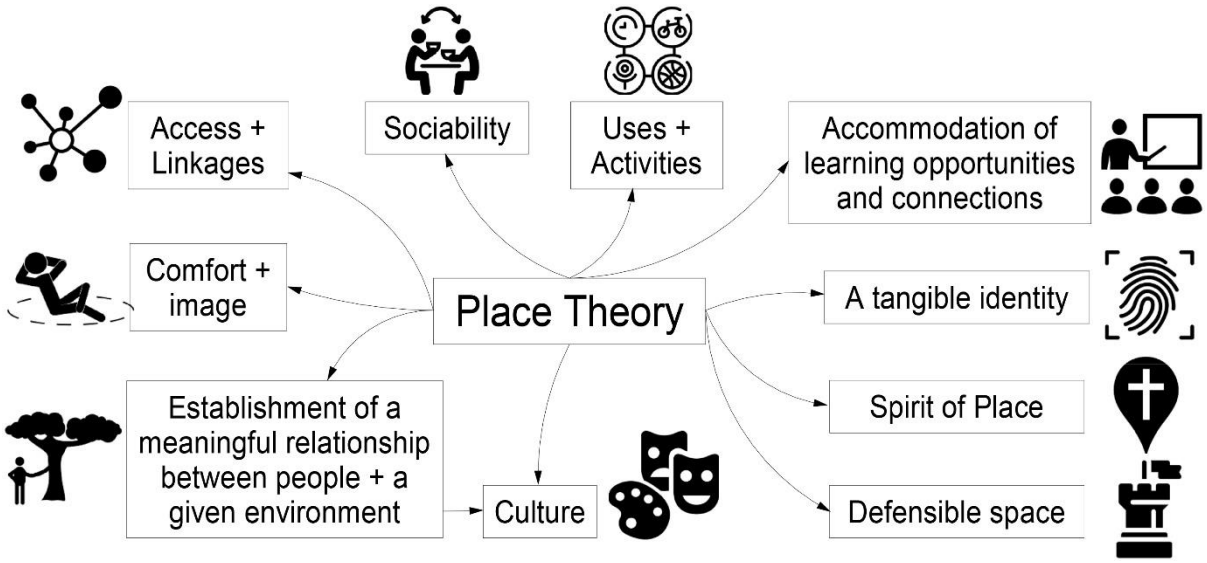


Figure 3.2 - Characteristics of Place Theory (Author, 2021)

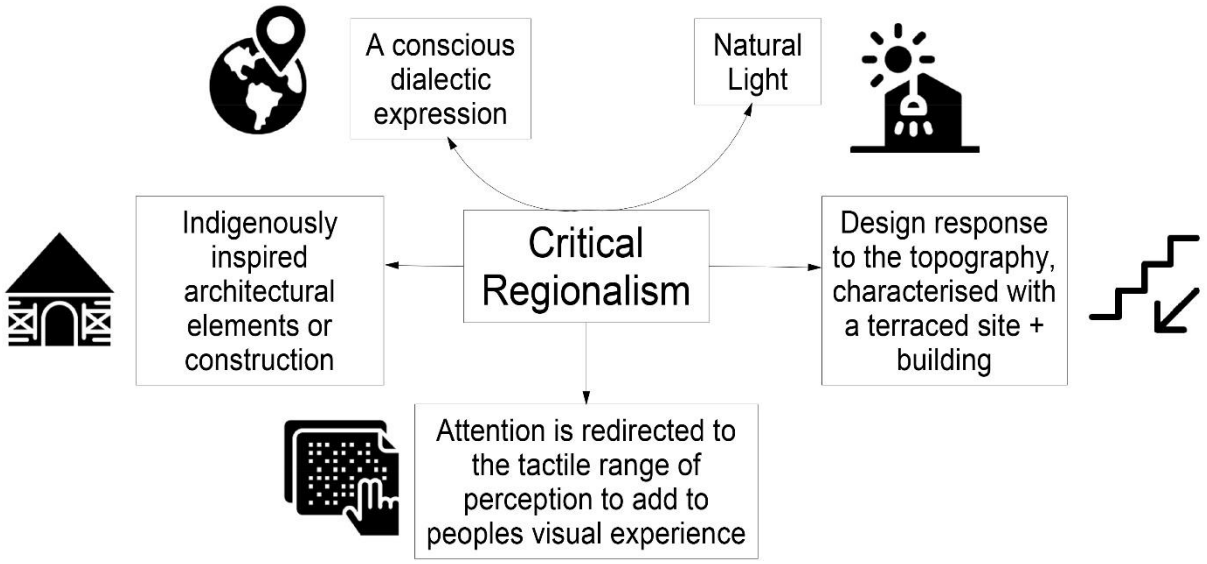


Figure 3.3 - Characteristics of Critical Regionalism (Author, 2021)

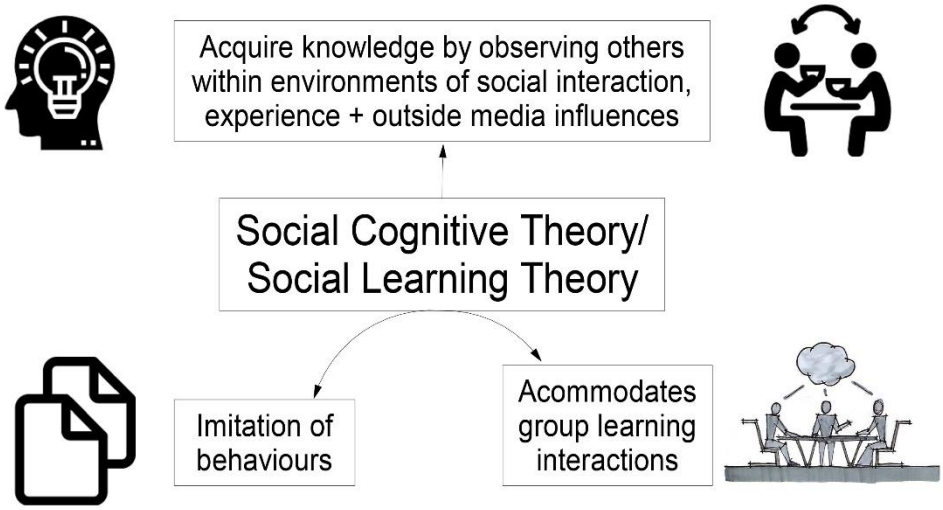


Figure 3.4 - Characteristics of Social Cognitive/Learning Theory (Author, 2021)

3.3 Design Drivers

The theories and research findings informed five design drivers, namely, community access and interaction, a variety of learning spaces with diverse spatial experiences, visual connections to education, cultural representation of the community, and inspirational and aspirational contemporary spaces.

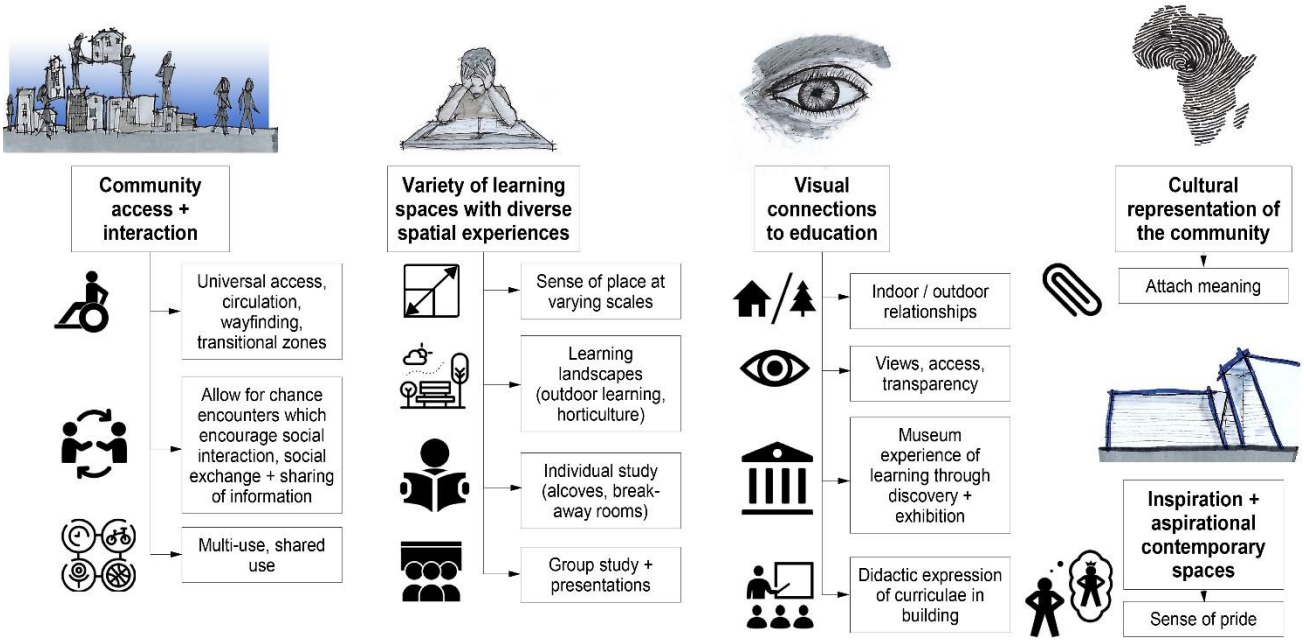


Figure 3.5 - Design drivers (Author, 2021)

3.3.1 Urban Design Concept Development

The urban response to the existing site conditions primarily proposed enhanced access and linkages, and increased uses and activities, in line with place making principles. The proposal was careful not to severe existing movement patterns, but instead, formalise these paths, and enhance the pedestrian experience.

The conceptual models below indicate how the site massing where was deconstructed to accommodate and enhance pedestrian circulation, whilst at the same time creating public accessible areas for pause and interaction, and accommodating the required accommodation needs for the community education and training centre.

The urban response reaffirms the ethos of Bridge City, providing the opportunities to bridge communities, existing to new, and verse versa, whilst connecting patrons to education.

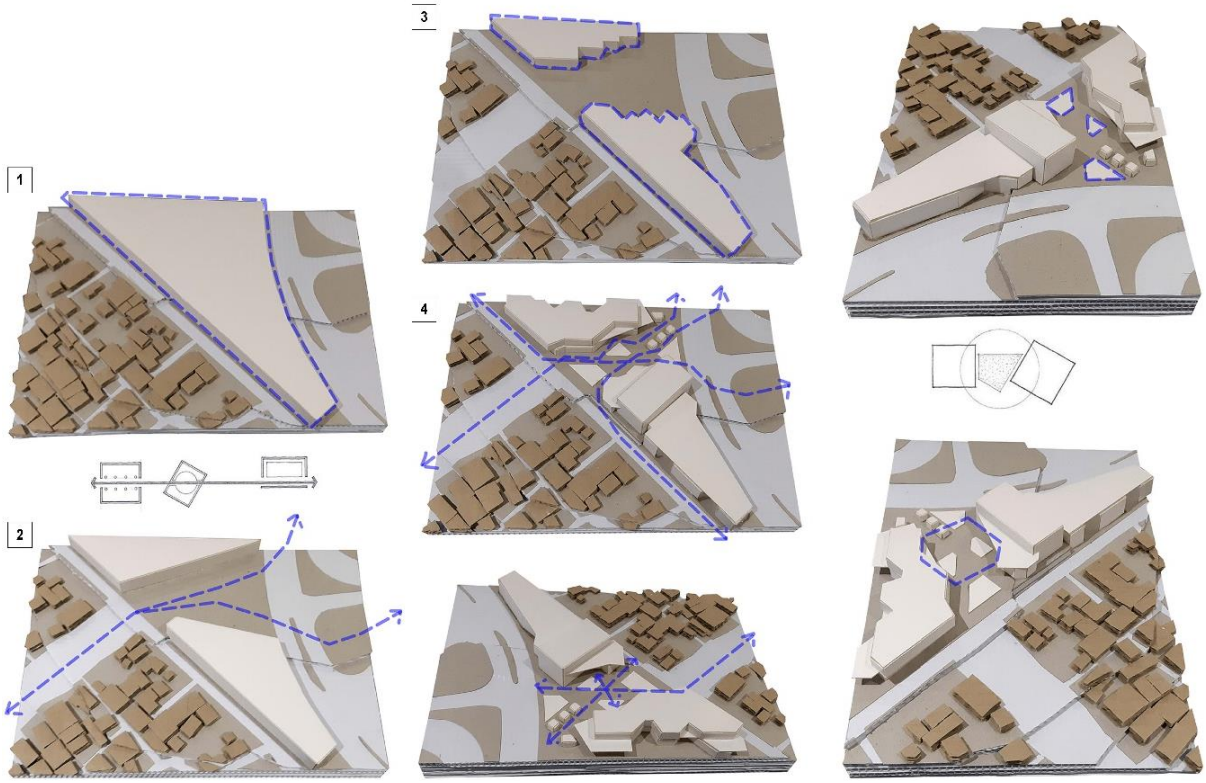


Figure 3.6 - Conceptual contextual models (Author, 2021)

3.3.2 Architectural Design Concept Development

The design concept “It takes a village” heralds from the idiom “it takes a village to raise a child”. The idiom signifies community involvement in development, which together with the effects of environment, is what the community education and training centre seeks to facilitate for adults.

Figure 3.7 – Architectural design concept diagram collated by Author (2021)

3.3.2.1 Conceptual Spatial Arrangement

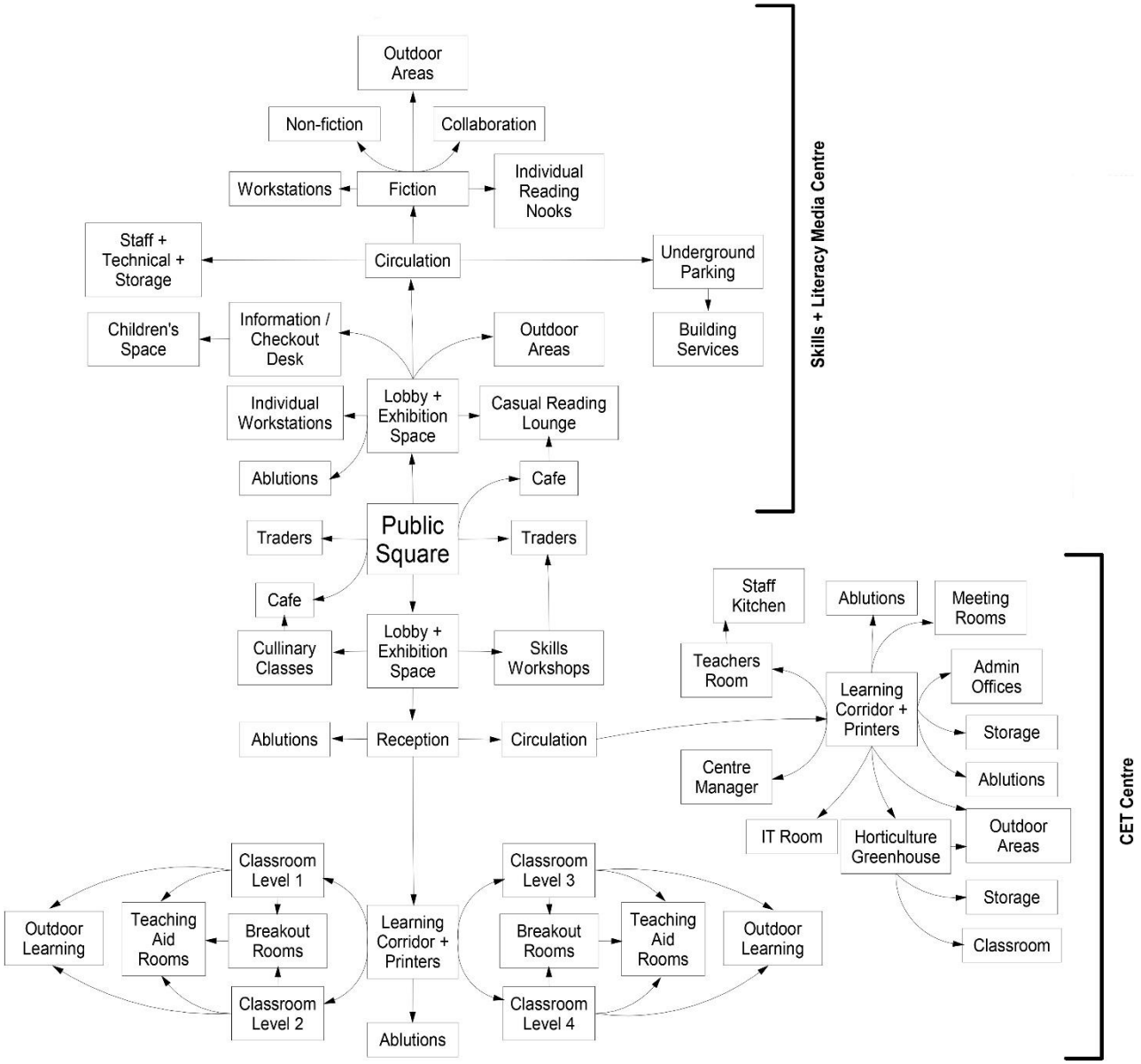


Figure 3.8 | Above - Spatial relationships indicated as conceptual spatial arrangement (Author, 2021)

Figure 3.9 | Right - Spatial intimacy gradient in plan and section (Author, 2021)

3.3.2.2 Spatial Development

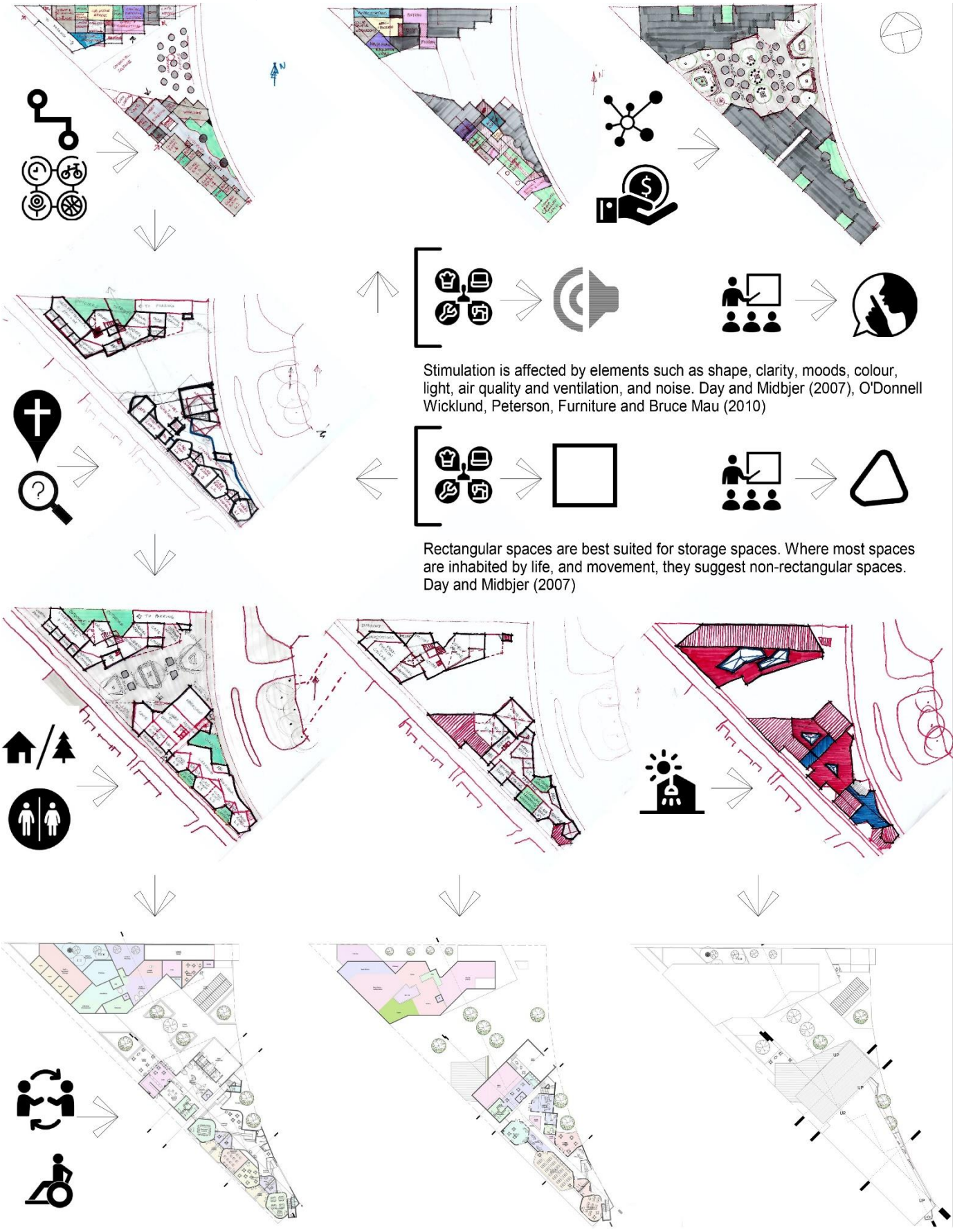


Figure 3.10 - Spatial development drawings (Author, 2021)

The design sketches that are represented in the previous page as well as below are an interpretation of the research findings in the form of plans, section, and elevations. The design accommodates diverse spatial experiences, that accommodate learning and interaction. From pragmatic vocational learning environments with exposed didactic expressions to more dynamic spaces for literacy and informal learning. Spaces included space for individual and group learning, and visual connections to learning.

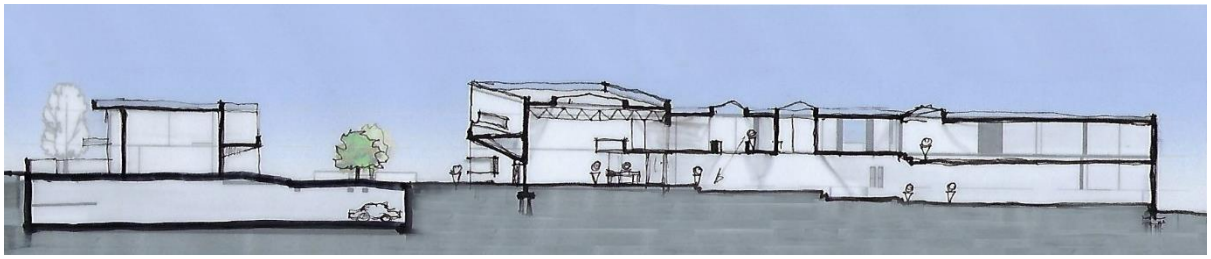


Figure 3.11 - Conceptual section through entrance and main circulation (Author, 2021)

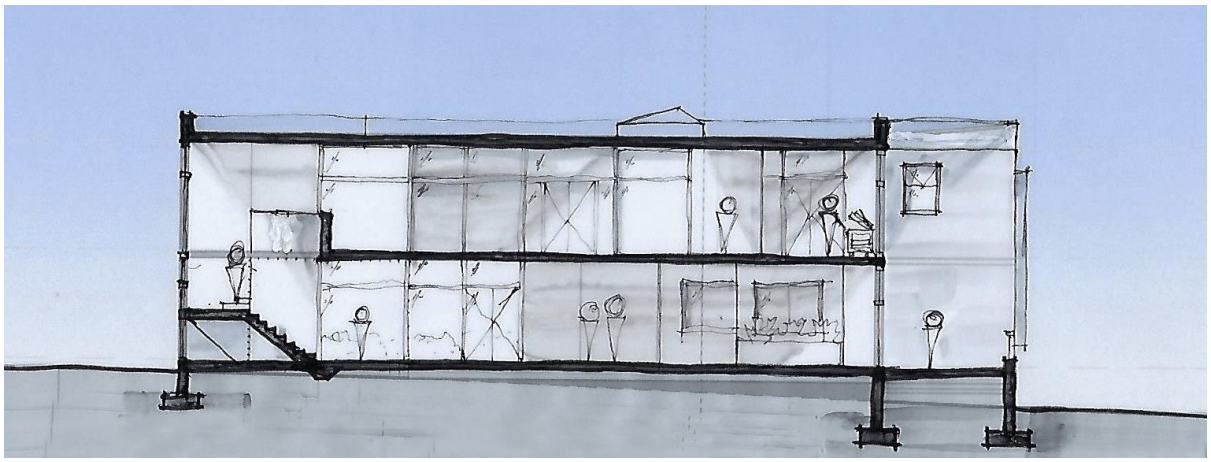


Figure 3.12 - Conceptual section (Author, 2021)

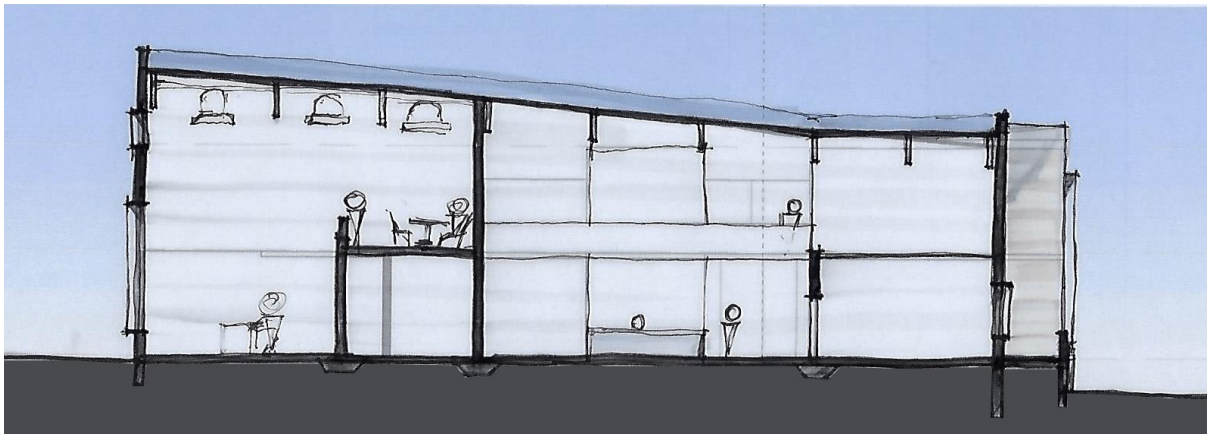


Figure 3.13 - Conceptual section through double volume lobby and workshops (Author, 2021)

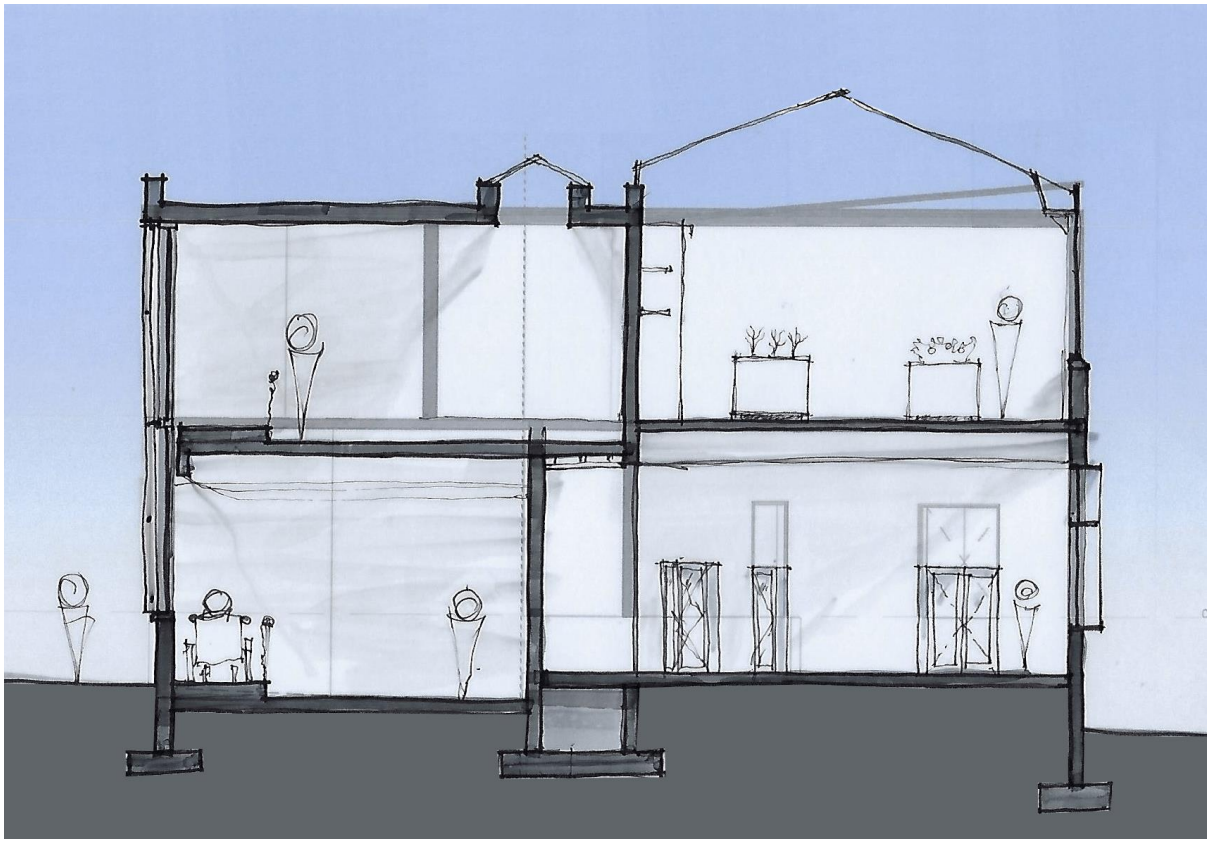


Figure 3.14 - Conceptual section indicating universal access, and visual access through indoor/outdoor relationships (Author, 2021)

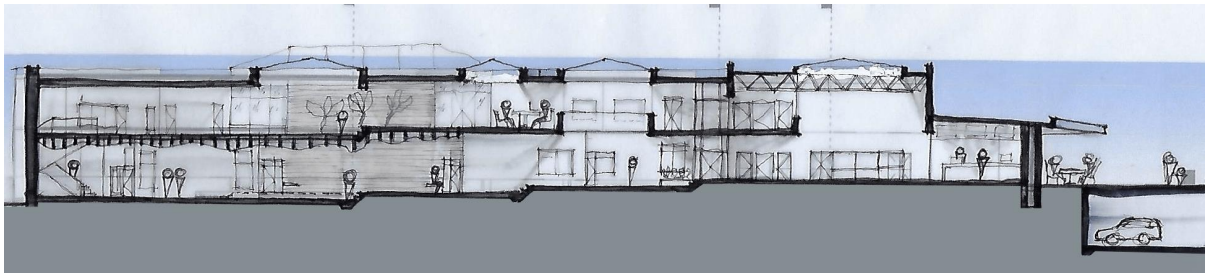


Figure 3.15 - Conceptual section through entrance, main circulation and double volumes (Author, 2021)

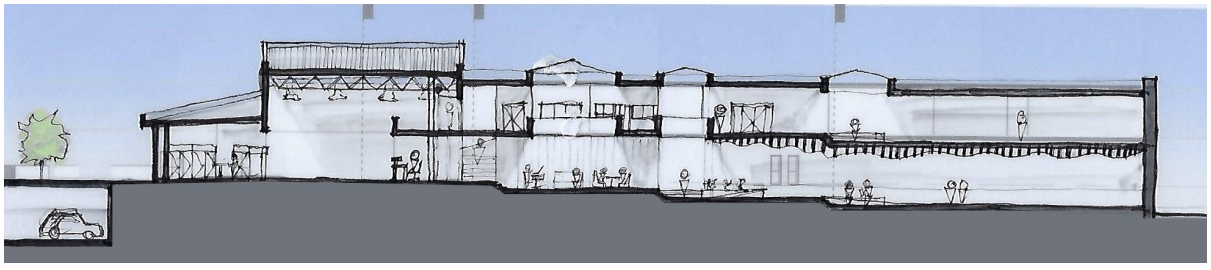


Figure 3.16 - Conceptual section through entrance, main circulation and double volumes (Author, 2021)

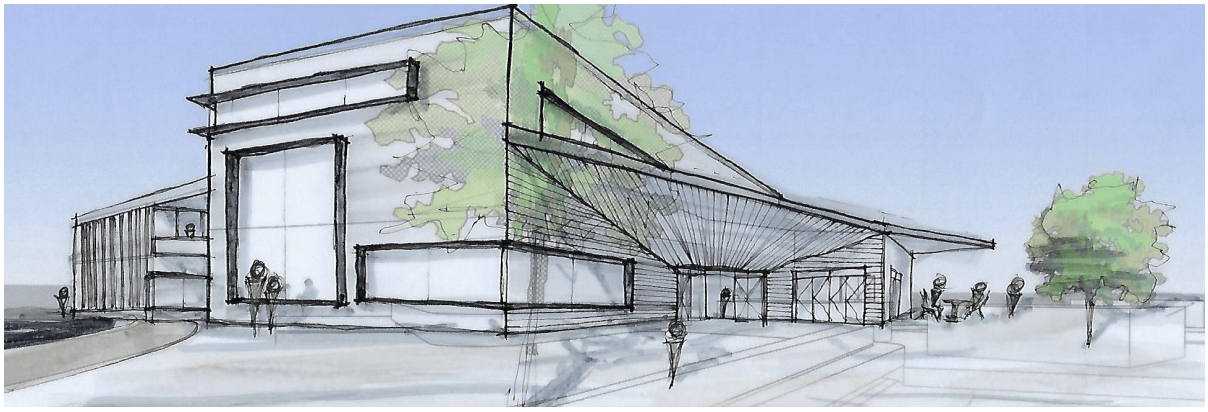


Figure 3.17 - Conceptual perspective sketch (Author, 2021)

3.3.2.3 Form Development

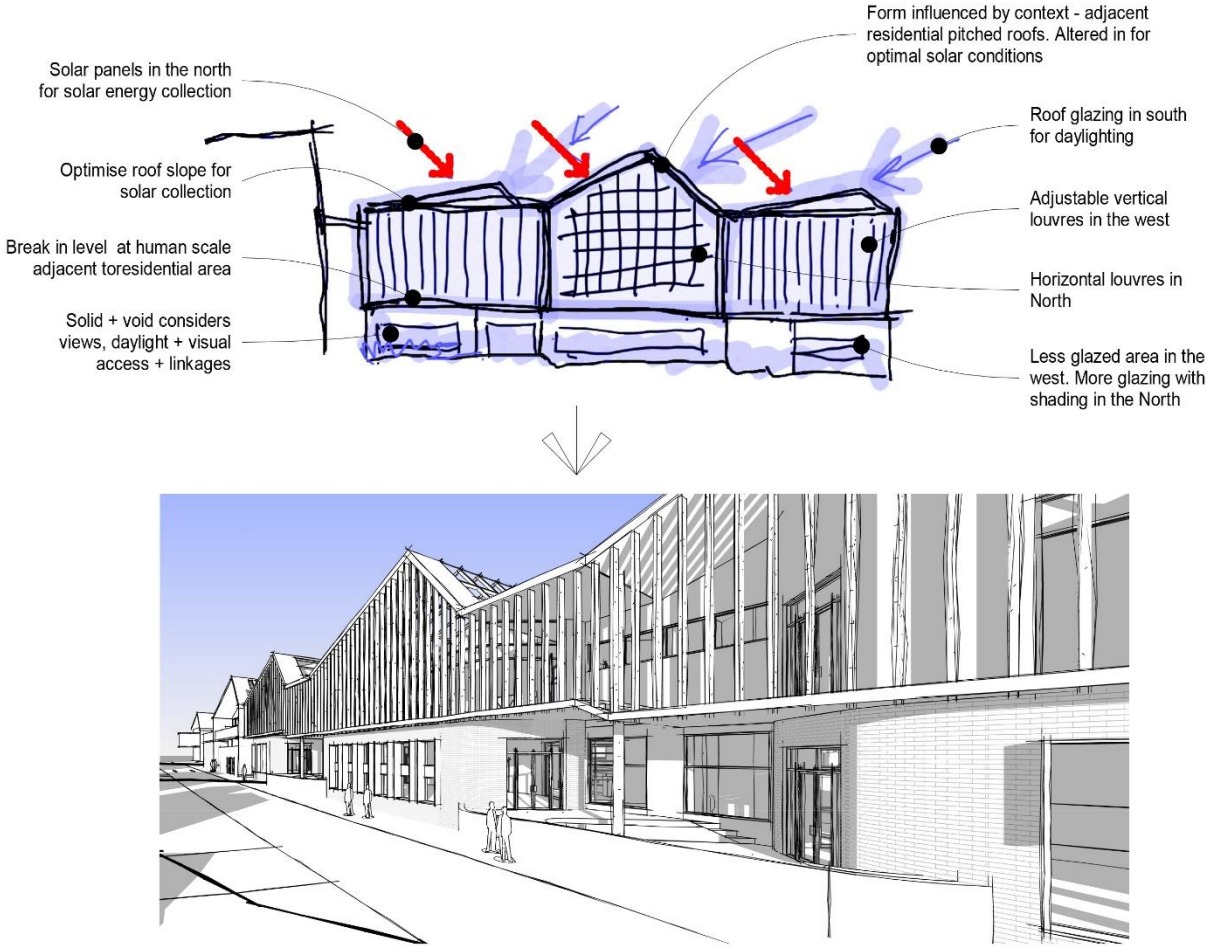


Figure 3.18 - Form development (Author, 2021)

Sustainability is considered in the large, glazed facades and ventilated patent glazing for maximum natural daylight. The mass folded concrete structure provides thermal mass for thermal insulation and heat gain during the day and radiation into the building in the

evenings. The building is supplemented by Mechanical ventilation to ensure thermal comfort and air quality. The roof slope has been optimised for solar energy collection.

3.3.2.4 Materiality

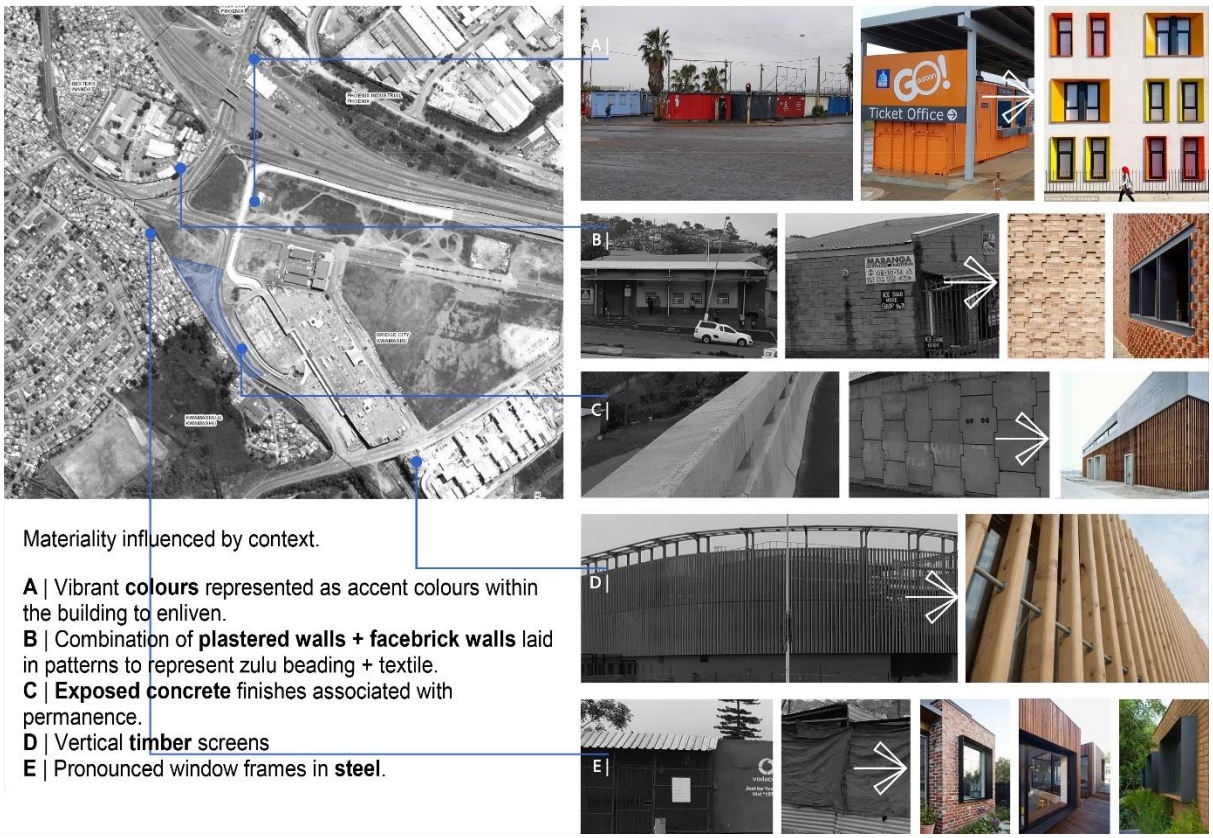


Figure 3.19 - Locally inspired materiality and representation (Author, 2021)

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Tongaat Hulett Developments. 2017. *Bridge City: Home* [Online]. Available: http://www.bridgecity.co.za/ [Accessed 03/02/2018 2018].

3.4 | Final Design Resolution

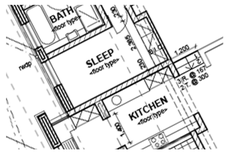
FACILITATING ADULT LEARNING THROUGH RESPONSIVE ARCHITECTURE

the design of a community education + training centre in
bridge city town centre, durban

Thobani Gumede | 208508383

Synthesis of Research

Introduction



Architecture forms an integral role in education and training as a form of a teaching and learning aid, in which it can allow for the creation of physical environments that may foster suitable conditions for learning to take place.

Motivation

The transformation of CET Colleges to respond to community needs

Eradicating adult illiteracy

Provide an ideal opportunity for skills development and learning towards global standards and quality

Affording flexible lifelong learning through second-chance opportunities for adults to complete their schooling.

Universal access to education and training that transcends physical ability, gender, and economic status

Research Problem

Current learning infrustructure not responsive to needs of adult learners, staff + community

Lack capacity + institutional identity as they were primarily dependant on public school infrustructure

Absence of resources + learning environments inhibits the facilitation of the CET Programmes

Classes only in the evenings are not the ideal for all learners due to safety concerns of unemployed female learners

Bad memories

Fewer employment opportunities

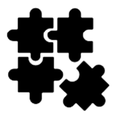
Lack of iconic presence + pride

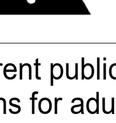
Often limited access to toilets + basic services

Proximity to community, transport + amenities

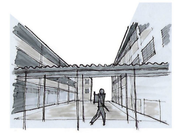
The current public institutions for adult learning were poorly articulated

Lack of infrastructure for skills training





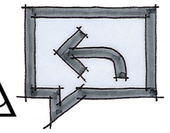
Problem Statement



Post-1994, uneducated adults in the townships were still at a disadvantage. Their employability and ability to acquire complex skills synonymous with the digital age was significantly reduced in comparison to their educated counterparts. The current adult education and training infrastructure and lack thereof were not responsive to the needs of the students, staff, and community as a whole.

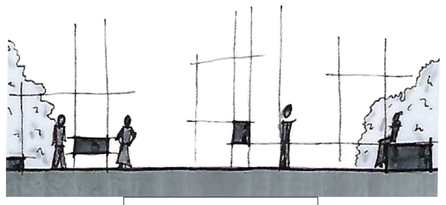
Key Question

What are the unique requirements and architectural qualities that could enhance adult learning whilst being contextually responsive?

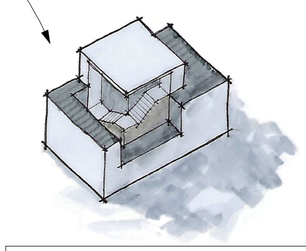


Sub Questions

a. What impact does location and urban planning have when siting an educational facility?

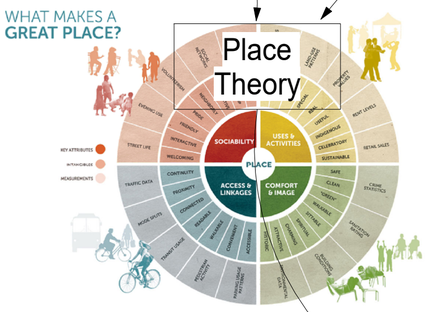


b. What are the spatial needs of adult learners?



c. How can architecture and the built environment stimulate learning?

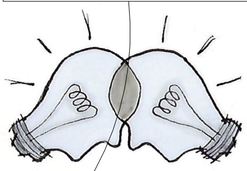
Theories

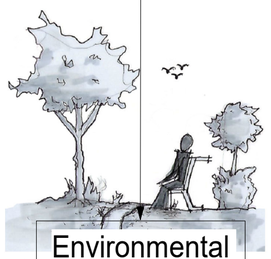


Place Theory

Critical Regionalism

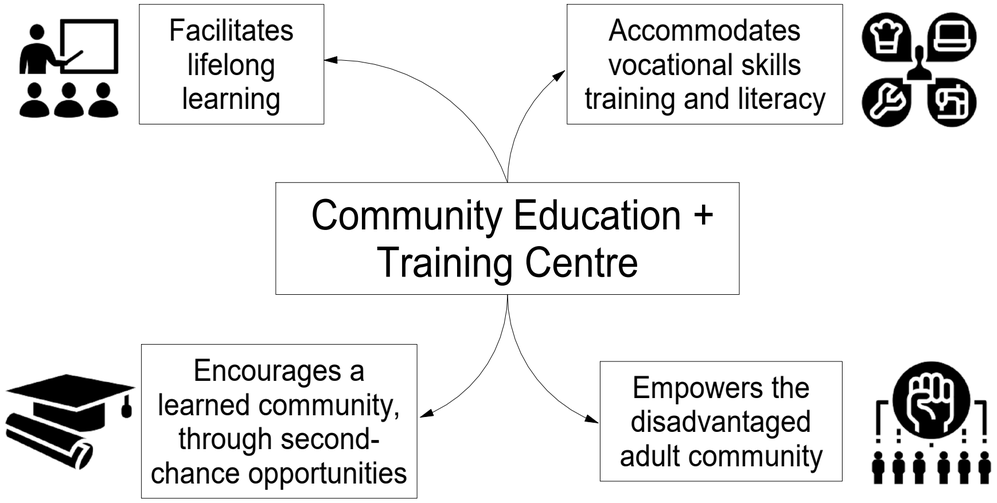
Social Cognitive / Learning Theory



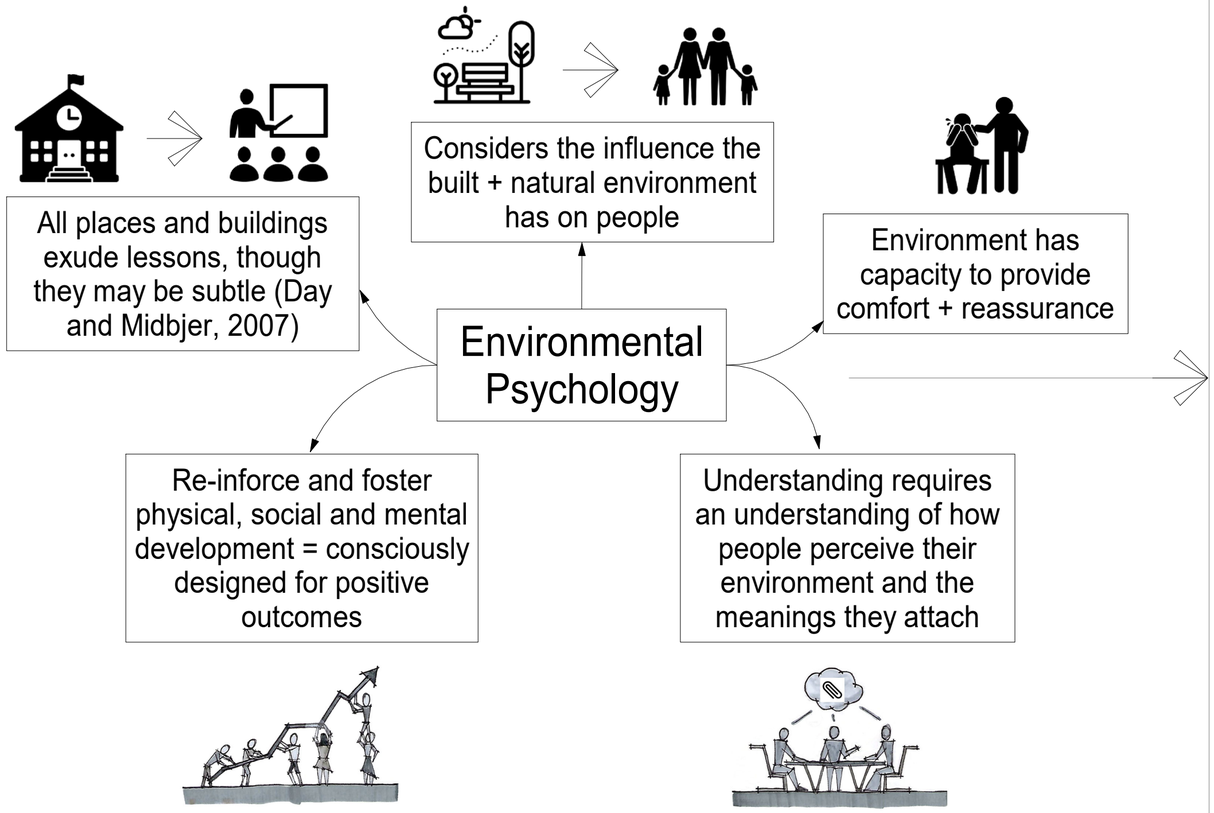


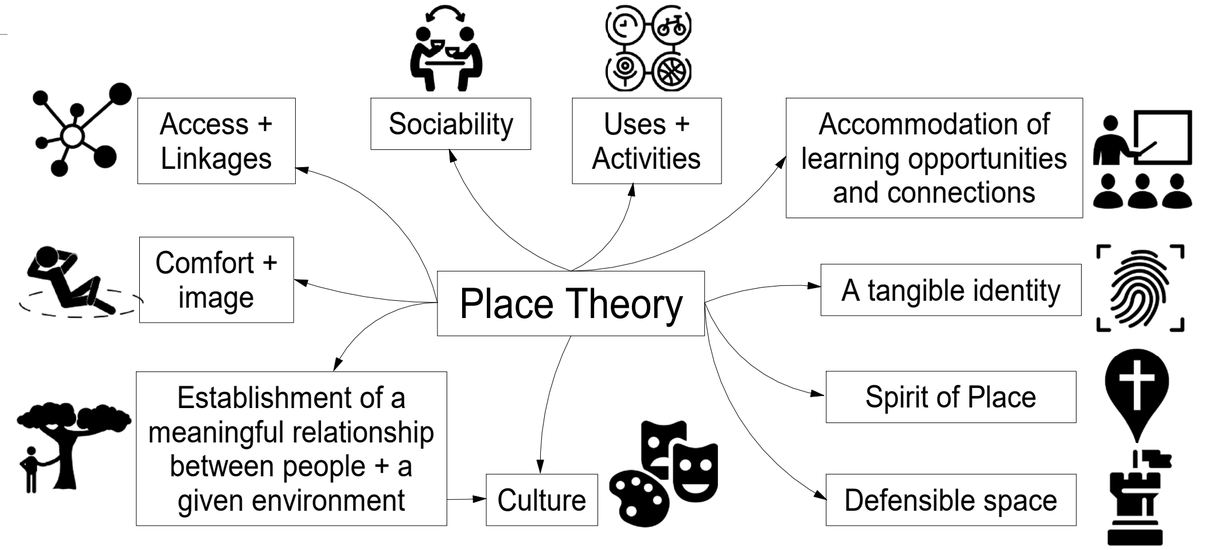
Environmental Psychology

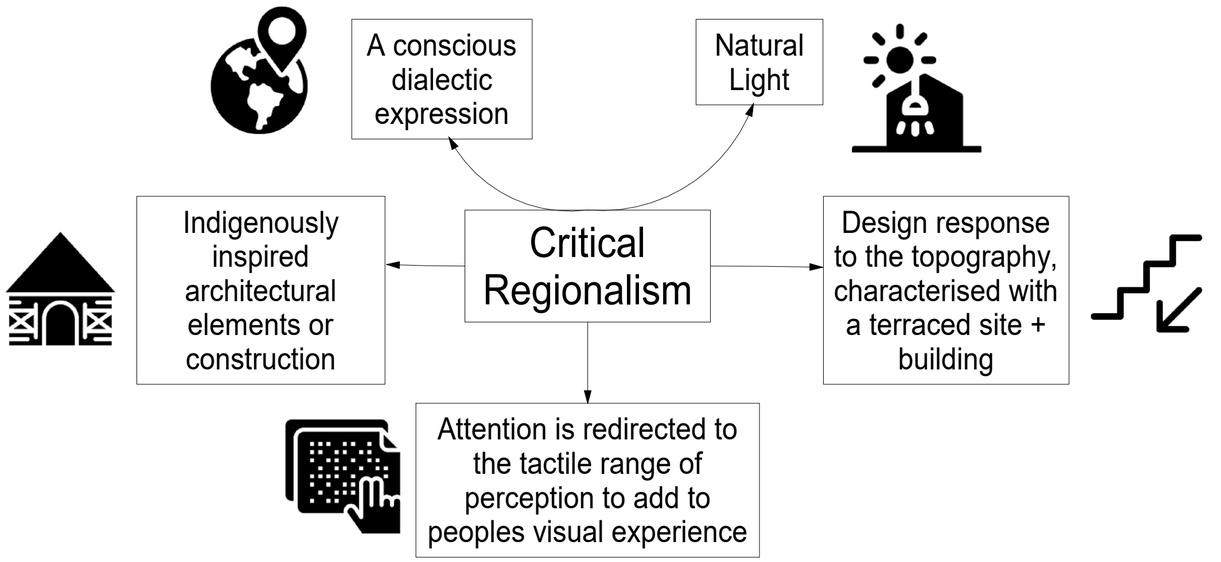
Justification of Typology

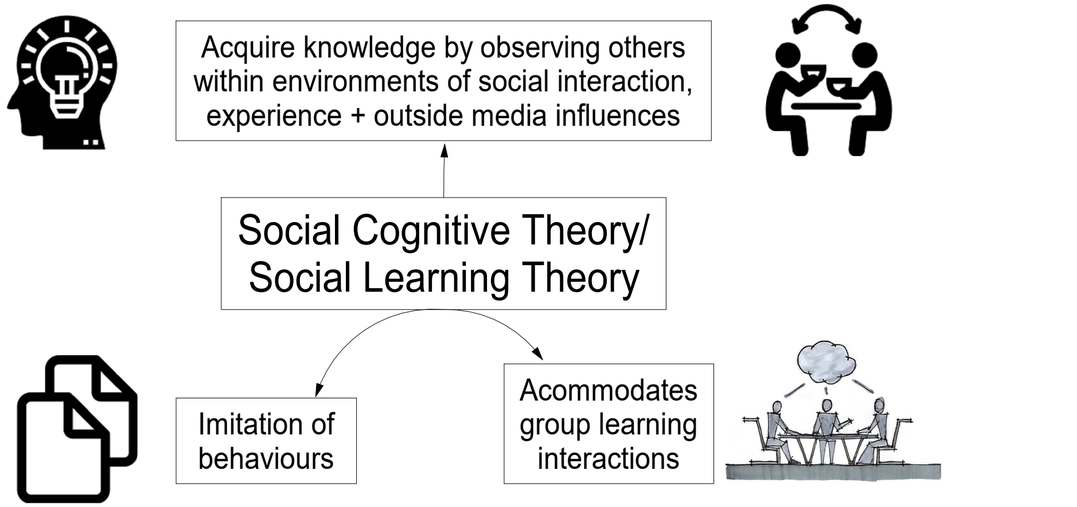


Theoretical Framework



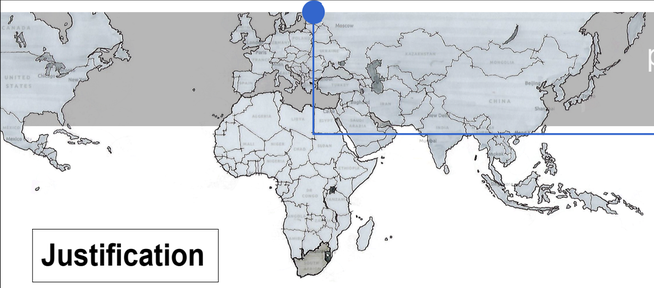






precedent analysis

Muanula House



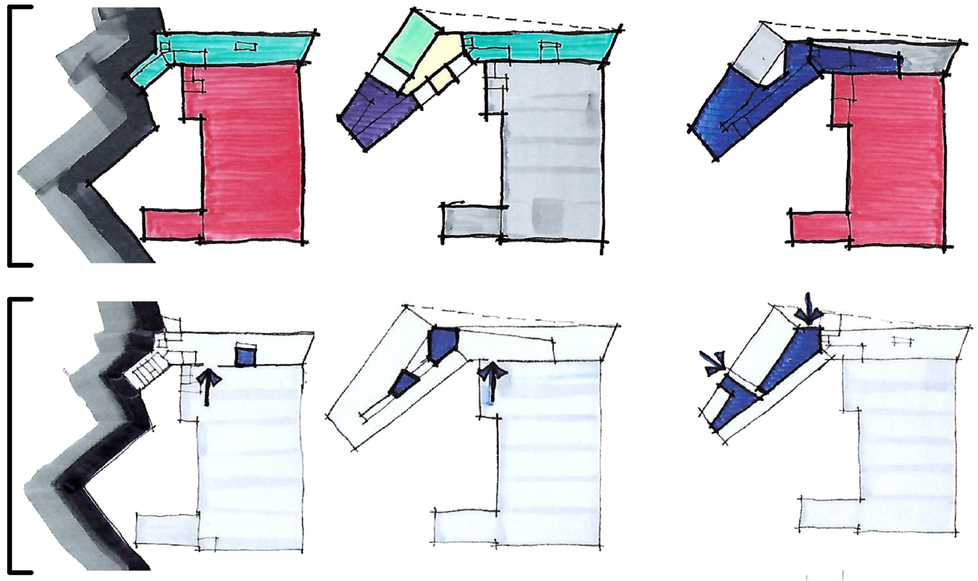
Helsinki, Finland

Justification

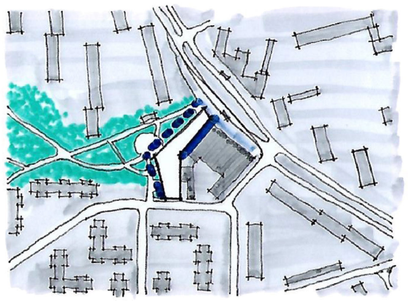
International precedent | Selected based on its combination of uses based on the needs of the community, conveniently located to shops + other amenities.

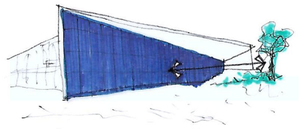
Attributes

Mixed-uses increase utilisation



Shared spaces centrally located + linked to adjacent space + entrances

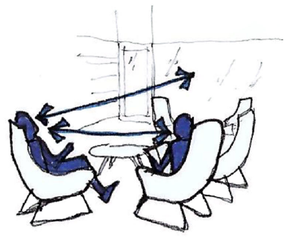


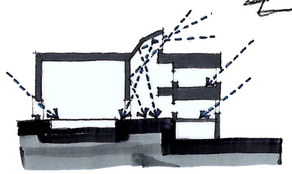


Indoor / outdoor connection

< Locality + building edges

Social interaction + connection >





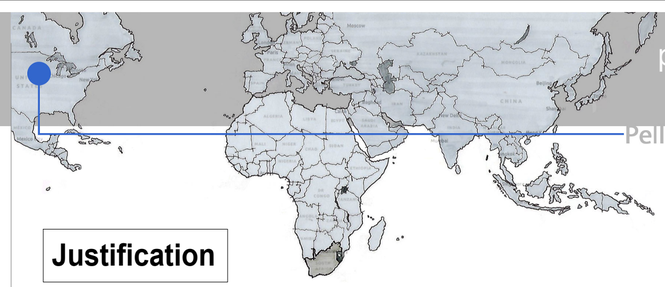
< Daylighting

Theory Links

- Place Theory
- Critical Regionalism
- Social Cognitive / Learning Theory

precedent analysis

Career Academy of Pella

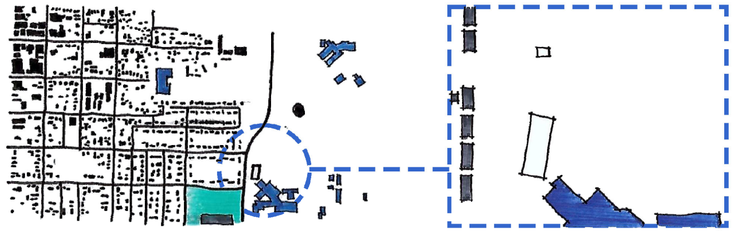


Pella, United States of America

Justification

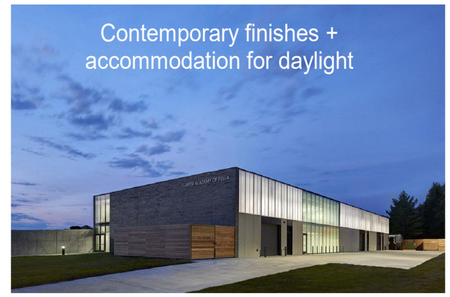
International precedent | Selected based on its primary use of space dedicated to vocational workshops, in a pragmatic + contemporary form + aesthetic, + curriculum expression.

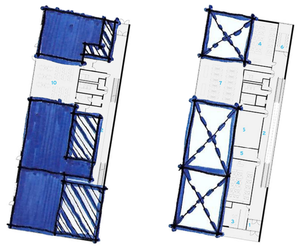
Attributes



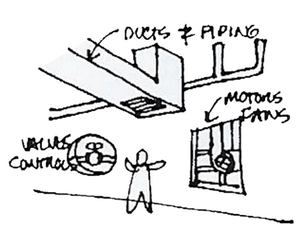
Forms part of an educational precinct

Adjacent to residential area





Simple utilitarian forms + supporting spaces for vocational spaces



Exposed hidden systems in vocation workshops + circulation spaces >

Theory Links

- Place Theory
- Critical Regionalism

precedent analysis

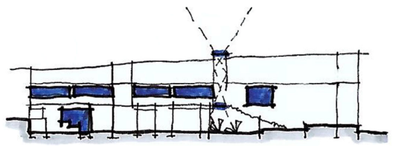
Grantleigh Titanium Learning Centre

Richards Bay, South Africa

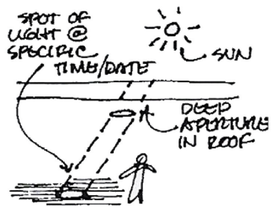
Justification

Local precedent | Primarily selected for its didactic expression of its curriculum - the sciences - in the building.

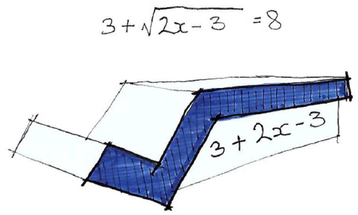
Attributes



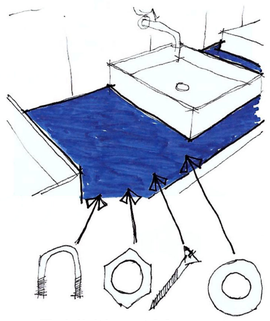
Daylighting



Solar alignment

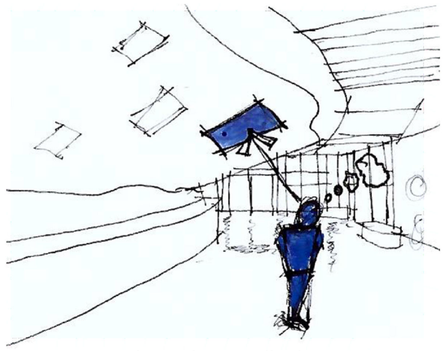


Didactic furniture

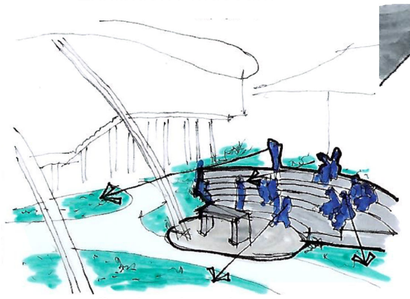


Exhibition / Museum

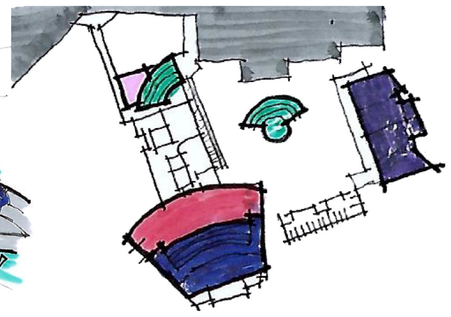
Didactic signage

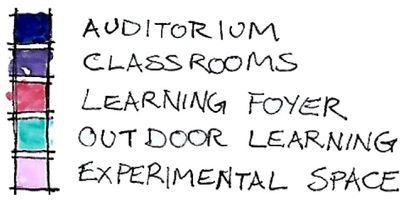


Learning on display



Outdoor learning





Diverse learning spaces

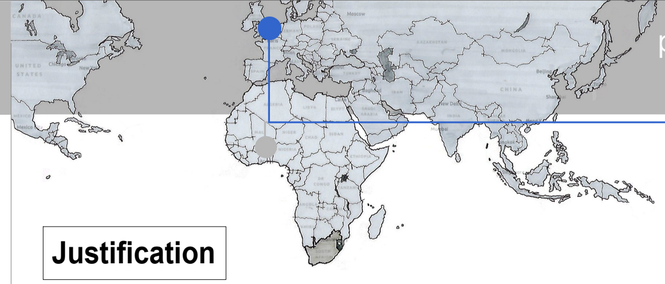
Theory Links

- Place Theory
- Critical Regionalism
- Social Cognitive / Learning Theory

precedent analysis

Francis Kere's 2017 Serpentine Pavilion

London, United Kingdom

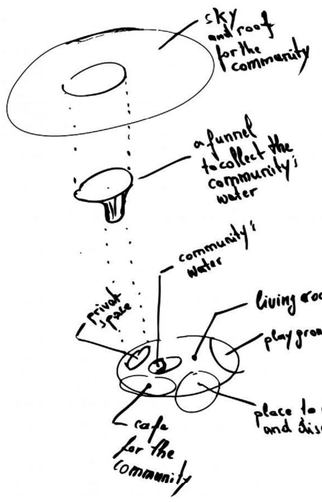


Justification

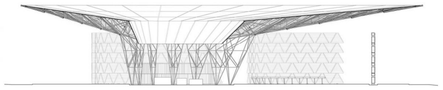
International precedent | Selected based on the abstract and contemporary instrinsic cultural representations expressed by the pavilion, as oppose to literal cliches and superficially applied treatments.

Attributes

Conceptual planning



Tree of Community interaction representation

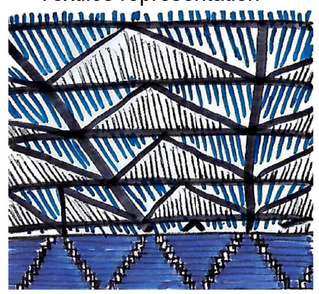


Multiple settings for interaction

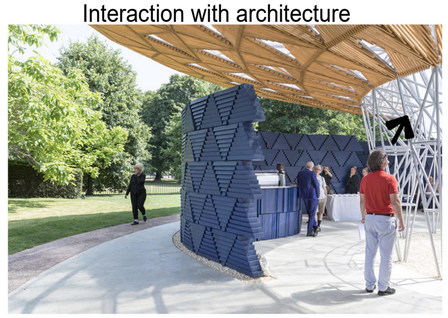
Settle, transverse, socialize, admire

Sustainability

Textiles representation

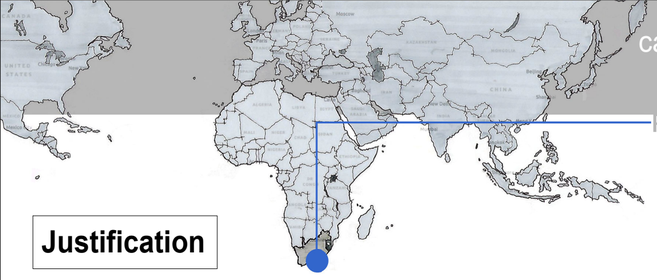


Interaction with architecture



Theory Links

- Place Theory
- Critical Regionalism
- Social Cognitive / Learning Theory



case study analysis

Ubuntu Centre

Port Elizabeth, South Africa

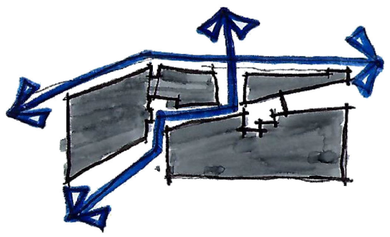
Justification

Local case study | Selected based on response to its contextual conditions, community requirements, and its architectural design seeking to inspire a sense of pride and stimulate community aspirations.

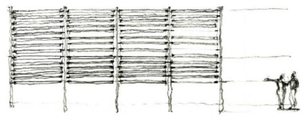
Attributes

Pedestrian pathways >

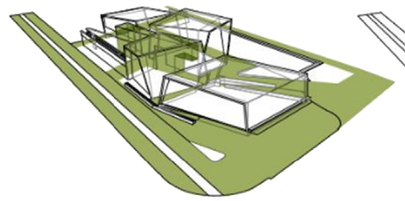
Built response to pathways



Breaking barriers with permeable gumpole sunscreens

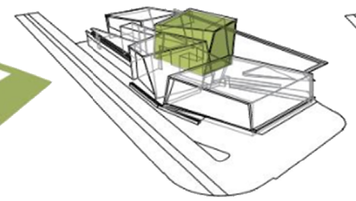


Complimentary mixed uses for a holistic approach



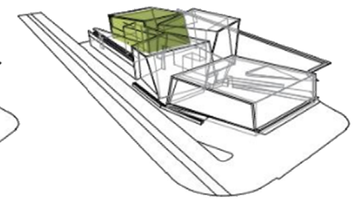
1 PEDESTRIAN CIRCULATION

- Non-congestive extension of pedestrian footpaths
- Connect major public facilities
- Accessible 24 hours



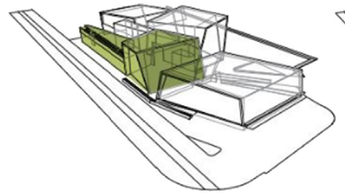
2 UBUNTU HALL

- Training space for schools, clinics and NGOs
- Meeting space for 250 people
- Theatre for after-school programming, holiday camps, and performances
- Cafeteria with catering facilities



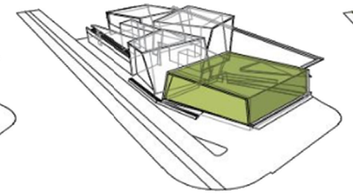
3 HIV/TB CLINIC

- HIV & TB testing site and laboratory
- HIV management and support facility
- Family and child-friendly counselling rooms



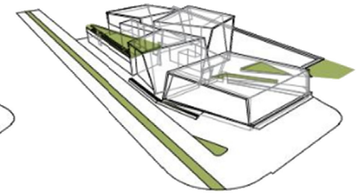
4 UBUNTU STAFF OFFICES

- Office space for up to 250 staff
- Conference rooms and workshop space
- Handicap accessible
- Adequate parking



5 EMPOWERMENT CENTRE

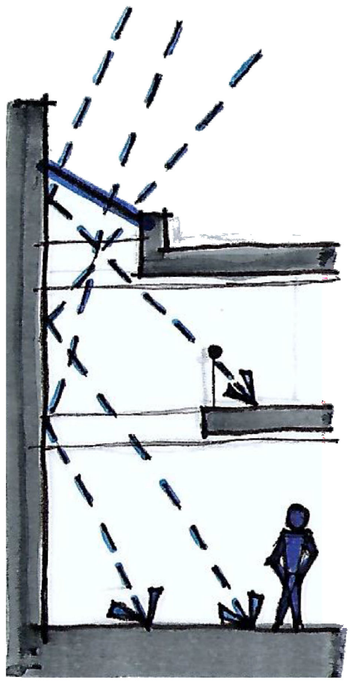
- Multimedia research room
- Computer laboratory
- Group study areas
- Career guidance and bursary administration facility
- Psychosocial Counselling Facility



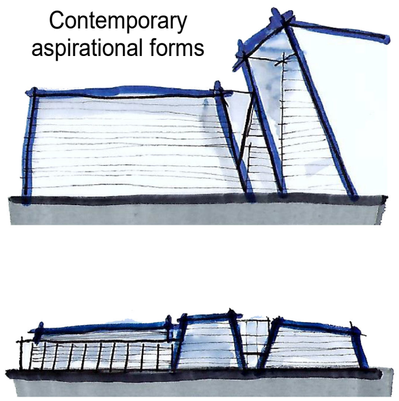
6 PUBLIC AND ROOFTOP GARDEN

- Shaded pedestrian promenade "Avenue of 1000 trees"
- Seasonal rooftop vegetable garden

Daylighting

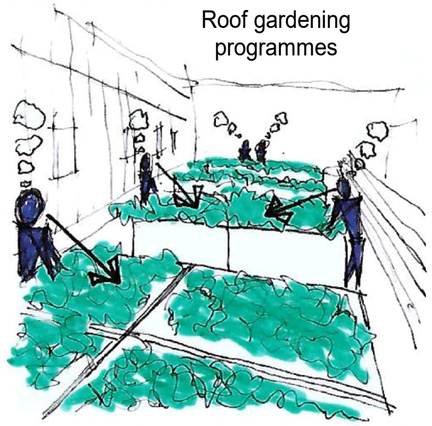


Contemporary aspirational forms

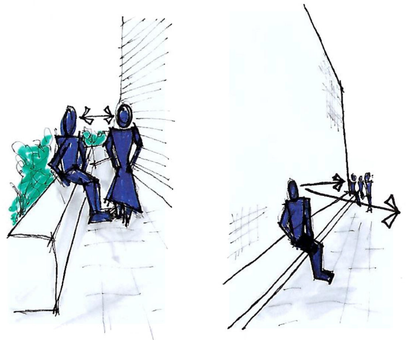


local artwork + woodwork

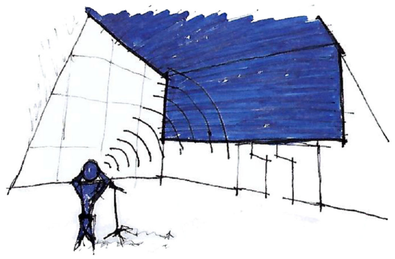
Roof gardening programmes



Seating for pause + interaction

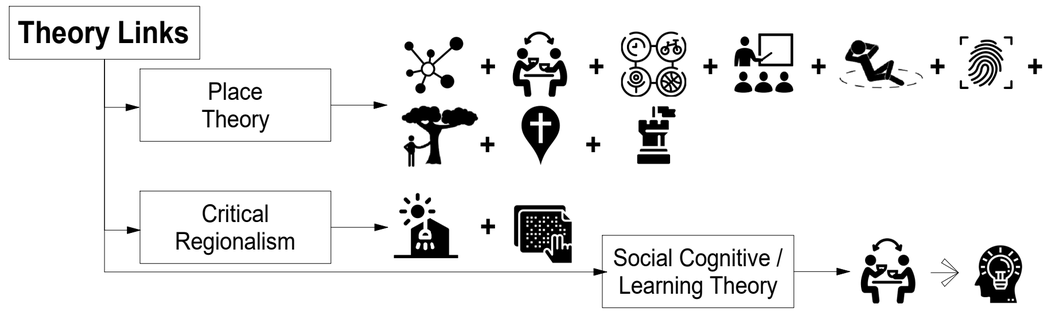


Accoustics



Materials of permanence

Theory Links



Findings

a. What impact does location and urban planning have when siting an educational facility?

- Location has paramount importance
- An understanding of the unique parameters of the following elements develops the best architectural design solutions:
  - Site
  - Context
  - Client
  - Desired uses
  - Culture
  - Ethnicity
  - Movement patterns
  - Vernacular elements of the community

b. What are the spatial needs of adult learners?

- Dedicated learning environments that possess institutional identity independent of mainstream children's education
- Articulated environments
- Universal accesibility
- Well lit environments
- Well ventilated
- Toilets in close proximity to learning spaces
- Libraries
- Comfortable + ergonomic furniture at a suitable scale
- Outdoor learning environments designed with an educational value
- Vocational skills workshops
- Quiet spaces

c. How can architecture and the built environment stimulate learning?

- The students' perception
- Shape
- Form
- Colour
- Daylight
- Acoustics
- Didactic architectural expressions
- Soft nurturing environments
- Air quality
- Ventilation
- Curiosity + discovery

What are the unique requirements and architectural qualities that could enhance adult learning whilst being contextually responsive?

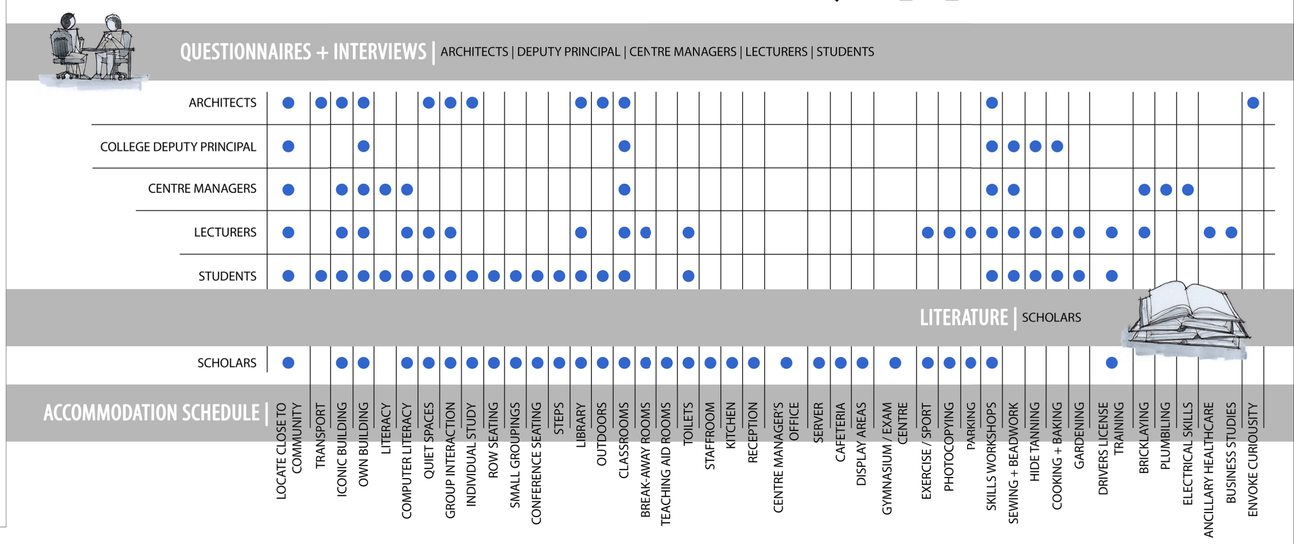
Theories

- environment does have an influence on people
- People in-turn have an influence on environment
- environment has the ability to teach in subtle ways

Recommendations

- Participatory planning process to ensure appropriate built environments
- Further research into the learning spaces for students of CET Colleges
- Visual instruments (e.g. imagery) for primary data collection
- All text and words in simplest form in particpants' home language

Conceptual Accommodation Schedule



What

A stimulating didactic community education + training centre that links and responds to its community and context, supporting and promoting lifelong learning and second-chance opportunities.

Who

Adult learners in the vicinity of the bridge city precinct seeking to learn basic literacy, complete their schooling, or acquiring vocational skills.

Why

To empower the disadvantaged adult community with basic education and skills training through quality learning environments relevant to their needs

How

Through contextually responsive + appropriate design that supports and promotes learning.

Where

Bridge City, Precinct, KwaZulu-Natal, South Africa.

Client

higher education & training

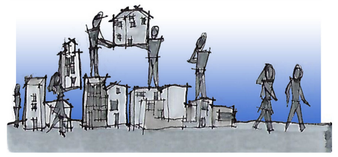
Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

+

public works

Department:
Public Works
PROVINCE OF KWAZULU-NATAL

Design Drivers



Community access + interaction

- Universal access, circulation, wayfinding, transitional zones
- Allow for chance encounters which encourage social interaction, social exchange + sharing of information
- Multi-use, shared use

Variety of learning spaces with diverse spatial experiences

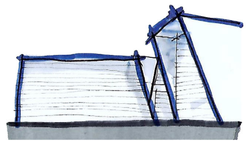
- Sense of place at varying scales
- Learning landscapes (outdoor learning, horticulture)
- Individual study (alcoves, break-away rooms)
- Group study + presentations

Visual connections to education

- Indoor / outdoor relationships
- Views, access, transparency
- Museum experience of learning through discovery + exhibition
- Didactic expression of curriculae in building

Cultural representation of the community

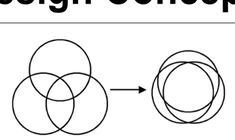
- Attach meaning



Inspiration + aspirational contemporary spaces

- Sense of pride

Design Concept



CONVERGENCE

PARTICIPATION

EMPOWERMENT + INTERACTION

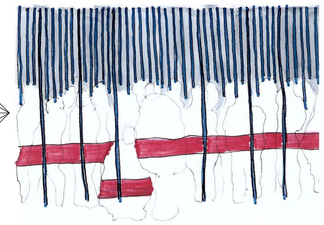
It Takes a Village

LINKAGES + CONNECTIONS

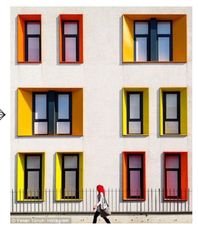
VISIBILITY

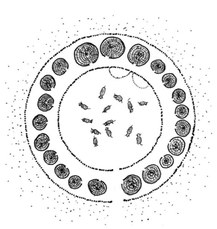
The concept draws on direct inspiration from the cultural celebrations of the community which occur during springtime.

SPRINGTIME:
Renewal
Rebirth
Regrowth



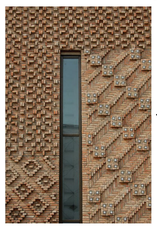
Celebration . New beginnings . Fix past errors . Love . Colour . Community . Social Interaction





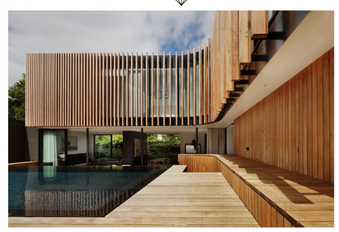
Bright coloured accents invigorate and energize. Inspired by Holi powder.

Celebration . Virtue. Pride . Dignity . Colour



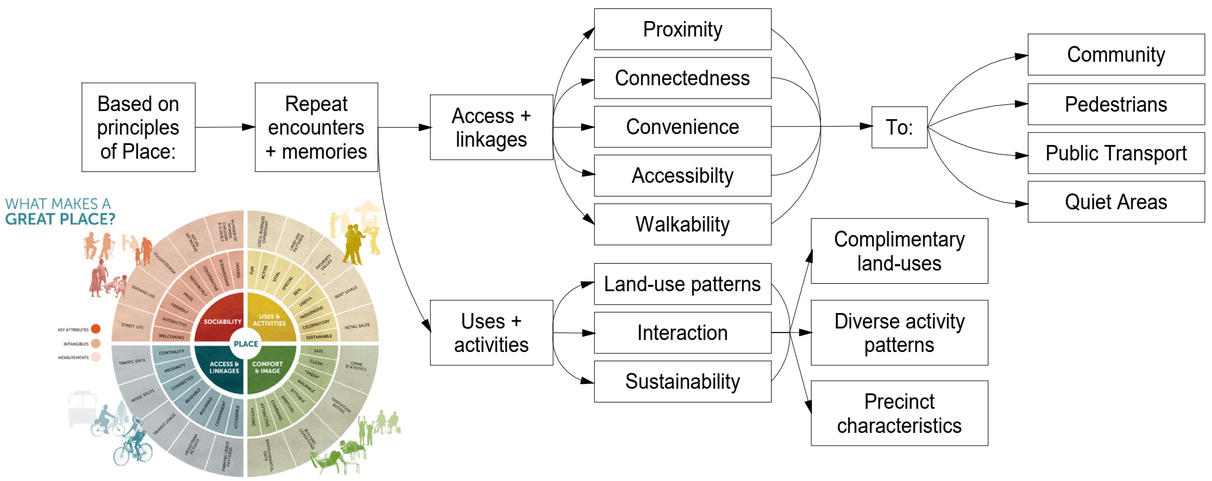
Tactile facebrick finishes. Inspired by Zulu beadwork designs. Homage to the cultural attire + the beading skills.

Walk to royal palace = Journey of Education . Links



Vertical timber screens. Inspired by the tall vertical reeds carried by maidens. Unity of one objective. Tall aspirations.

Site Selection Criteria



Site Information

The chosen site enjoys a greater number of amenities and services within 500 meters walking distance, as opposed to other alternatives. The amenities are in-line with the primary requirements of the adult learners and staff who participated in the primary research. The positioning allows for the centre building to form part of an educational / cultural precinct.

12 Nkunzana Road, Bridge City	STREET ADDRESS	16 Nkunzana Road, Bridge City
Ptn125 of Erf 8, Bridge City	CADASTRAL	Ptn 126 of Erf 8, Bridge City
2637m²	DESCRIPTION	5002m²
0.04	SITE AREA (7639m²) FAR	2.5

Contextual Demographics

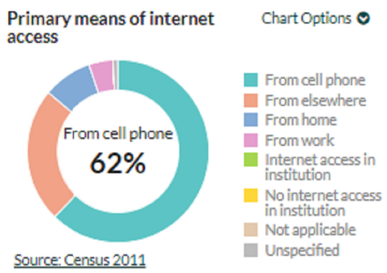
Internet access

33.4%

Households with internet access

about the same as the rate in KwaZulu-Natal: 33.91%

a little less than the rate in South Africa: 35.32%



Source: Census 2011

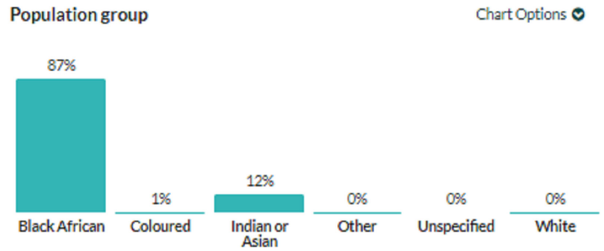
Population

27 383

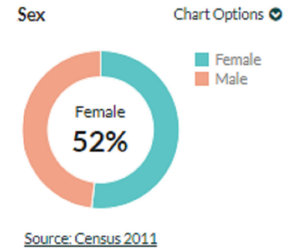
People

KwaZulu-Natal: 10,267,300L

South Africa: 51,770,560L



Source: Census 2011



Source: Census 2011

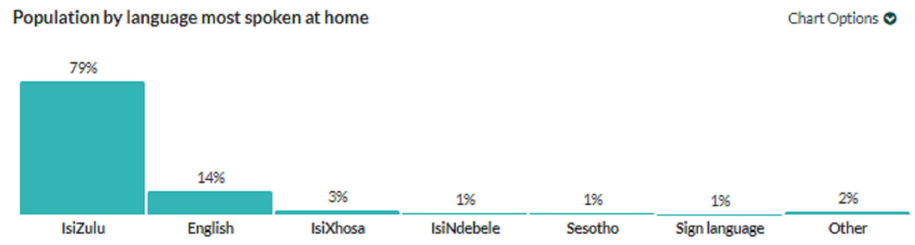
Language

IsiZulu

Language most spoken at home

a little higher than the figure in KwaZulu-Natal: 76.96

more than double the figure in South Africa: 22.38



Source: Census 2011

Educational level

73.3%

Completed Grade 9 or higher

about 10 percent higher than the rate in KwaZulu-Natal: 64.25%

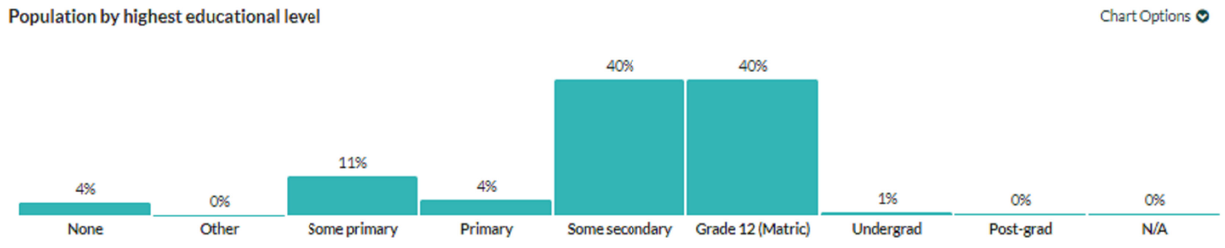
about 10 percent higher than the rate in South Africa: 65.83%

41%

Completed Matric or higher

a little higher than the rate in KwaZulu-Natal: 39.31%

a little higher than the rate in South Africa: 39.34%



* Universe: Individuals 20 and older

Source: Census 2011

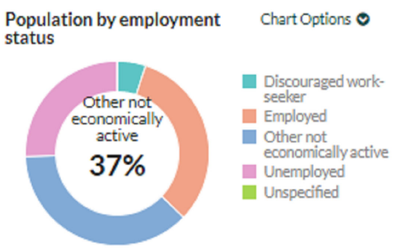
Employment

32.2%

Employed

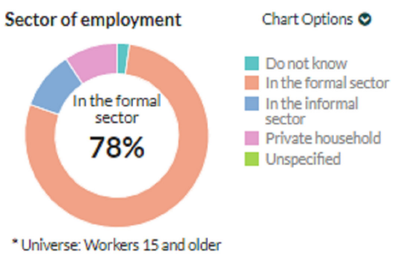
about the same as the rate in KwaZulu-Natal: 31.51%

about 80 percent of the rate in South Africa: 38.87%



* Universe: Individuals 15 and older

Source: Census 2011



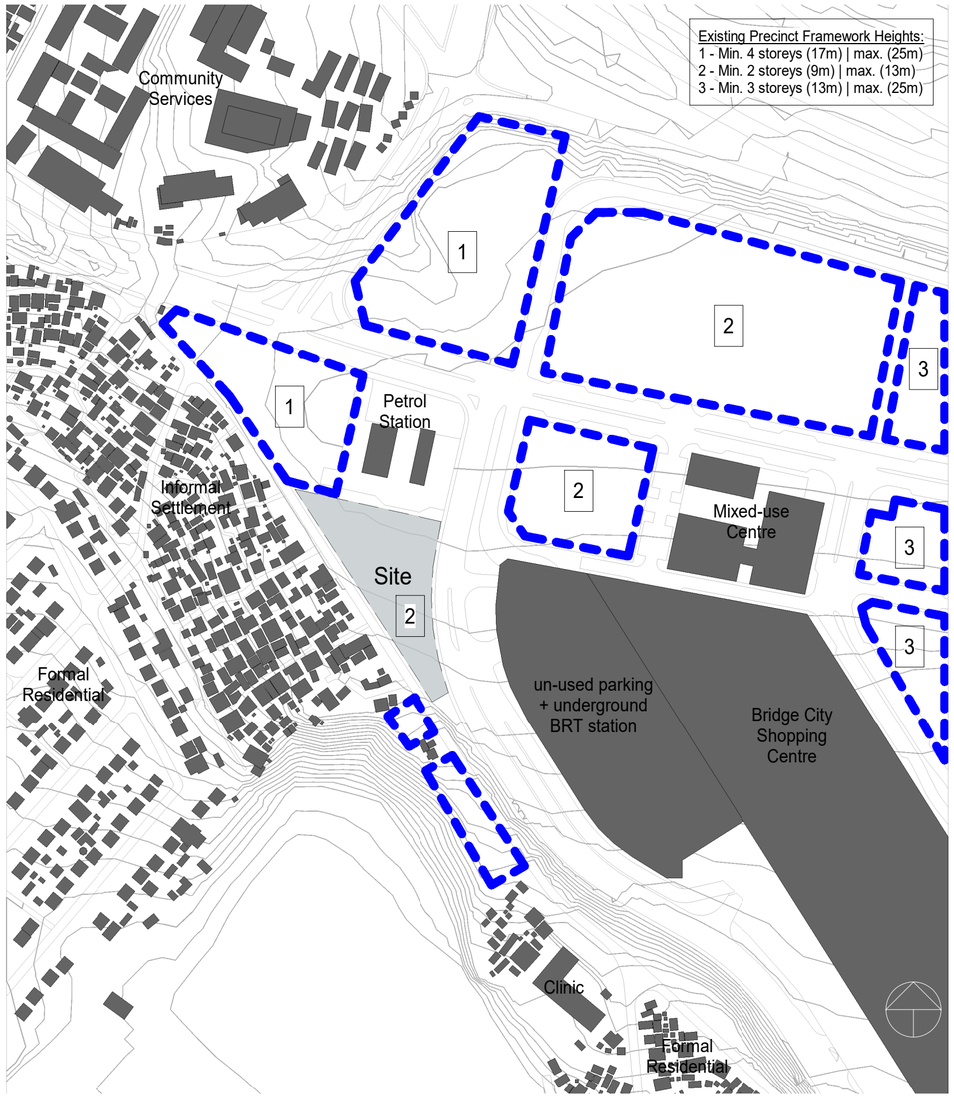
* Universe: Workers 15 and older

Source: Census 2011

Site Analysis

1 Figure Ground

1 : 2500

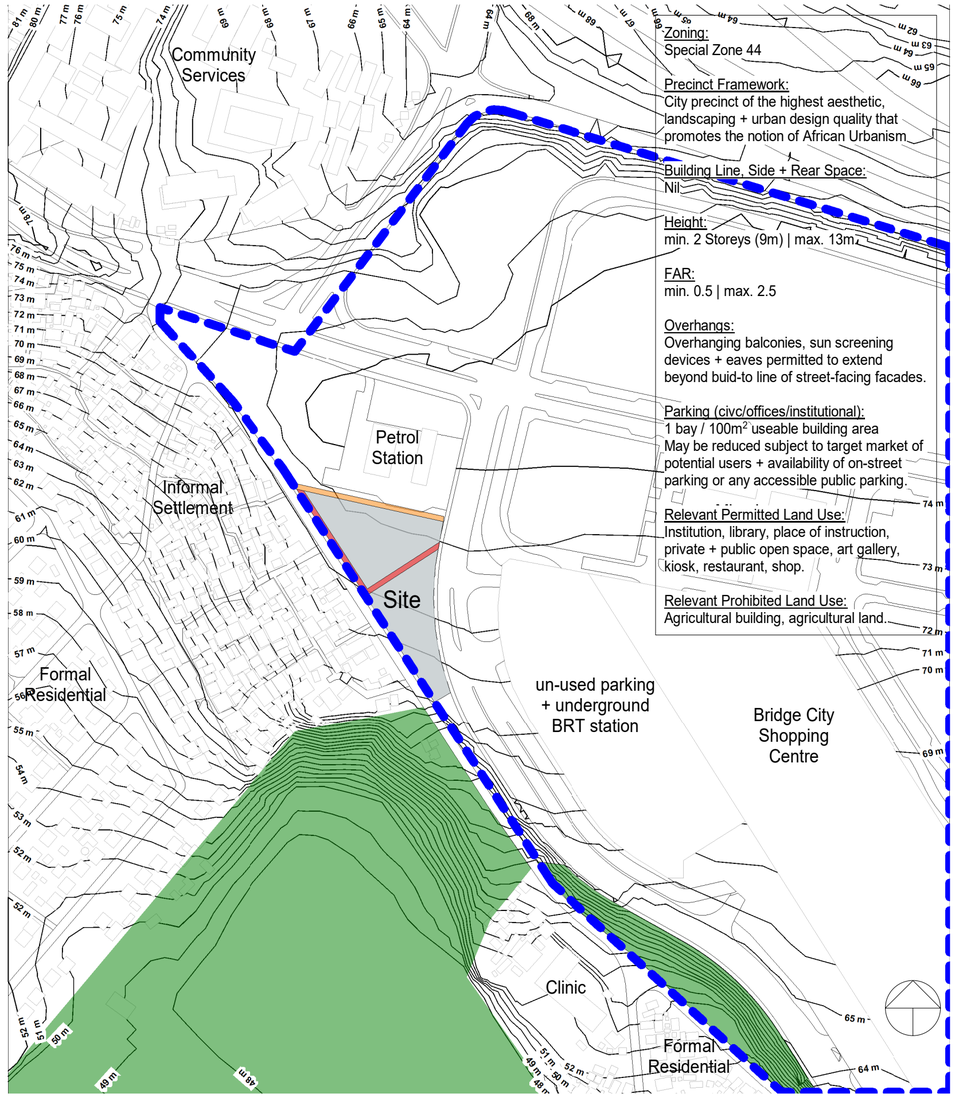


Built form

Opportunities for densification

2 Natural Features + Controls

1 : 2500



Green open space

3m sewer servitude

3m sewer + stormwater servitude

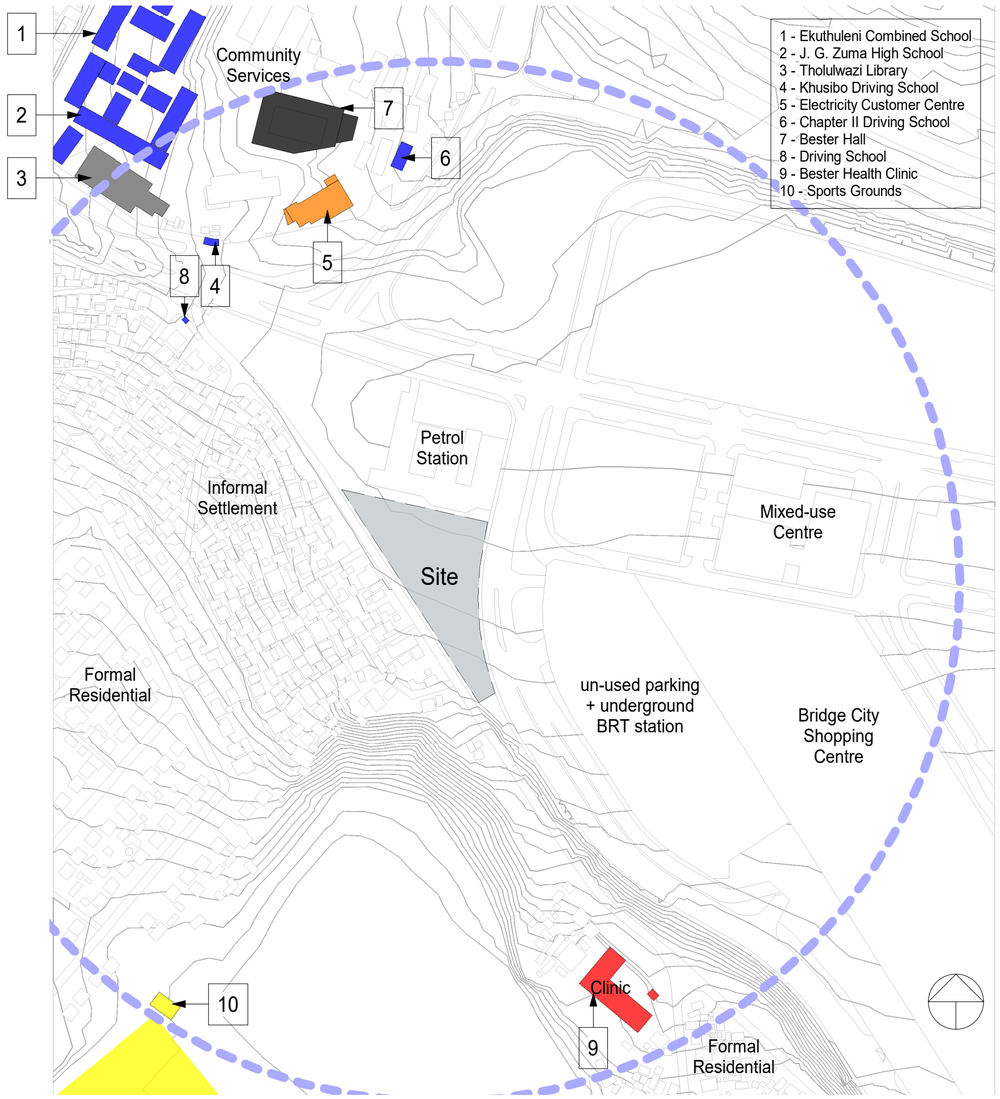
—48m— Contour lines

Special zone 44

Site Analysis

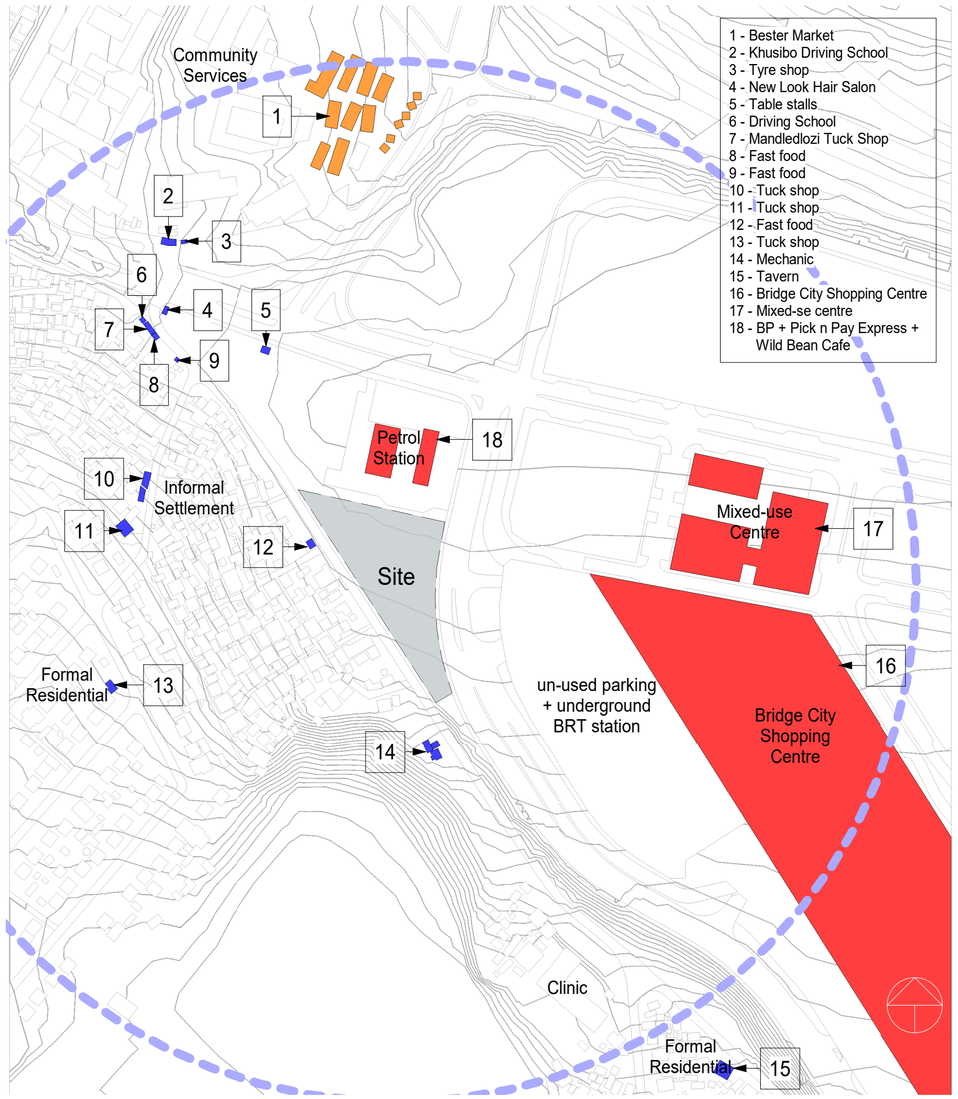
3 Communal Services

1 : 2500



4 Trade

1 : 2500



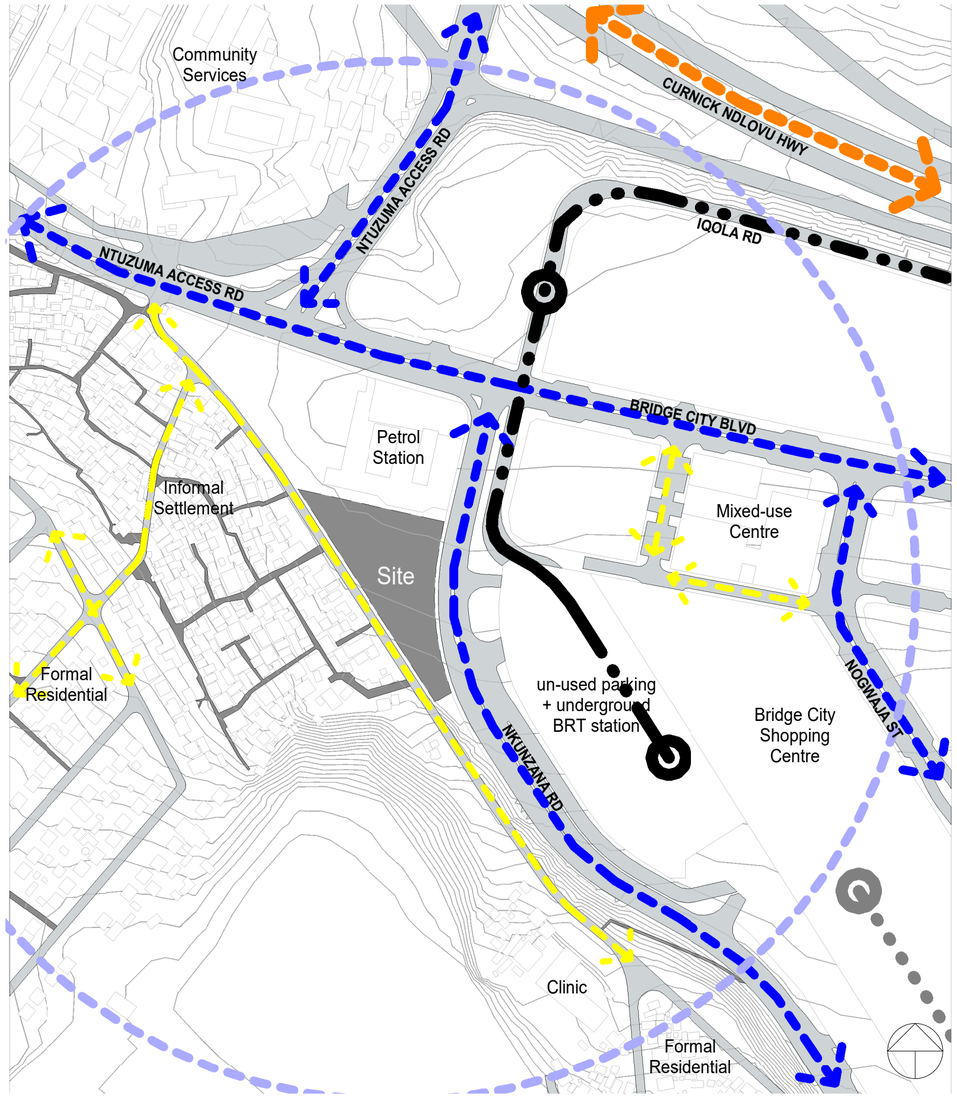
Education
Public Library
300m radius
Community hall
Sizakala Centre
Community Clinic
Sports facilities

Informal trading
300m radius
SMME's
Formal trading

Site Analysis

5 Access + Public Transport

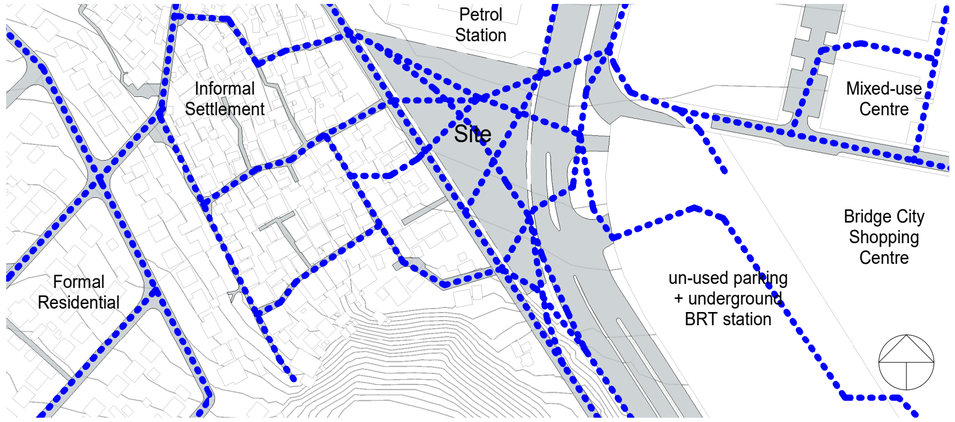
1 : 2500



Vehicle road surface
Pedestrian pathways
Major highways
Primary vehicular circulation
Minor vehicular circulation
Bus Rapid Transport route
Bus Rapid Transport bus stop
Train station
Passenger railway route
300m radius

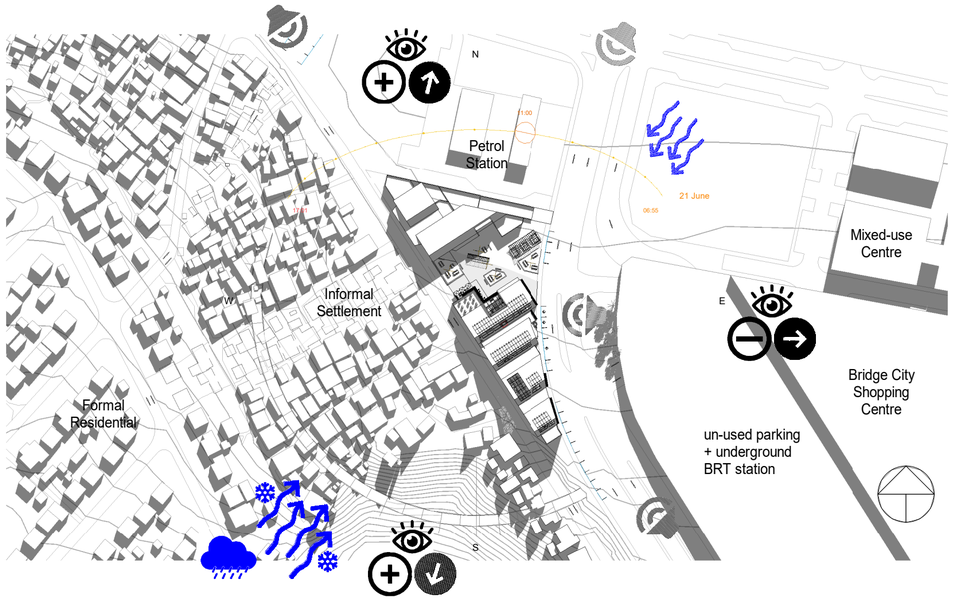
6 Pedestrian Patterns

1 : 2000

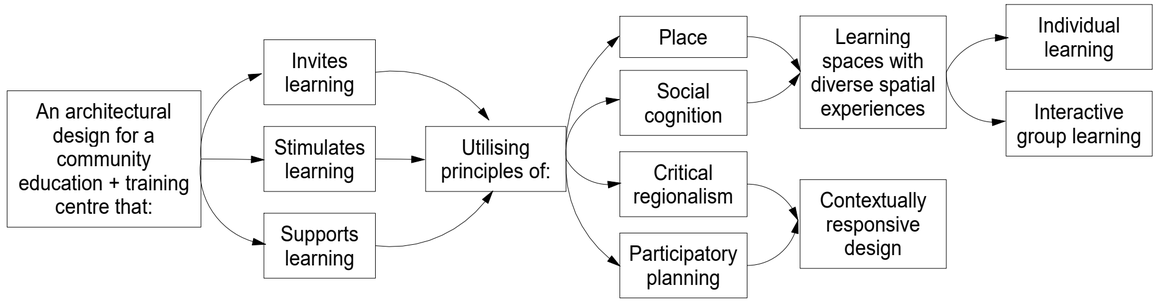


Major pedestrian circulation patterns

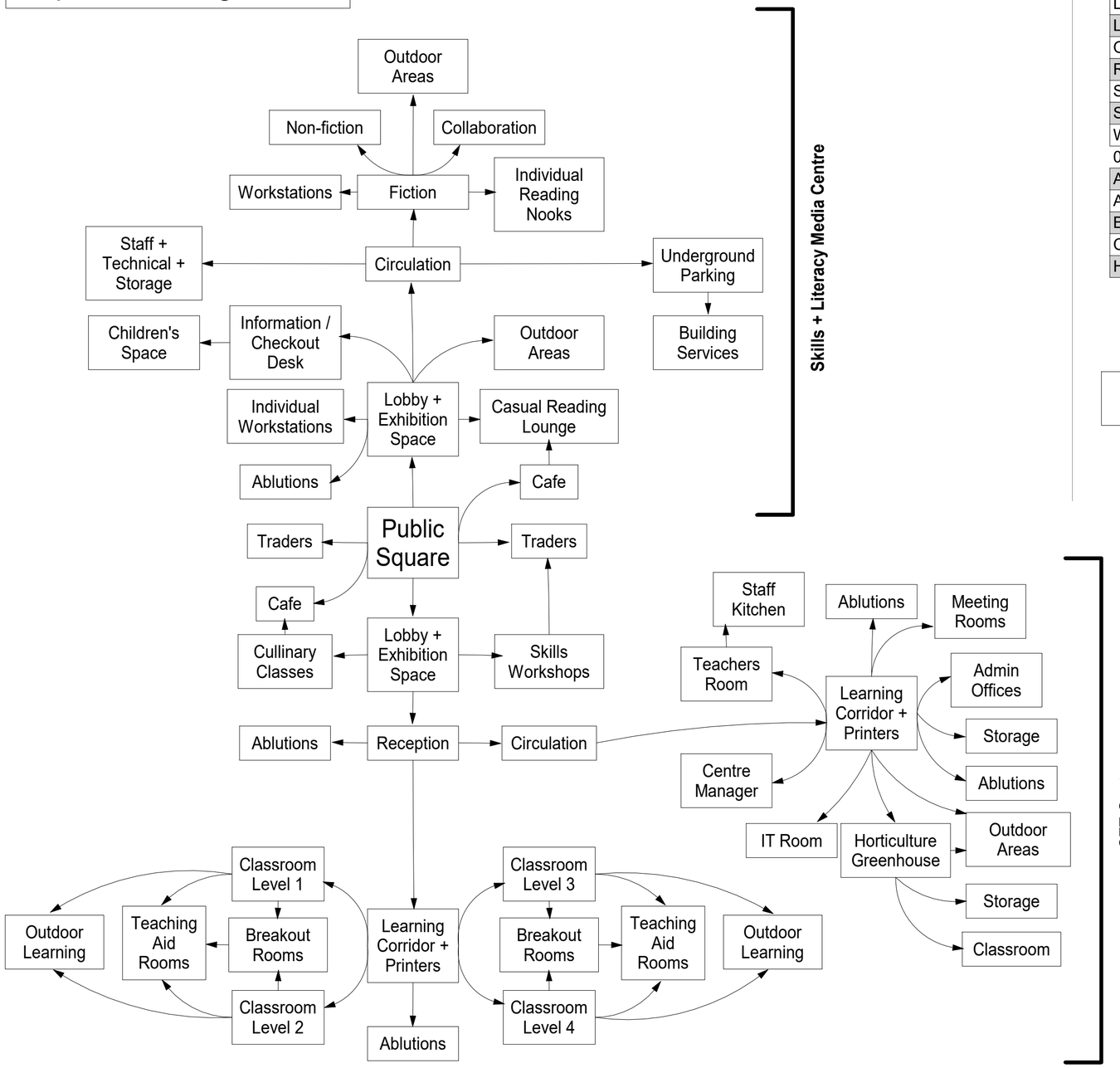
7 Climate + Views + Noise



Brief



Spatial Arrangement



Accommodation Schedule

Name	Area
CET Centre	
00 Ground Level	
Ablutions	76 m²
Break Out	60 m²
Cafe	87 m²
Classroom Level 1	58 m²
Classroom Level 2	60 m²
Classroom Level 3	62 m²
Classroom Level 4	61 m²
Cullinary Classroom	43 m²
Learning Corridor	414 m²
Lift	5 m²
Lobby + Exhibition	105 m²
Office	10 m²
Reception	47 m²
Skills Workshop	113 m²
Store	40 m²
Workshop Lobby	8 m²
01 First Level	
Ablutions	73 m²
Admin Offices	58 m²
Boardroom	41 m²
Centre Manager	15 m²
Horticulture Classroom	57 m²

Name	Area
Horticulture Greenhouse	123 m²
I.T.	15 m²
Learning Corridor	427 m²
Lift	5 m²
Meeting Room	12 m²
Mezz.	52 m²
Store	28 m²
Teachers Room	58 m²
CET Centre - Outdoor Space	
00 Ground Level	
Bins Yard	17 m²
Covered Outdoor Learningscape	59 m²
Gas Bottles	5 m²
Outdoor Learning	78 m²
Service Yard	11 m²
01 First Level	
A/C Plant	0 m²
Covered Balcony	147 m²
Public Square	
00 Ground Level	
Cafe Outdoor Seating	68 m²
Public Square	1225 m²
Trader Kiosks	57 m²

Name	Area
Skills + Literacy Media Centre	
00 Ground Level	
Ablutions	30 m²
Cafe	52 m²
Casual Reading	41 m²
Children's Space	55 m²
Circulation	26 m²
Individual Workstations	67 m²
Info / Checkout	21 m²
Kitchen	23 m²
Lift	4 m²
Lobby + Exhibition	117 m²
Outdoor Playground	116 m²
Outdoor Reading	140 m²
Staff + Technical + Storage	168 m²
Trade	92 m²
01 First Level	
Balcony	177 m²
Fiction	116 m²
Individual Workstations	49 m²
Lift	4 m²
Non-fiction + collaboration	168 m²
Workstation	89 m²

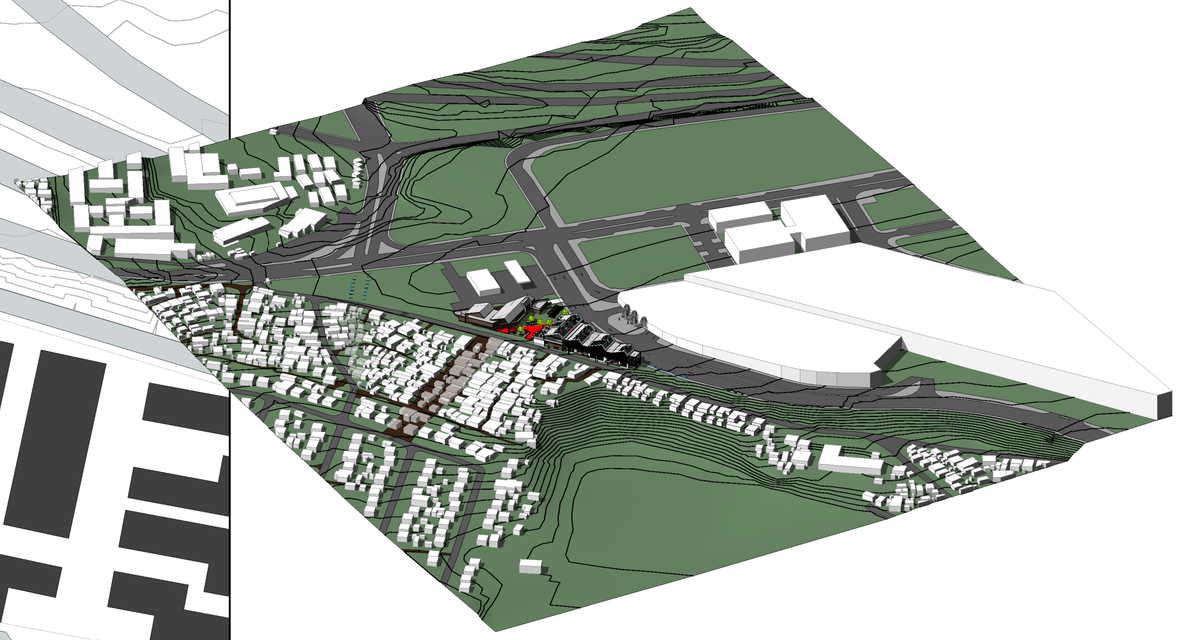
Spatial Intimacy Gradient

Urban Design Response

Community Services
Informal Settlement
Formal Residential
Petrol Station
Mixed-use Centre
un-used parking + underground BRT station
Bridge City Shopping Centre
Clinic
Formal Residential

URBAN PLAN | 1:1500

3D MASSING OF EXISTING CONTEXT | 1:3000

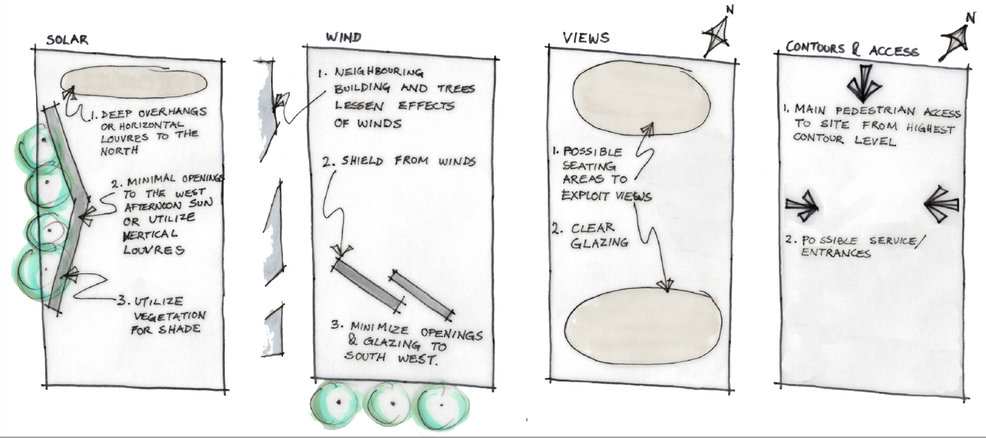


URBAN PLAN LEGEND

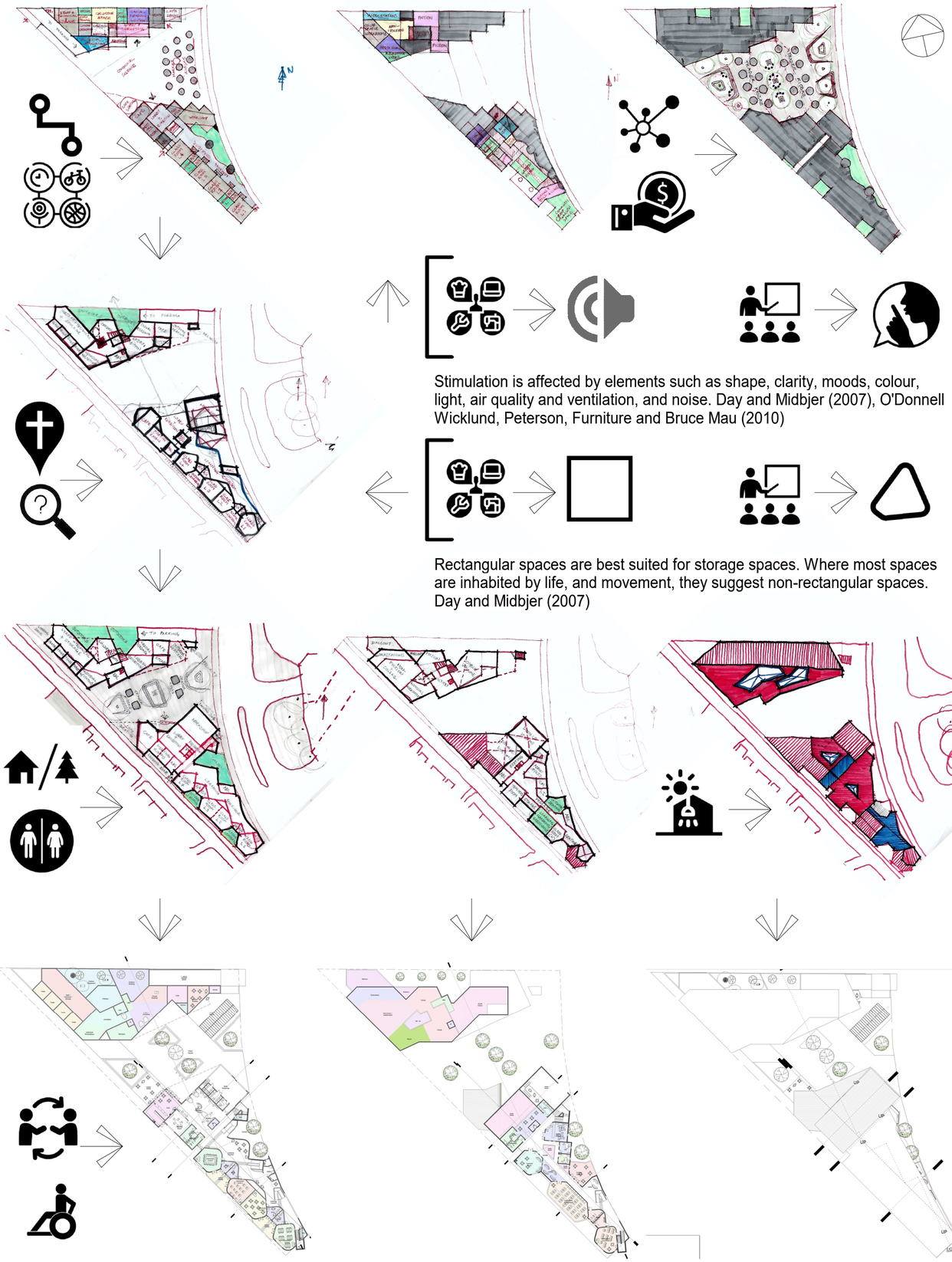
1 - New junction to intersection for improved access.
2 - Improved link between residential community and primary vehicular + transportation routes
3 - Pedestrian link connecting residential community to Bridge City Precinct. Activated by trade.Influenced by movement patterns.
4 - Public square interaction induces sense of place + social learning
5 - New pedestrian bridge link to Nogwaja Street + concourse to train station
6 - CET Centre, clinic + community services link by pedestrianised road. Softend with lanscaping. Activated with trade + densification.
7 - New pedestrian crossining links
8 - Proposed government + municipal services building
9 - Proposed private college (Damelin, Regent, Mancosa, etc.)
10 - Residential units relocated here. Mechanic accommodated in industrial section of Precinct.
11 - Formal cafe/ restuarant serviced by cullinary students from CET centre. Activating corners.
12 - Trade of product made at CET centre
13 - Visual access to vocational learning
14 - Visual access to informal learning
15 - Visual access to formal learning
16 - Access ramp to BRT Station

- Proposed education precinct
- Proposed mixed-use buildings adapted from Bridge City urban framework
- Informal trade units | for tuck shops, bakeries, salons, barbers, shisanyama's, tailors, fast foods, etc.
- Proposed densification of residential units. More eyes on the street for defensible space.
- Tactile paving on proposed avenue + street parking. Induce traffic calming
- Proposed tarmac road
- Tactile paving + traffic calming
- Landscaped pedestrian boulevard

Site Design Response Considerations



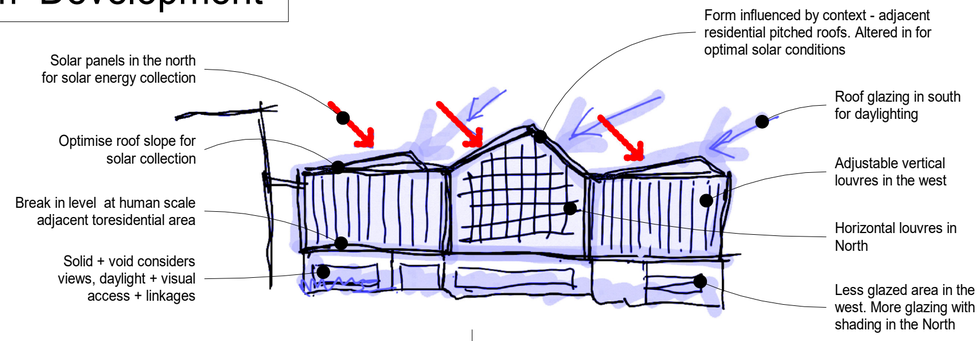
Spatial Development

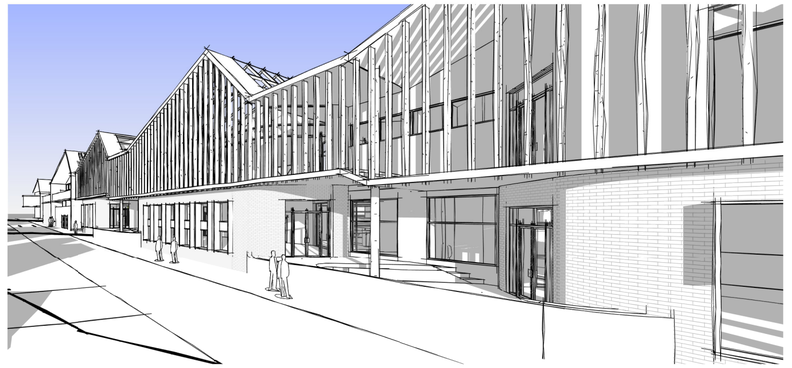


Stimulation is affected by elements such as shape, clarity, moods, colour, light, air quality and ventilation, and noise. Day and Midbjer (2007), O'Donnell Wicklund, Peterson, Furniture and Bruce Mau (2010)

Rectangular spaces are best suited for storage spaces. Where most spaces are inhabited by life, and movement, they suggest non-rectangular spaces. Day and Midbjer (2007)

Form Development





Materiality

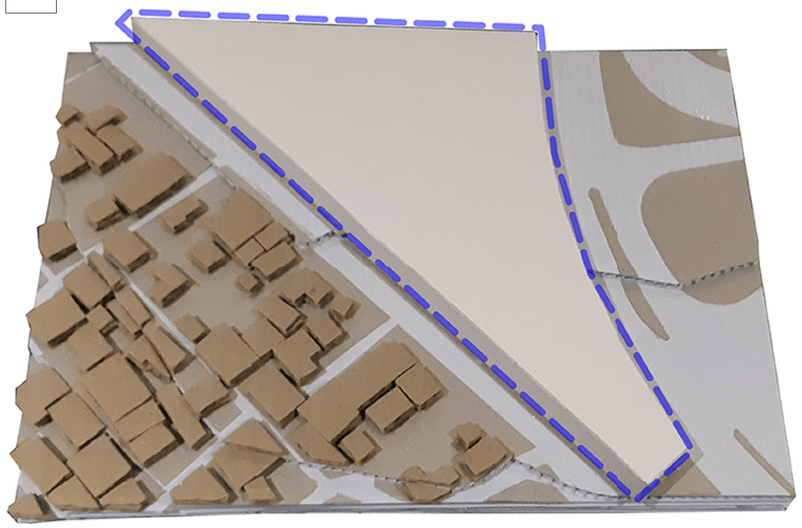
Materials of permanence to oppose the current makeshift nature of the rest of the CET Colleges.

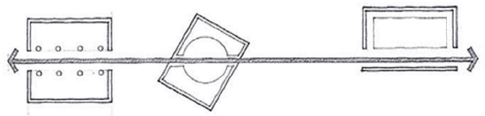
Materiality influenced by context.

A | Vibrant **colours** represented as accent colours within the building to enliven.
B | Combination of **plastered walls + facebrick walls** laid in patterns to represent zulu beading + textile.
C | **Exposed concrete** finishes associated with permanence.
D | Vertical **timber** screens
E | Pronounced window frames in **steel**.

Conceptual Models

1





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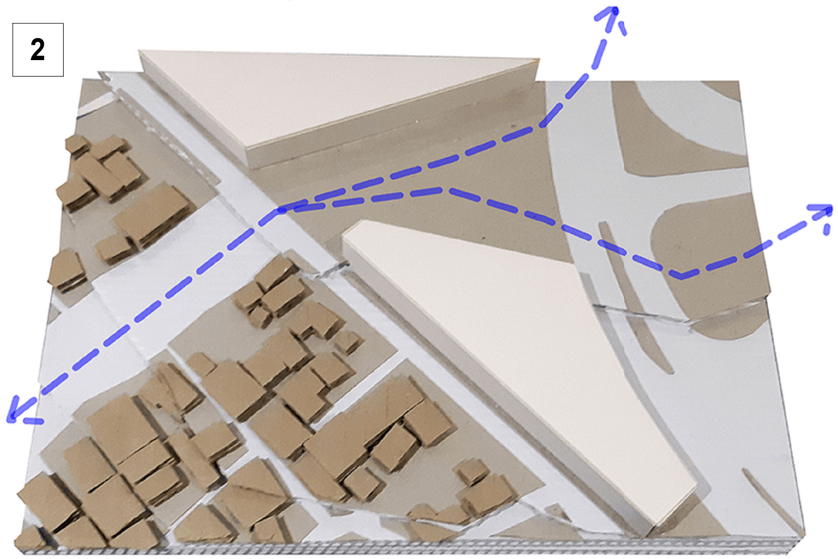

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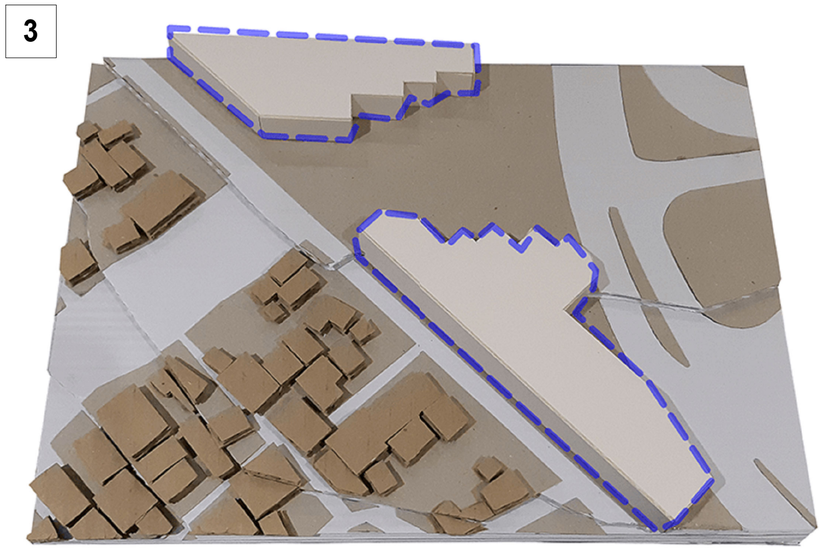

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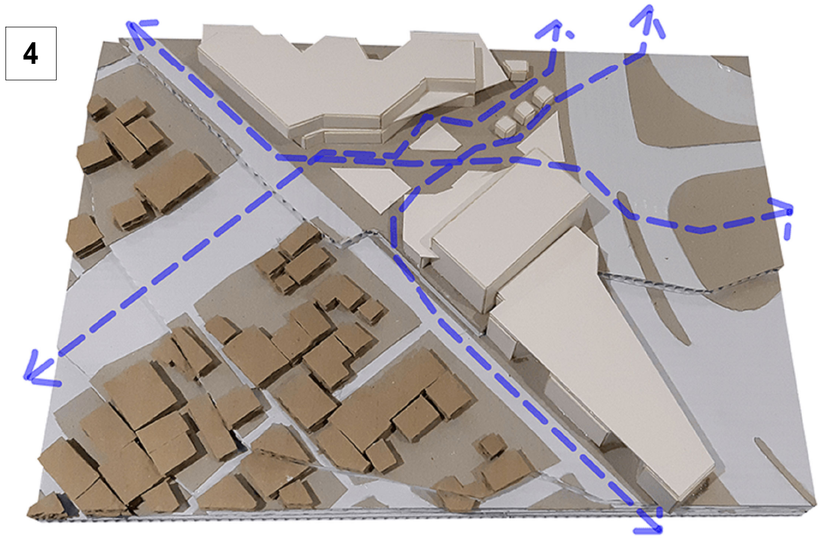
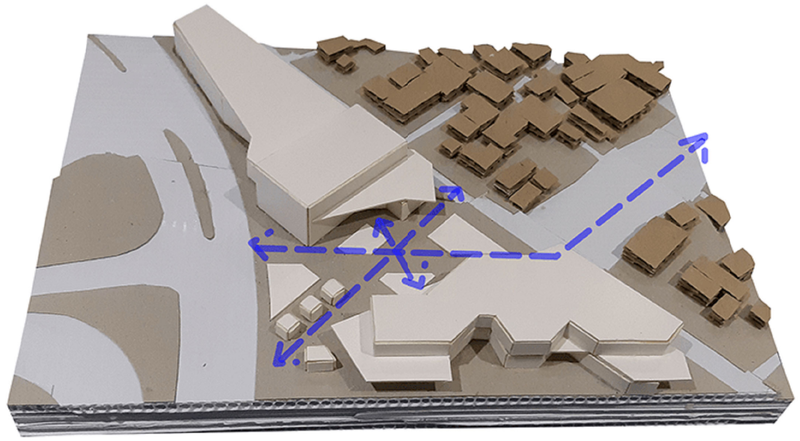
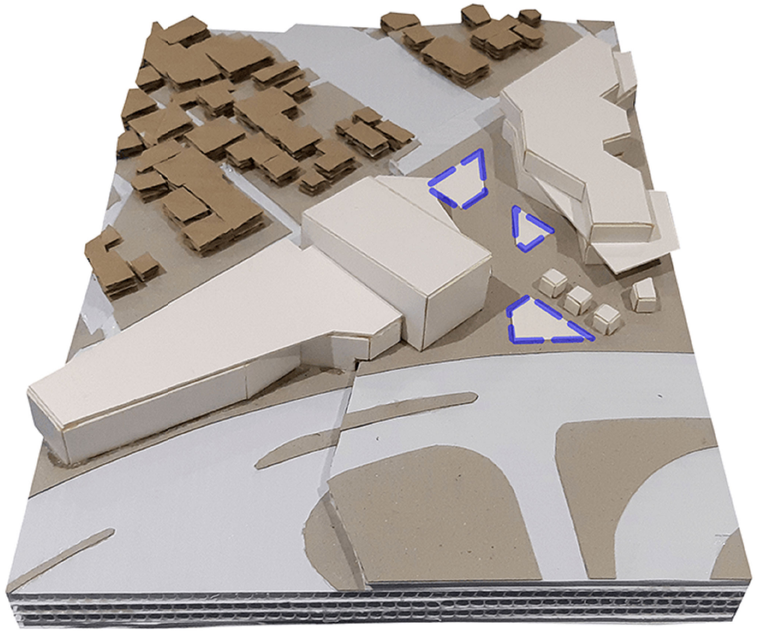
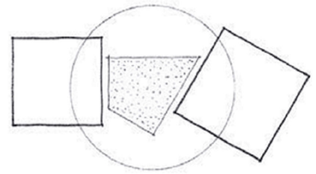
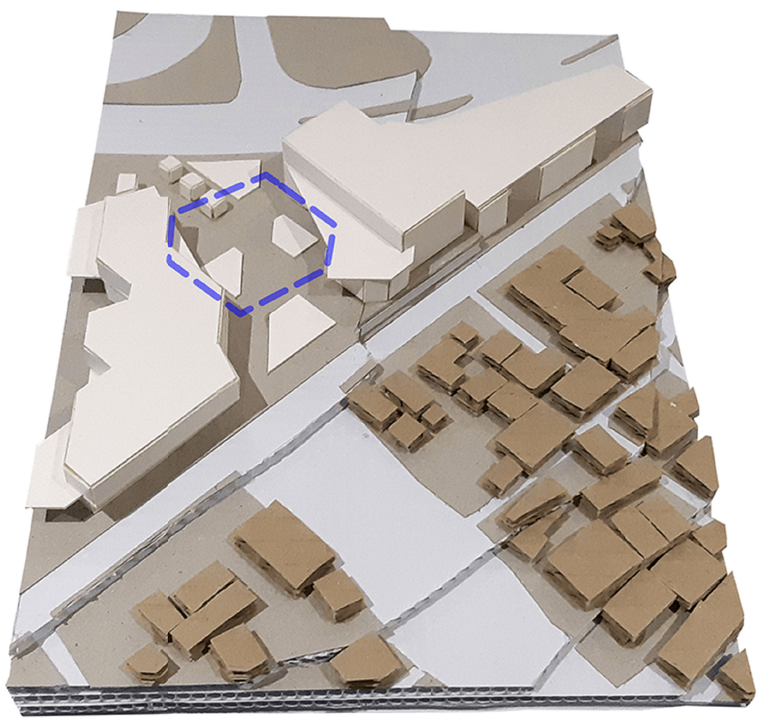


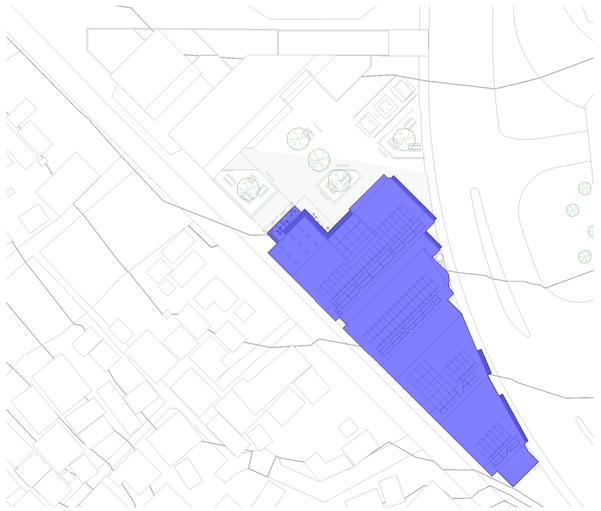




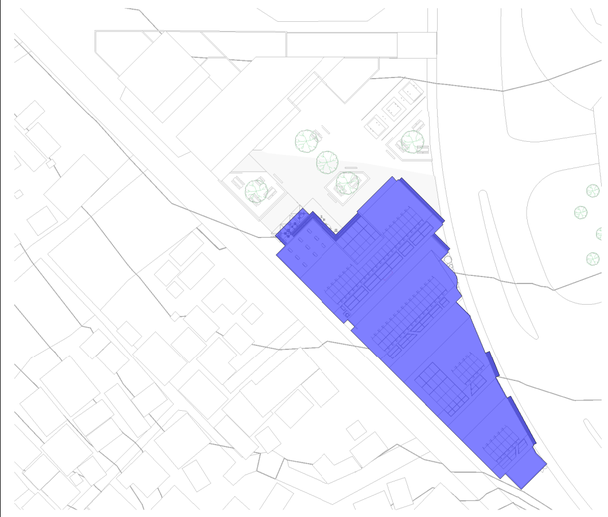




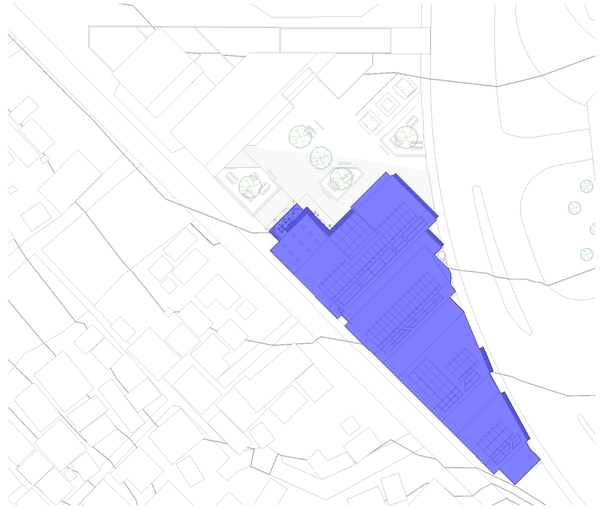
SITE PLAN | 1:500

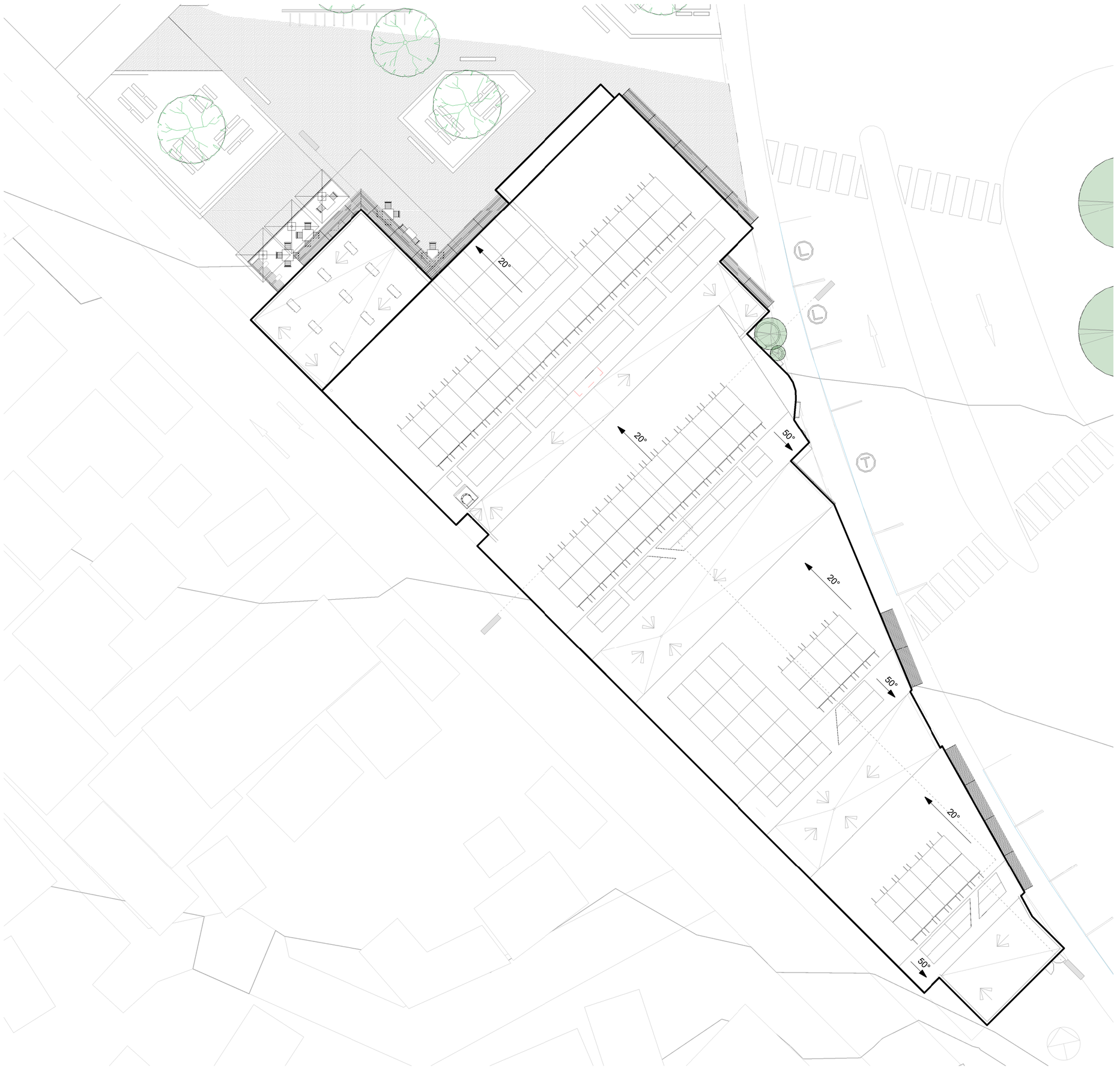


GROUND STOREY - LEARNING CENTRE | 1:200



FIRST STOREY - LEARNING CENTRE | 1:200



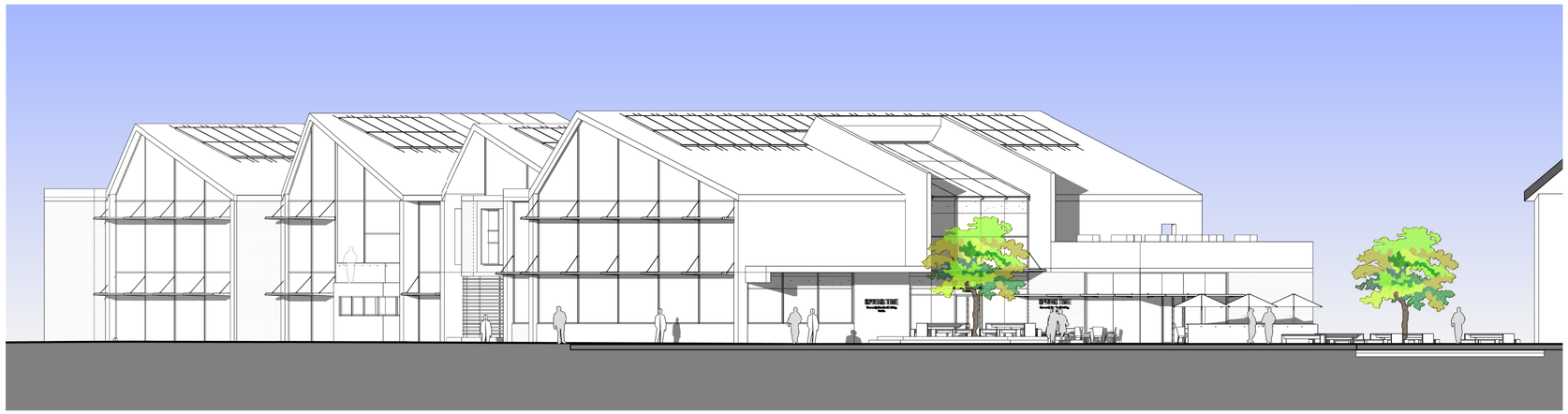


ROOF STOREY - LEARNING CENTRE | 1:200

Elevations

1 North East Elevation

1 : 200



2 North Elevation

1 : 200

4 South East Elevation

1 : 200

3 North West Elevation

1 : 200

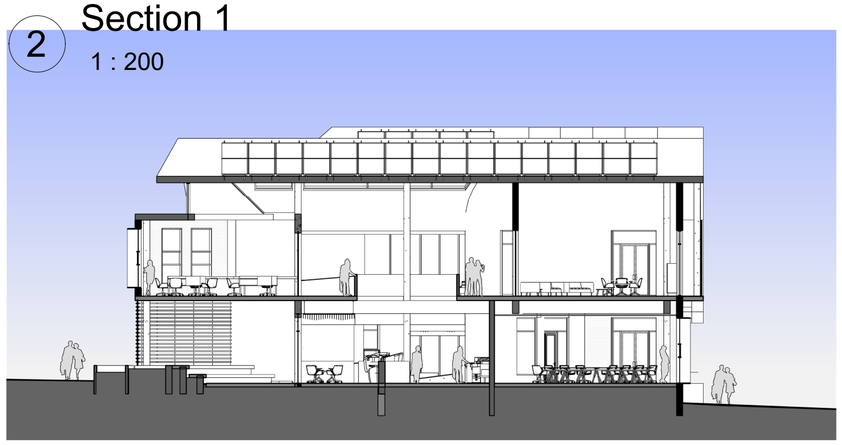
Elevations + Sections

1 South West Elevation

1 : 200

2 Section 1

1 : 200



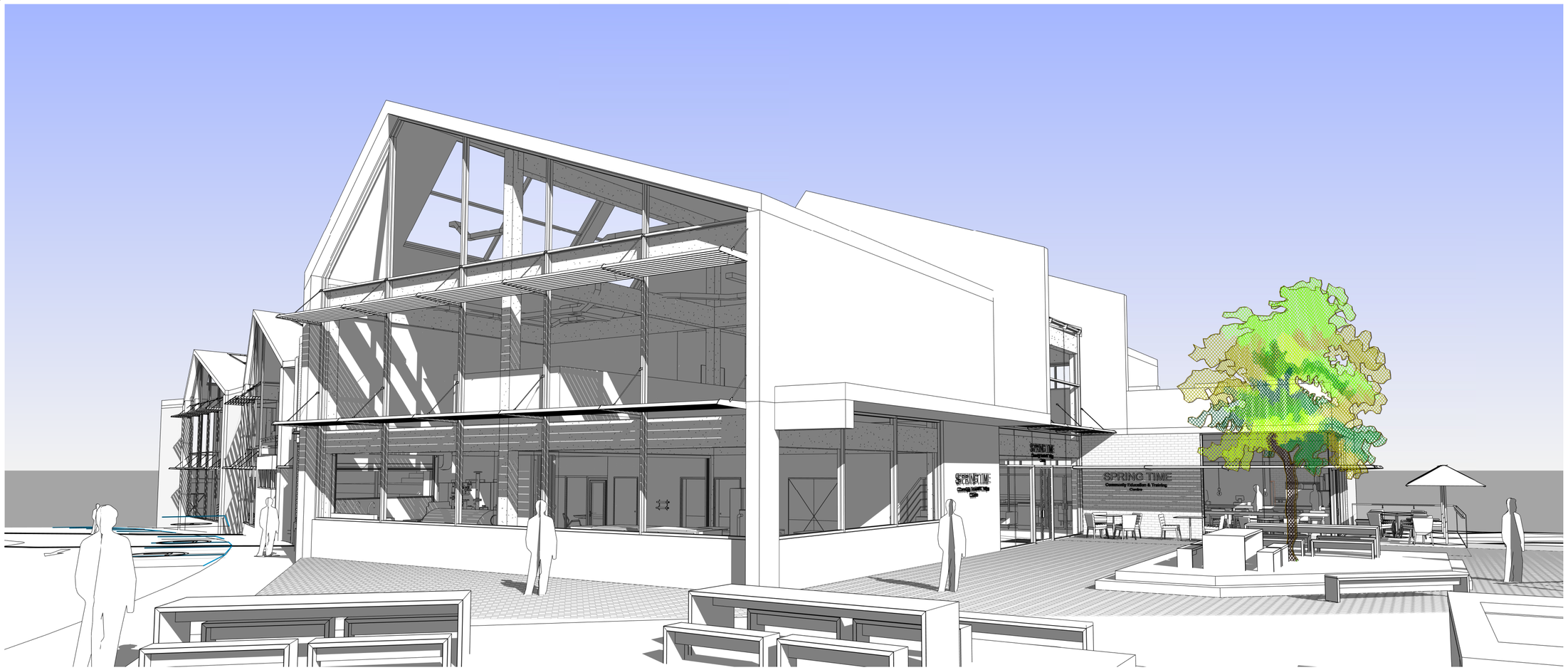
3 Section 2

1 : 200

Facade Brickwork

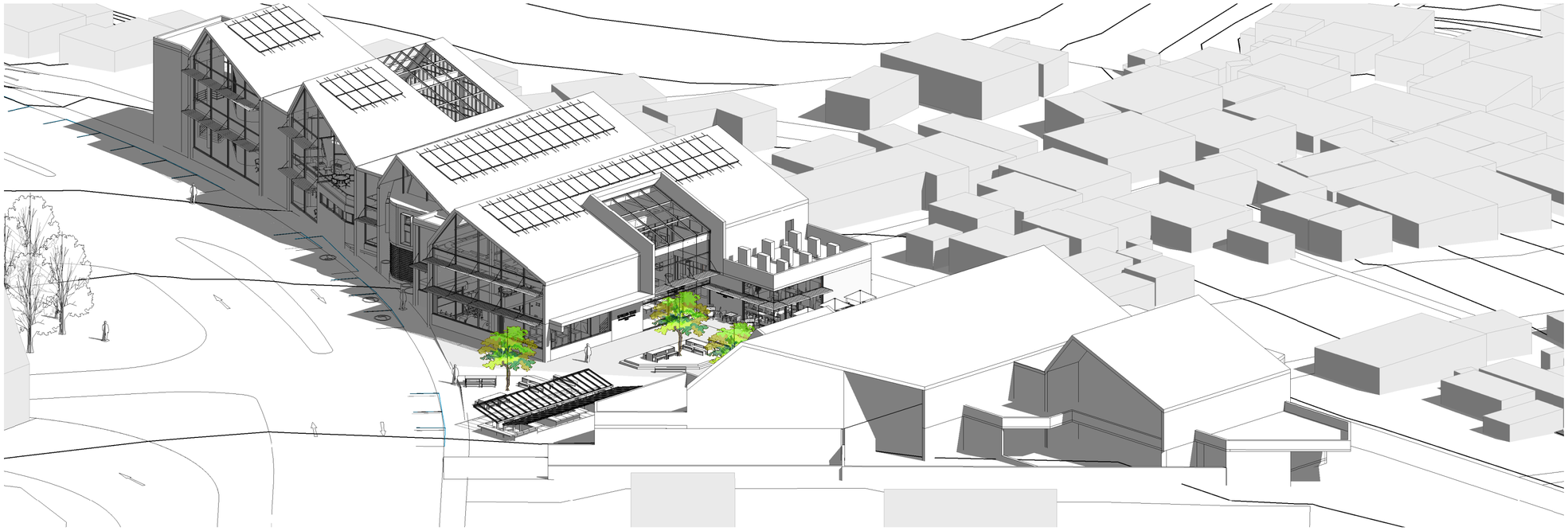
Perspectives

1 North-East Perspective

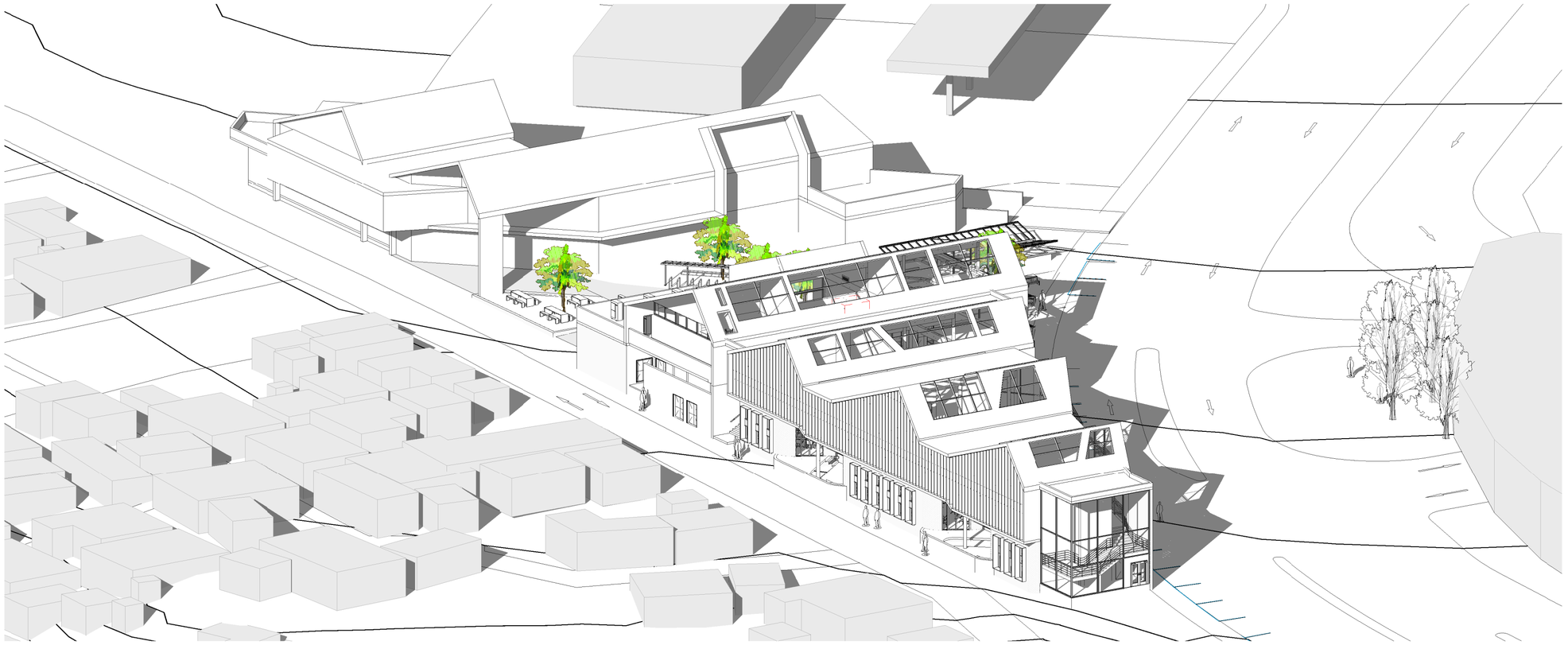


2 North Perspective

Perspectives

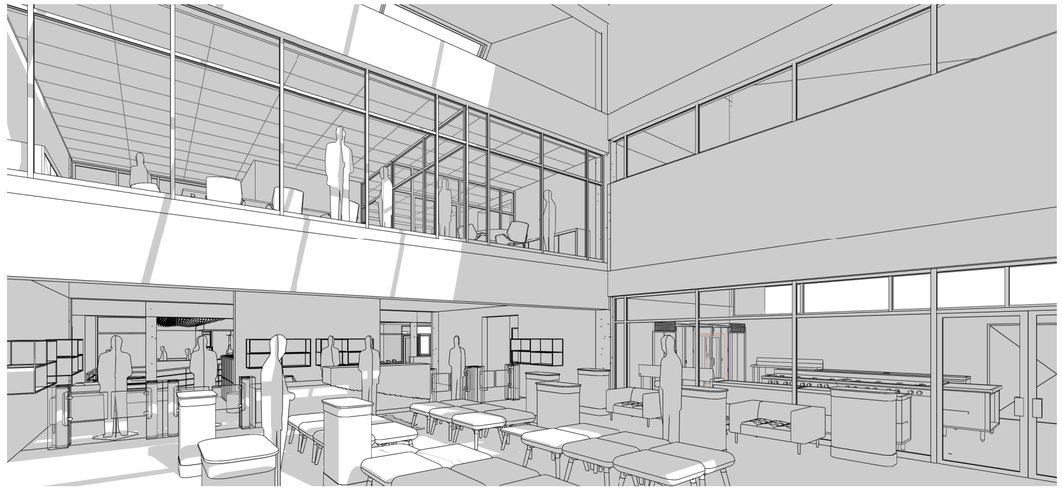


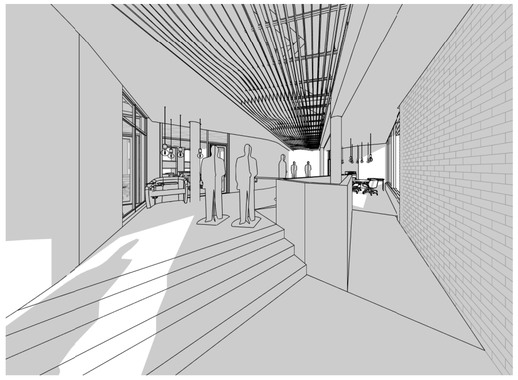
1 North Aerial Perspective

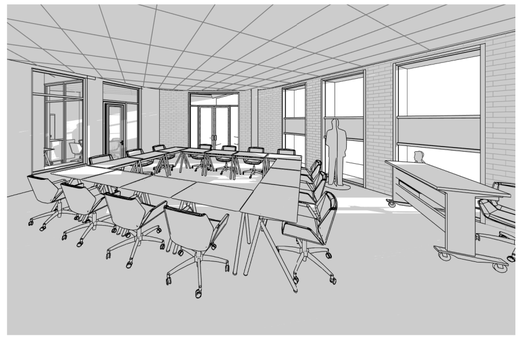


2 South Aerial Perspective

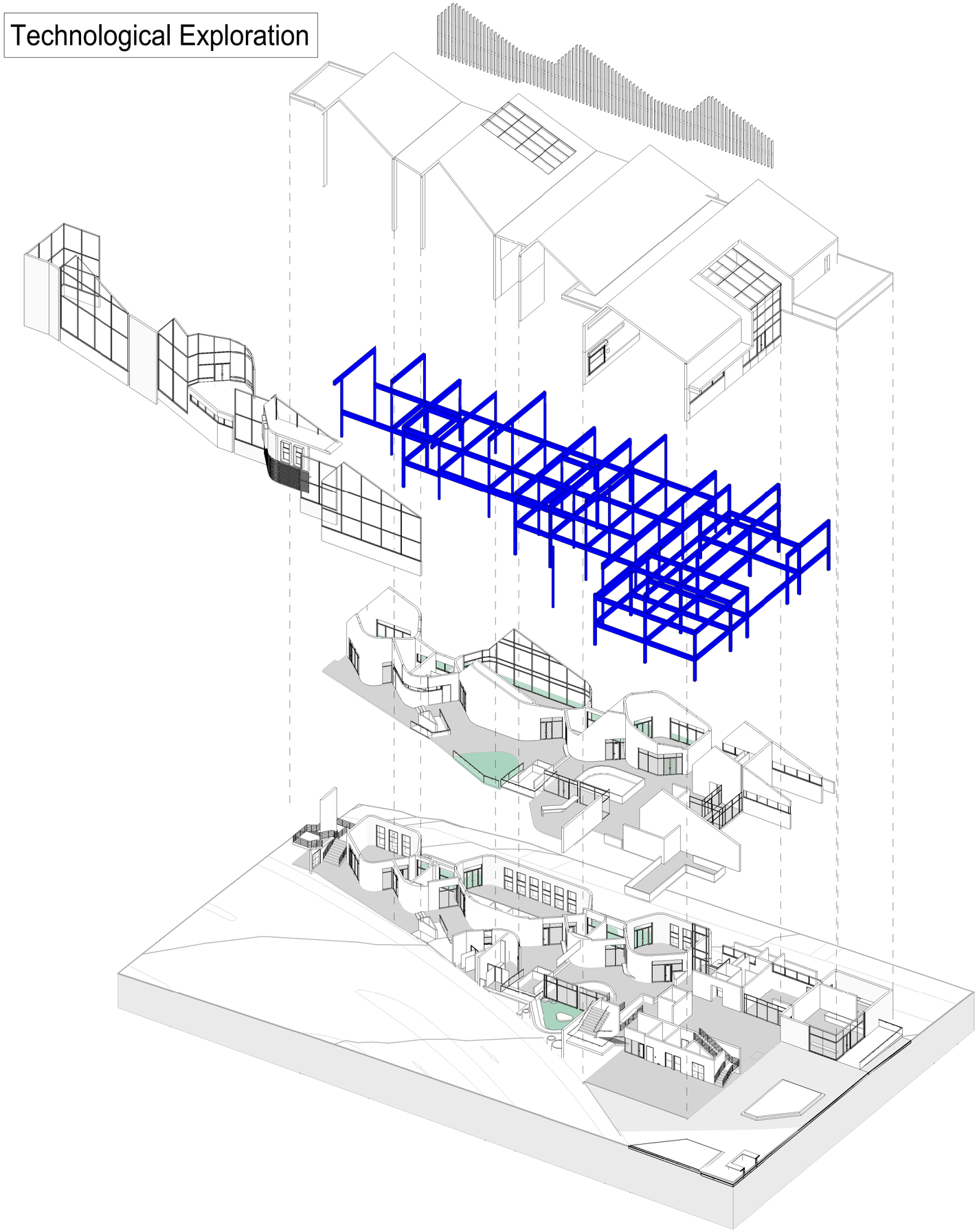
Interior Perspectives







Technological Exploration



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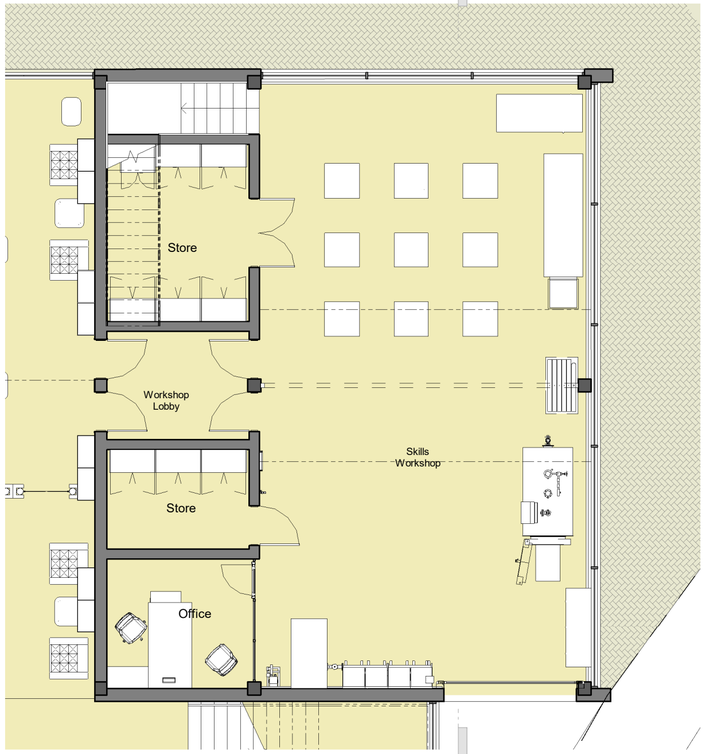
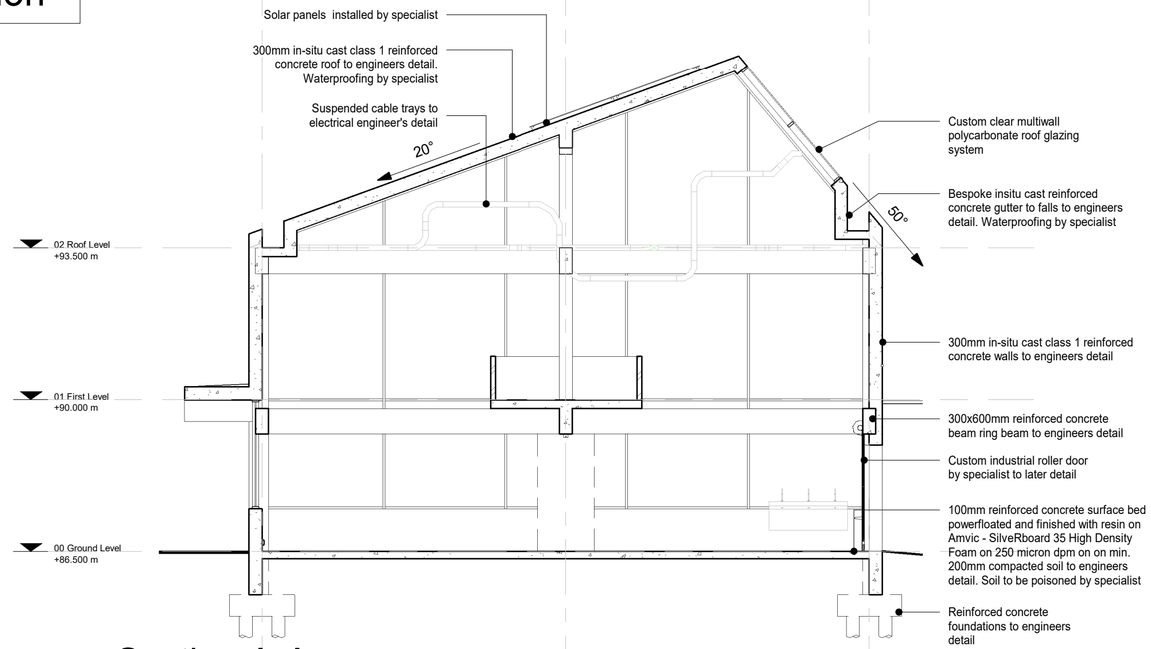


1 Vocational Skills Workshops

1 : 100

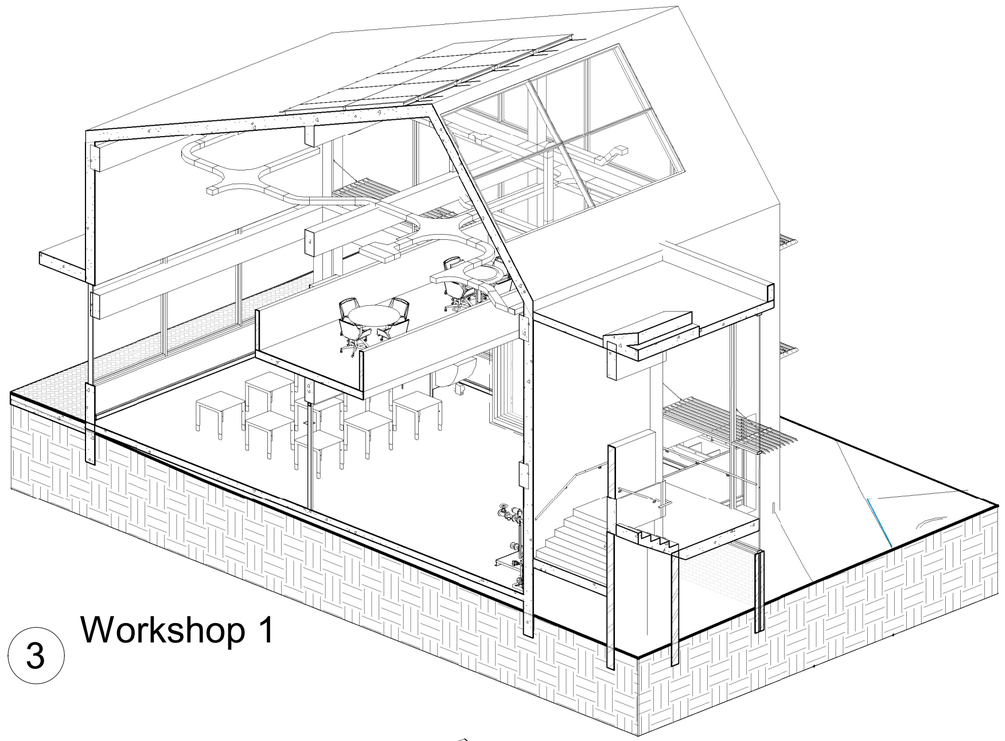
Section



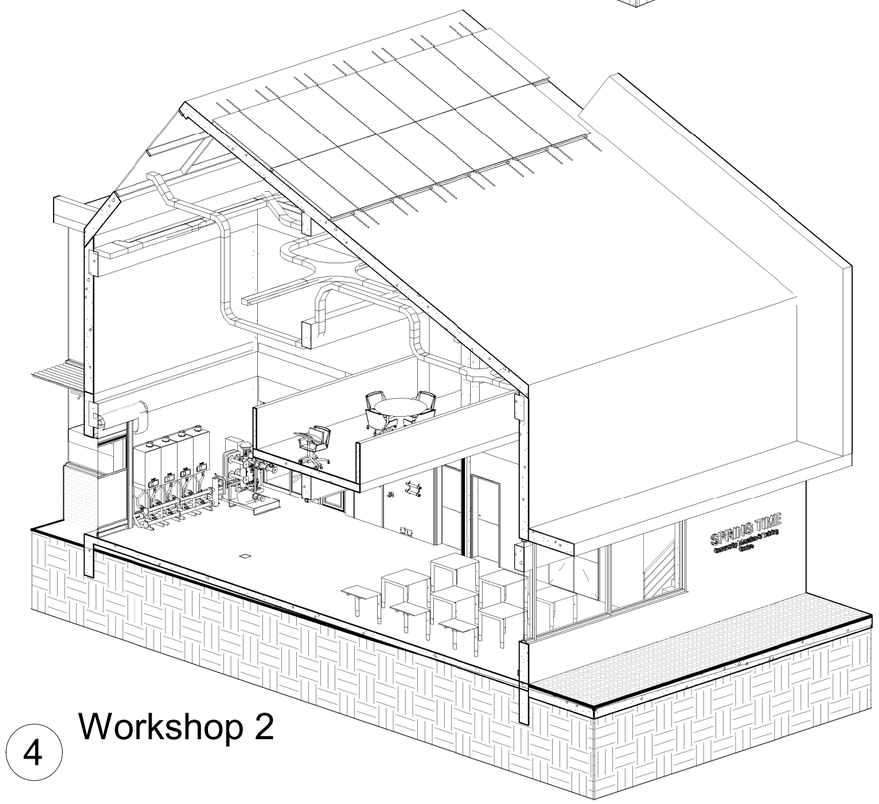
2 Section A-A

1 : 100

3d Section



3 Workshop 1



4 Workshop 2