THE INFLUENCE OF EARLY CHILDHOOD DEVELOPMENT ON ARCHITECTURE:

TOWARDS THE DESIGN OF A COMMUNITY CHILD DEVELOPMENT CENTRE IN RURAL KWAZULU-NATAL, SOUTH AFRICA

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DECLARATION

I declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. This dissertation is submitted in partial fulfilment of the requirements for the degree of Master of Architecture in the School of the Built Environment and Development Studies, College of Humanities, University of KwaZulu-Natal. None of the work has been previously submitted for any other degree or examination in any other university.

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Date

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For iKhethelo Children's Village, I hope our dreams come true.

ABSTRACT

In South Africa, rural communities are exposed to impoverished and unhygienic living conditions that jeopardise the survival, health and development of children. Despite the rejection of policies instilled during apartheid, equity in terms of the distribution of resources, service delivery, and early childhood development has not been achieved. Millions of orphaned and vulnerable children are transitioning into formal schooling without the intellectual and physical capabilities needed to excel. Thus, opportunities for children are compromised as is their quality of life as an adult. Through the research and analysis presented, it is clear that the outcomes of early childhood development facilities in rural South Africa have failed policy aims.

In response to poor quality early childhood development infrastructure and socio-economic inequality, this dissertation aims to transform learning spaces for children between 0 and 6 years old by exploring architecture to support the development of children in rural KwaZulu-Natal. In order to fulfil the rights of children, and provide them with a fair chance in life, the environment in which a child lives and grows should encourage the human development process and should provide opportunities for early learning. Children are dependent on their support system. Therefore, empowering communities generates stronger socio-economic conditions in which children are able to grow emotionally, intellectually and physically to their full potential.

This dissertation will result recommendations for a community early childhood development informed by primary and secondary data collected by the researcher and organised thematically. Theories of social justice, cognitive development and perception in phenomenology engage with core components of the topic – early childhood development, the built environment and rural KwaZulu-Natal – in order to facilitate the design of a community child development centre based in iKhethelo Children's Village. Through sensory and intellectual stimulation, the built environment aims to provide a venue for pedagogic concepts, principles and experiences in order to promote higher levels of learning.

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Figure 1: We are responsible for our children.

Source: https://www.dailymaverick.co.za/article/2020-05-28-who-will-look-after-the-little-children/

1.1. INTRODUCTION

1.1.1. BACKGROUND

"From a child's point of view, an environment is what a child can make of it" – Strong-Wilson & Ellis

The physical environment promotes forms of learning and offers unspoken messages, therefore architecture has the capacity to support learning and encourage a child's developmental process (Atmodiwirjo, 2014). The spaces created by parents and educators hold enduring memories for children and have a powerful influence on their worldview (Fraser, 2012). This may impact the values, perspectives and cognitive abilities (among others) that children develop well into adulthood. Unstimulating and unhealthy environments can have adverse effects on the development and wellbeing of children. Therefore, architecture for children should be treated with rigour and empathy (Dobbins, 2018).

In South Africa, a child's experience of the world may depend on their place of birth, financial status, and skin colour (Bamford, 2019). As a result of the apartheid spatial and social configuration, places of birth are disparate in South Africa. Approximately 33% of South Africans still live in rural areas today (The World Bank, 2018). Despite the rejection of values and policies instilled during the apartheid regime, rural communities are still burdened with high levels of unemployment, poverty, service delivery and public infrastructure. The impoverished and unhygienic living conditions of marginalised communities jeopardises the survival, health and development of children thus further contributing to the inter-generational challenges of poverty (Pillay, 2018).

In 2018 there were 2.7 million children orphaned and vulnerable in South Africa. KwaZulu-Natal has the highest orphan population (Hall & Sambu, 2019). These children are susceptible to forms of child neglect and abuse, which have a detremental impact on the structure, function and capacity of a developing brain (Bollinger, Monasch, Stover, & Walker, 2007). Traditional fostering households for orphaned and vulnerable children are commonly troubled by financial instability. Furthermore, there is poor access to education, food and nutrition, protection, shelter, and psychosocial support (Hall & Sambu, 2019). Stunted growth and an inability to adjust to a schooling environment are major concerns for orphans and vulnerable

children. Pillay (2018) strongly aserts that early childhood development and care is the main vehicle to address these concerns.

Although there are policies in South African that address early childhood development, there is a shortfall in terms of implementation (Department of Basic Education, 2018). A majority of rural children in rural communities do not have access to educational facilities before formal schooling in Grade One. The educational inequalities are further exacerbated by an exclusive schooling system that disregards indigenous knowledge and cultural practices (Hlalele, 2013). However, early inequalities can be reduced through pre-school exposure and early learning opportunities that stimulate appropriate development for children and school readiness (Hall, 2019). Provided that these environments are good quality, early learning programs are an important mechanism to reduce socio-economic differences in learning potential between children before the foundational phase of schooling (Hall, 2019).

1.1.2. MOTIVATION FOR THE STUDY

The aim of supporting early childhood development is to provide equal opportunities for all children to develop to their full physical, cognitive, emotional, social and moral capacity, as this has profound benefits on lifelong learning and wellbeing (WHO, 2020). The implications of poor investments into early childhood development and services may be evident in the high unemployment rate in South Africa, which hovers at 28.48% (StatsSA, 2020), as problems experienced during childhood often persist into adulthood (Alderman, 2011). Providing opportunities for education, and infrastructure, for children and families has the potential to reduce socio-economic disparities and create prosperous societies for children (United Nations Department of Economic and Social Affairs, 2006).

'If we are to break the cycle of poverty, we need to educate the children of the poor. We have insisted that this should start in early childhood.' (President Cyril Ramaphosa, SoNa 2018)

During the period of early childhood, quality care and educational programmes can confront inequality and interrupt inter-generational patterns of poverty, disease, violence and discrimination (Pillay, 2018). Hlalele (2013) suggests that an investment into early childhood development, from local government and international organisations, augments notions of fairness and equity, and mobilises social change for human development, which starts at birth.

The DG Murray Trust (2018) predicts that for every Rand invested in quality early childhood development, South Africa will receive at least R10 back.

Child development research has demonstrated that the most accelerated brain development occurs before three years of age during which time children develop the ability to think and speak, learn and reason, and lay the foundation for the socio-economic outcomes that persist into adulthood (Bamford, 2019). Children who live in healthy environments are able to play, learn and develop better mental and physical capabilities. During adulthood, they may be more productive and may become higher earners, thus contributing to social and economic growth of local communities (UNICEF W. &., 2002).

Early childhood development centres prepare children for real-life conditions by promoting a child's physical, psychological and social development through pedagogy involving friendship, sharing, problem solving etc. (Aleksic, 2015). These centres have the opportunity to improve the lives of marginalised children (figure 2) by providing nutrition, care and learning experiences irrespective of ethnicity, religion or class (Kotnik, 2017). Impoverished and deprived environments in rural communities can compromise opportunities for children thereby compromising their quality of life as an adult.

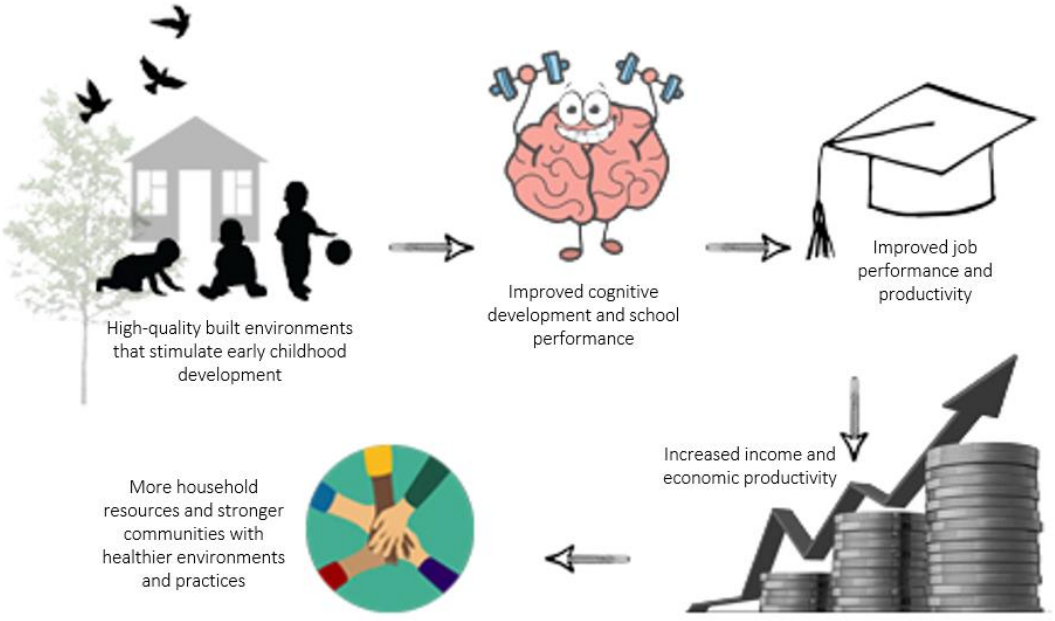

Figure 2: The impact of high-quality environments on early childhood development and life-long success. Source: Author. 2020.

The built environment for children in rural areas lacks an appropriate architectural response for developing children. Thus, the study is justified by the need for early childhood development infrastructure that supports various forms of learning through the built environment. Research suggests that architecture and quality design has the potential to encourage children's creativity, cognitive and socio-emotional development (Day, 2004).

A greater investment into the provisions of high-quality educational environments for early childhood development is required for marginalised communities to overcome persistent injustices and systematic poverty inherited from Apartheid (Carelse, 2018).

1.2. DEFINITION OF THE PROBLEM, AIMS AND OBJECTIVES

1.2.1. DEFINITION OF THE PROBLEM

Considering that 43% of South Africa's child population lived in rural households, in 2018, with poor access to education, nutrition, healthcare services and public infrastructure (Hall, 2019), it is understandable that the Progress in *International Reading Literacy Study* indicated that 78% of Grade 4 learners were unable to read for any meaning in any language (Carelse, 2018). Rural early childhood development facilities face obstacles concerning learning materials, resources, funding and sanitation. Poor quality-built environments generate unhealthy and unstimulating environments that threaten the long-term developmental outcome of children (Atmore, et al., 2012).

Inequalities faced by orphaned and vulnerable children in rural areas are further intensified by absent parental figures. This results in children transitioning into school without the basic foundations for learning (UNICEF, 2012). Rural communities are forced to accept available forms of childcare in facilities that are under resourced and insufficient. This highlights the critical need to redress infrastructure and socio-economic inequality through architecture by focusing on early childhood development interventions aimed at transforming learning spaces for children.

1.2.2. AIM

The research seeks to explore methods of architectural design that supports early childhood development in rural KwaZulu-Natal.

1.2.3. OBJECTIVES

- To explore the role of community engagement in early childhood development.
- To understand the state of early childhood development in rural South Africa.
- To examine the relationship between the built environment and early learning.
- To investigate spaces that encourage cognitive, social, physical and emotional development for young learners.

1.3. STATING THE ASSUMPTIONS

1.3.1. DELIMITATION OF RESEARCH

This research is primarily contained within the field of architecture and will use peripheral fields, such as social studies, psychology and pedagogy, to support and elucidate the argument. It is focused on orphans and vulnerable children between 0-6 years of age.

The problems postulated by this study are underpinned by a broader range of socio-economic and historic challenges; the researcher understands that architecture is not the sole solution. The research will be aligned with the current initiatives that consider environmental, social, and economic developments in architecture in the context of early childhood development in South Africa.

1.3.2. DEFINITION OF TERMS

Early Childhood Development: An integrated concept involving multiple sectors – health and nutrition, education and social protection – and refers to the physical, psychological, cognitive and social development that a child experiences from birth up to age 8 (Alderman, 2011).

Built Environment: Includes all man-made spaces, furnishings, open and public spaces and other infrastructure in which humans live, play or work (Hepp & Walker, 2016).

Orphan: a person under the age of 18 who has lost either one or both parents (UNICEF, 2017).

Apartheid: The system of racial segregation, and discrimination, that persisted for decades in South Africa. Apartheid determined where White, Black, Indian and Coloured people were allowed live and work, and which public facilities they could use (Findley & Ogbu, 2011).

Rural Areas: Open land that has few surrounding buildings or other homes, and not many people. The population density is usually very low in comparison to urban or peri-urban areas. Villages, towns, and other small settlements are usually in or surrounded by rural areas (Rutledge, et al., 2011). In South Africa rural areas experience patterns of exclusion and unjust circumstances of poor access to water, electricity, sanitation, education, and low economic status (Feketha, 2018).

Community: A group of people with diverse characteristics who are linked through social relationships, common perspectives and share a geographical location or settings (MacQueen, et al., 2001).

1.3.3. STATING THE ASSUMPTIONS

The research assumes that children between 0-6 years are perceptually sensitive to sensory stimulants, and that their development is affected by social, economic and cultural circumstances. Sensitively designed spaces for children to occupy can help shape positive experiences, encouraging a spectrum of early learning opportunities. The research further assumes that research and practice, from western cultures and developed countries, can be applied in a South African context within reason. Studies cannot be applied in totality to the South African context as a contextually responsive solution is required.

1.3.4. KEY QUESTIONS

PRIMARY QUESTION

In what ways can the built environment support early childhood development in rural areas in KwaZulu-Natal?

SUB QUESTIONS

- How can community engagement aid service provision and resources for early childhood development infrastructure?
- How does the South African socio-economic context of rural communities impact the development of children?
- How can the built environment provide opportunities for early learning?
- How can architectural spaces encourage cognitive, social, physical and emotional development for young learners?

1.4. THEORETICAL & CONCEPTUAL FRAMEWORK

The review of literature in Chapter Two unpacks the theoretical and conceptual framework that informs this dissertation. Theories and concepts will be contextualised to address early childhood development in rural landscapes in South Africa, and specifically in KwaZulu-Natal. Theories of social justice, cognitive development and perception in phenomenology engage with core components of the topic in order to establish a framework for the built environment and early childhood development in rural KwaZulu-Natal (figure 3).

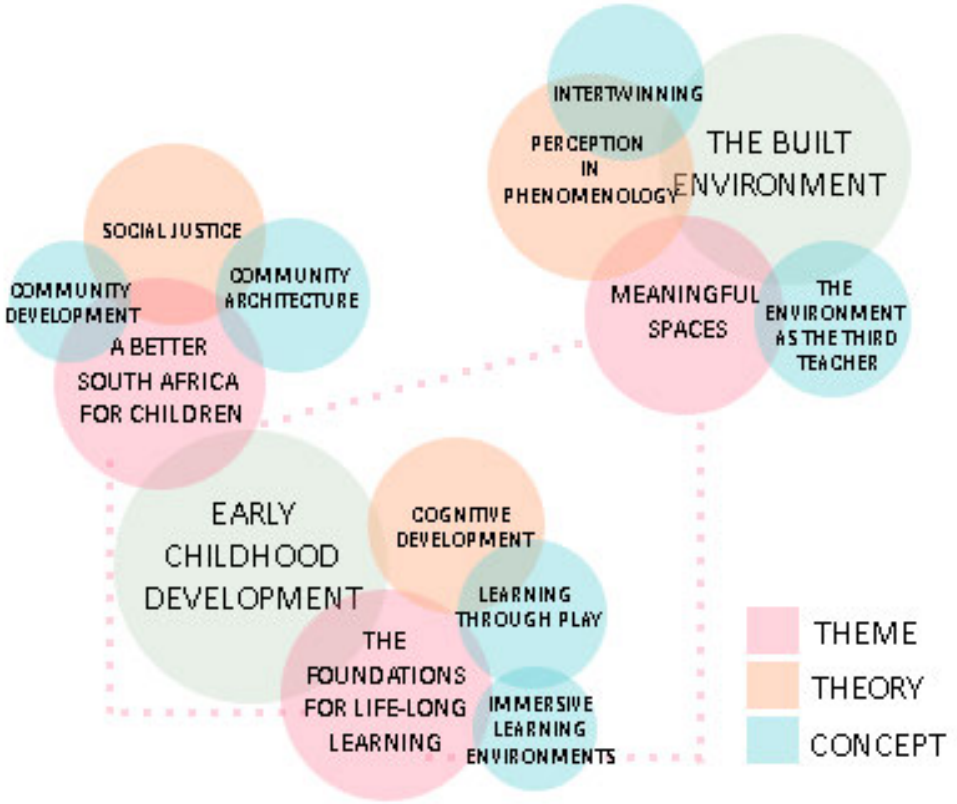

Figure 3: Confluence of theories, concepts and ideas to form framework. Source: Author, 2020.

SOCIAL JUSTICE

South Africans today are unequivocally aware of, and connected to, the dehumanising and oppressive history endured by many because of the apartheid system. Poverty, inequality and unemployment are the daily indignities experienced by rural communities (Ki-moon, 2010). The promotion of early childhood development, education and skills development has been associated with minimising inequality; therefore, it can be used as a mechanism for profound social transformation (Feketha, 2018). Architecture has the essential role in advancing social

justice by focusing on design that responds to challenges of social sustainability, economic equity, and opportunities for all societies (Bates, 2019).

THEORY OF COGNITIVE DEVELOPMENT

Jean Piaget's theory of cognitive development focuses on understanding the processes through which the human brain grows and changes from birth throughout childhood. It concerns capabilities including memory, thinking, and reasoning where spatial processing, problem-solving, language and perception are required (Richland, et al., 2016). The built environment needs to be sensitive to the needs of developing children as their understanding of the world is under rapid transformation. If environmental conditions are unfavorable, a child's development and life-long success may be implicated (Frost, et al., 2012).

PERCEPTION IN PHENOMENOLOGY

The investigation of sensory spaces encourages children to problem solve and understand their immediate environment (Koch, Marcus, & Steen, 2009). Perception in phenomenology favours the human experience where visual, tactile and aura sensations guide architectural practice. Multi-sensory qualities of space, measured by the eye, ear, nose, skin, tongue, and skeleton of the body, provide a human-made realm for an existential experience (Pallasmaa, 1996). An interactive and inspiring built environment promotes higher levels of thought and can be used as a tool for teaching in preparation for formal school and adult life (Atmodiwirjo, 2014).

1.5. RESEARCH METHODS & MATERIALS

1.5.1. RESEARCH METHODS

The research philosophy was constructivism, where there was no single perception of reality. Constructivism signifies that reality is socially constructed and is subjective to an individual's perception of the world (Galbin, 2014). The research referred to the South African context – specifically KwaZulu-Natal. The study adopted a qualitative approach using primary and secondary data to draw conclusions. The process of engagement was ethical and sensitive. All sources of information were referenced. Interview participants received an informed consent letter prior to interviews.

This research was approved by the Humanities and Social Science Research Ethics Committee (HSSREC) and a gatekeeper's letter for the primary data collection has been attached in the appendix.

The thematic analysis involved identifying themes or patterns in qualitative data. All the data collected was analysed and organised thematically with the findings informing recommendations and approach to the architectural design. A qualitative approach to the research was used in order to capture behaviour in a natural setting were beliefs, values feelings and motivations.

1.5.2. PRIMARY DATA

The research has explored the role of the built environment in early childhood development. The primary data collected and produced by the researcher involved the case study analyses of iKhethelo Children's Village in rural KwaZulu-Natal. Observations, semi-structured interviews, photographs, and annotated sketches were used to capture information. The research identified the intangible factors, unpacking opinions, attitudes and beliefs. The fieldwork component was conducted within the constraints of COVID-19 restrictions using alternative methods of communication and remote sensing.

Interviews were conducted with two key informants from iKhethelo Children's Village: A child caregiver, and house mother, who works with orphaned and vulnerable children; and iKhethelo Children's Village's CEO, who facilitates and manages a range of challenges experienced by children daily. Both respondents have the relevant qualifications and experience to provide information about the research problem. Both interview schedules are attached in the appendix.

Due to the restrictions of COVID-19 and the language barrier between researcher and interview participants, only two participants were interviewed because both are fluent in English. The primary data collected with key informants was organised thematically in order to interpret the data. Chapter Five, PRESENTATION OF DATA AND ANALYSIS, provides an analysis of the data by continuing the discussion from the literature review, precedent studies and case study.

1.5.3. SECONDARY DATA

1.5.3.1. LITERATURE REVIEW

The review of literature has provided a theoretical and methodological framework where concepts and themes are used to address the research problem postulated in this dissertation. It expanded on research relating to the core components of the topic – early childhood development, rural areas, and architecture. The perspectives developed in this section have aided in establishing a framework for architectural design that is responsive to early childhood development and the socio-economic context that orphans and vulnerable children are exposed to during their developmental years.

1.5.3.2. PRECEDENT STUDY DESCRIPTION

Two precedent studies were chosen in response to the problem statement and theoretical and conceptual framework. Both were examples of early childhood development centres that have inform the design approach, guidelines, and brief. Silindokuhle Preschool in Port Elizabeth provided an example of effective community resources and initiatives in response to early childhood development in a rural South African context. Kinderkrippe Nursery School in Germany was celebrated for shaping profound phenomenological experiences for children during the seminal years.

1.6. CONCLUSION

This chapter has outlined the research background, aims, problem statement, theoretical and conceptual framework and methodology that informed the outcome of this dissertation. The problem has been identified as poor-quality built environments that hinder the early childhood development of orphans and vulnerable children living in rural communities. Early childhood development centres in rural areas face a multitude of socio-economic challenges. This justifies the need for further research into architectural design methods that may positively contribute to early childhood development. The findings result in a framework and recommendations for the architectural design of a community early childhood development centre in rural KwaZulu-Natal. The table below provides a brief outline of the dissertation.

CHAPTER ONE:	An outline of the structure and methodology of the study.
CHAPTER TWO:	A literature review exploring key theories and concepts in reference to early childhood development and the built environment.
CHAPTER THREE:	A review of two precedent studies selected in response to the problem statement and theoretical and conceptual framework.
CHAPTER FOUR:	The presentation of empirical work and analysis of data. This chapter will include the case study analysis of a local early childhood development centre and accommodation for orphaned and vulnerable children in rural KwaZulu-Natal.
CHAPTER FIVE:	This chapter provides a description of the primary data collected and analysed. The chapter analyses the data thematically by continuing the discussion from the literature review, precedent and case studies.
CHAPTER SIX:	A conclusion and list of recommendations, drawn from the primary and secondary data, to define architectural guidelines for Part 2 of this dissertation.

CHAPTER TWO: LITERATURE REVIEW

Figure 4: Water Me. Sculpture by Author, 2020.

2.1. INTRODUCTION

In order to generate architecture that encourages early childhood development, for children living in rural KwaZulu-Natal, it is imperative to understand the needs of children and the contributing factors to early childhood development in South Africa. The chapter is divided into three sections: A Better South Africa for Children, The Foundations for Lifelong Learning, and Meaningful Spaces. Through the exploration of social justice, cognitive development, perception in phenomenology and relating concepts, the research responds to the key questions outlined in chapter one:

- How can community engagement aid service provision and resources for early childhood development infrastructure?
- How does the South African socio-economic context of rural communities impact the development of children?
- How can the built environment provide opportunities for early learning?
- How can architectural spaces encourage cognitive, social, physical and emotional development for young learners?

The literature review will begin by breaking down each theory and concept individually and its contribution towards architectural spaces that have the potential to enhance early childhood development. Figure 5 provides the theoretical and conceptual approach to each section of this literature review.

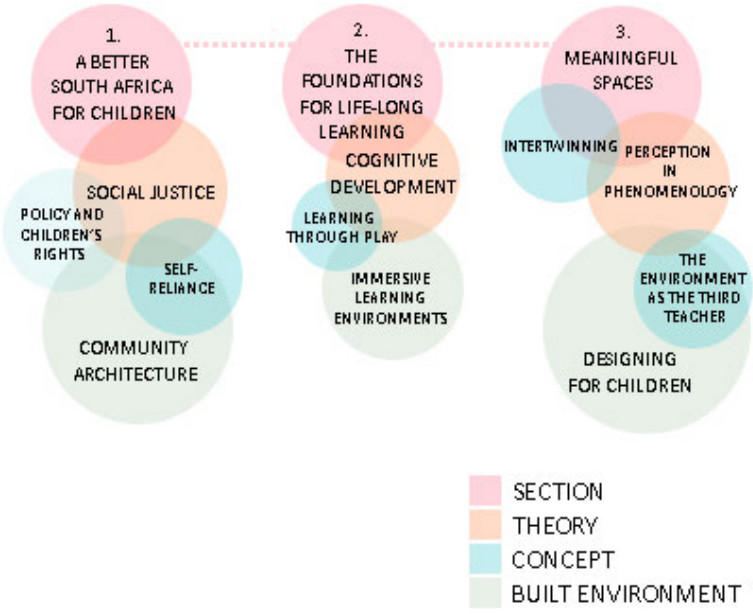

Figure 5: Literature Review Outline. Source: Author, 2020.

2.2. A SOUTH AFRICA FOR ALL CHILDREN

"Early childhood development is the most powerful investment in human capital that a country can make."- James Heckman, Nobel Prize Winner for Economic Sciences (2000).

The effects of Apartheid has resulted in poor children receiving an inferior standard of education. During Apartheid all policies and systems were based on segregation and discrimination on the grounds of race. Black children were given significantly less than white children and their teachers were mostly underqualified for their jobs. "In 1961, only 10% of black teachers held a matriculation certificate."- Francesca Villette, 2016. Former white schools had money and resources to build a strong foundation for children however schools in townships and rural areas did not. This has perpetuated an inferior schooling system for the country's majority (Villette, 2016).

Today the South African reality stands in sharp contrast to the Constitutional goals for a democratic society (Davis, 2020). The post-apartheid Constitution has failed to address historical systematic challenges that refute basic human rights. A child's right to quality education and a dignified future is connected to poverty and the scarcity of resources (Ki-moon, 2010). High levels of poverty and illiteracy condemn families into inter-generational challenges where people are denied healthcare, education and other critical components embedded in the Constitution (Rountree, 2019).

"We have made a conservative estimate that more than 200 million children under 5 years fail to reach their potential in cognitive development because of poverty, poor health and nutrition, and deficient care." (Cheung, et al., 2007, p. 60). Inequality, measured in terms of the Gini coefficient of income distribution, places South Africa in the top five most unequal countries on a global scale (Feketha, 2018). Rural children are exposed to harmful environments and practices that hinder the period of early childhood development unlike their urban counterparts who have displayed accelerated growth (Aidoo, 2018). Communities living in rural areas experience patterns of exclusion and unjust circumstances of poor access to water, electricity, sanitation, education, and low economic status.

Research estimates that three million children, under the age of six, living in rural South Africa have minimal access to early childhood development services and resources (Hall, et al., 2019). Education is a basic human right and is fundamental for life-long success and economic

opportunities (Atmore, et al., 2012). The majority of young black children are impacted by a range of social and economic inequalities, undermining their development. The impact of early deprivations on the growing and changing structure of the brain can lead to challenges in learning, behaviour and physiology thereby increasing the chance of stress-related chronic diseases (Pells & Woodhead, 2016).

Figure 6 unpacks the correlation between poverty and its implications on early childhood development.

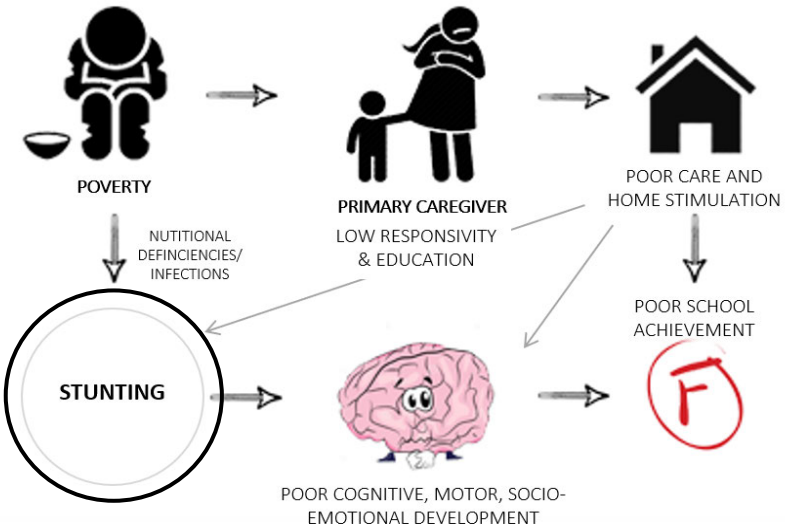

Figure 6: The Impact of Poverty on Early Childhood development. Source: Author, 2020.

Many early childhood development centres in South Africa function without basic infrastructure such as running water, access to electricity or suitable sanitation. Atmore, van Niekerk, & Ashley-Cooper (2012) found that the infrastructure of community-based facilities are of a poorer standard and are unregistered due to the fact that they do not meet the infrastructural requirements for registration. The poor infrastructure seen in early childhood development centres not only presents significant health and safety risks to children but also leads to poor quality early childhood development. 'Programmatically sound early childhood development' can be provided in poor quality buildings. However, 'impoverished learning environments' is often associated with substandard early childhood development with limited development opportunities (Department of Basic Education et.al, 2011). In order to create a better South Africa for all children, access to quality education and equal learning opportunities is essential. Education is closely linked to many development goals such as improving child health, reducing hunger and poverty, economic growth and creating peaceful societies.

2.2.1. SOCIAL JUSTICE: HISTORY, MEANING AND PURPOSE

A system that is socially just is void of unnecessary suffering, exploitation, abuse, oppression, prejudice, and discrimination (Jost & Kay, 2010). The theories and principles of social justice address the root cause of the problem and seek to change the status quo to create new possibilities and opportunities for children and families (Gibson, Hard, & Press, 2013). The efforts of social justice activists tackle poverty, exclusion, and unemployment to promote solidarity, harmony, and equal opportunities within and between societies. Patterns of social injustices are linked to race, ethnicity, culture, language, gender, age, class, religion, ability, and sexual orientation (Gibson, Hard, & Press, 2013).

Distributive justice, procedural justice and interactional justice are three main aspects that contribute to the making of social justice, however, there are numerous sub-categories (Jost & Kay, 2010). The theory of social justice should address at least one of these aspects of justice, not necessarily all three. Figure 7 elaborates on the main aspects of social justice.

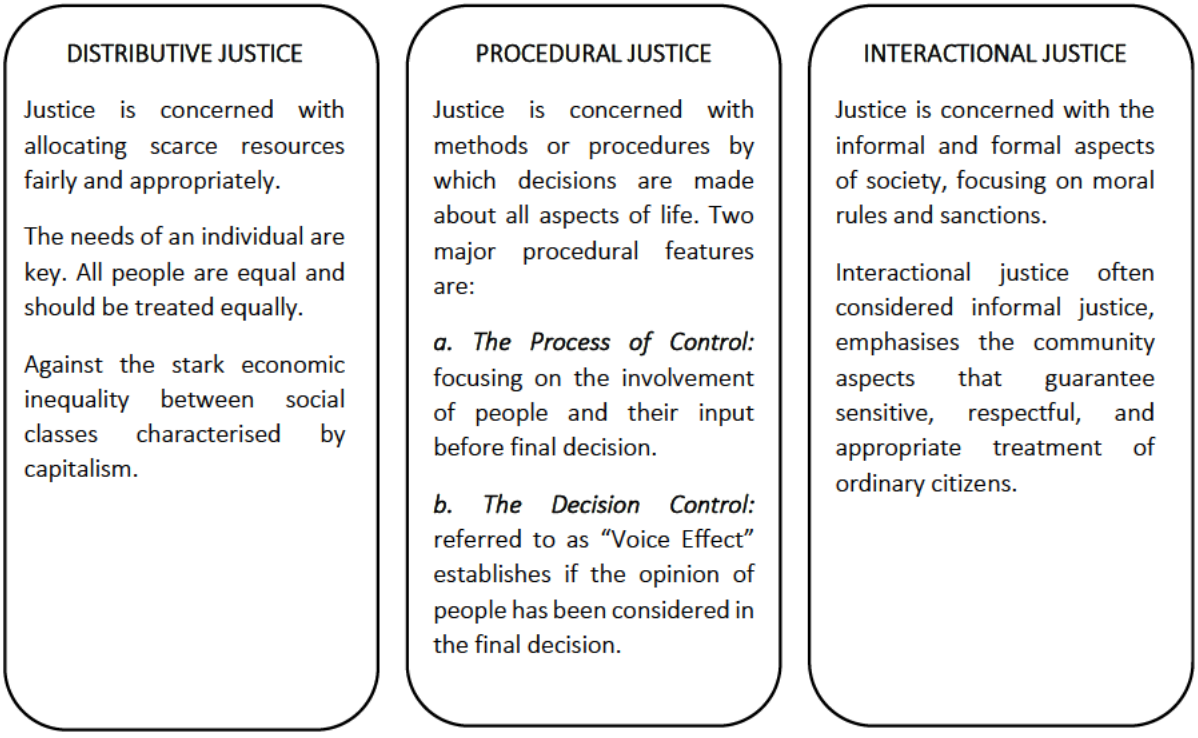

Figure 7: The Dimensions of Social Justice. Source: Author, 2020.

Early conceptions of social justice, namely distributive justice, by Aristotle in ca. 322 BCE, questioned the allocation of scarce resources appropriately (Jost & Kay, 2010). Aristotle believed that people should be treated equally, arguing for principles of equity, proportionality, and merit, by acknowledging the relationship between 'legal' and 'just'. Aristotle described social justice as the fair, equitable allocation of resources, opportunities, obligations, and power in a society, concentrating on needs of individuals (ibid). Significantly later in the 1930's, Kurt Lewin promoted social justice by fostering democratic norms, preventing tyranny and oppression from authorities in Germany. Lewin's research programmes focused on overcoming various forms of prejudice, exclusion, hostility and self-hatred among the Jewish community (Jost & Kay, 2010).

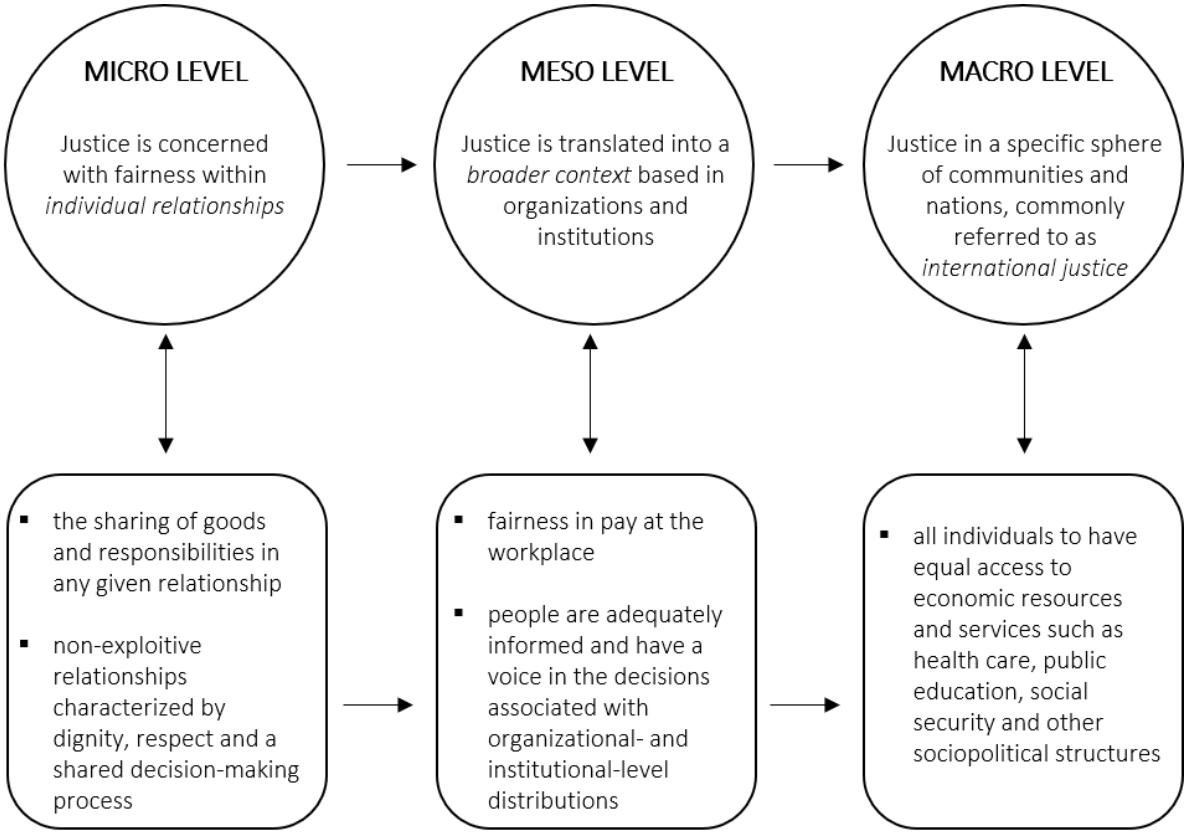

Figure 8: Social Justice as a multi-level construct. Source: Author, 2020.

Methods and procedures of social justice can be experienced as a multi-level construct from a micro to a macro level (figure 8) (Jost & Kay, 2010). In the modern context, social justice is described by government policies as fairness and equity in relation to the distribution of resources and access to vital services; the promotion and recognition of civil, legal and

industrial rights; and the provision of opportunities for open participation in community life and decision-making (Gibson, Hard, & Press, 2013). Social justice becomes the extension of principles preserved in Constitutions that values human dignity, equity, and freedom to participate in all political, socio-economic and cultural spheres of society (Ki-moon, 2010).

The increase in inequality between – and within – countries in the global econonmy demonstrates the failure of Governments and international organisations, making the pursuit of social justice more important than ever (Ki-moon, 2010). Poverty and suffering affect a large proportion of humankind and the persistence, aggravation and existence of extreme poverty constitutes as an injustice. This is a violation of basic human rights according to current international standards (DESA, 2006). In South Africa, there is a shortfall of key elements of social protection such as access to free basic services, such as shelter, water, sanitation and electricity for poor households, and free education in schools in poor communities, and a school nutrition and transport programme (Department of Planning, Monitoring and Evaluation, 2014). Unless this gap is bridged, there will be a deepening of income-related inequalities, specifically in ownership of capital and access to a variety of services and benefits (Bardhan, 2001).

Twenty-six years after the end of Apartheid, significant improvements in social equity and poverty reduction have been made. However, poverty, unemployment and inequality remain South Africa's most pressing problems (The United National Development Programme, 2014). Apartheid, with its legacy of socio-economic inequalities, has deprived most South African children of their fundamental human rights, including the right to early education. The investment into quality early childhood development programmes for the most deprived South African children will have a significant contribution on the reduction of poverty and inequality across society (Pillay, 2018).

2.2.2. POLICY AND PROGRAMME RESPONSE

The pursuit of social justice depends on policy and programme response from international organisations and local government to optimise early childhood development. The term 'early childhood development', in relation to policy and action, should make reference to the survival, health, care and education of a child (Pells & Woodhead, 2016). Research suggests that early childhood development is a cost-effective strategy for eliminating disadvantage in developing

countries. Improvements in public services including access to free education, basic housing and health care, brings the world closer to achieving just societies in which children may prosper (Evans, Rosen, & Nelson, 2014). The reduction of poverty, and other deprivations, go hand-in-hand with strategies to improve health and education, as well as reduce inequality and encourage economic growth (Pells & Woodhead, 2016).

INTERNATIONAL POLICY

The United Nations Convention on the Rights of the Child (UNCRC) is a human rights treaty that outlines the civil, political, economic, social, health and cultural rights of children. The United Nations Convention on the Rights of the Child provides an international legal framework as a commitment to protect and fulfil the rights of every child. It has inspired global change for laws and policy to address child health care, nutrition and development. However, it has not been implemented effectively. While international standards are highlighted for the realisation of the rights of every child, the Sustainable Development Goals provide a contemporary vision for sustainable social, economic, and environmental progress for everyone (UNICEF, 2020).

Figure 9: The Sustainable Development Goals. Source: ***https://www.imf.org/en/Topics/SDG***

The Sustainable Development Goals address global challenges related to poverty, inequality, environmental degradation, peace and justice (UN, 2020). The 17 Goals (Figure 9) are interconnected and act as a blueprint for the world to improve human lives and protect the environment. The United Nations recognises that ending poverty and other deprivations goes

hand-in-hand with the aforementioned strategies. (Gaffney, et al., 2013). Strengthening early childhood development is key in achieving at least seven of the Sustainable Development Goals including poverty, hunger, health and child mortality, education, gender, water and sanitation, and inequality (Pells & Woodhead, 2016).

Early Childhood Development is a priority in Target 4.2 that respects children's rights, needs, capacities, interest and other ways of appropriate development at each stage of their early lives. The main aim is to create accessible, inclusive, and quality early childhood development for all young girls and boys (Gaffney, et al., 2013). The interdependencies between health, care and education, from the 'first 1000 days' onwards, are recognised as a crucial aspect in achieving the goals and delivery of quality early childhood development (Pells & Woodhead, 2016).

NATIONAL POLICY

South Africa is committed to achieving the international mandated goals of the Sustainable Development Goals through the implementation of the *National Development Plan* (Voluntary National Review, 2019). Early childhood development has been identified as the source of human capital that drives education, jobs and economic growth. The National Development Plan, through the vision for education and training, emphasises the need for access to education. This is in the best interest of all stakeholders and responds to community and economic development. The plan focuses on harvesting the resources of South Africa's population by creating an inclusive economy combined with increased government capacity and promoting leadership and partnership throughout society (GovSA, 2020).

The National Integrated Plan for Early Childhood Development in South Africa intends to give all children in the country the best start in life by building a solid foundation of emotional, psychosocial, cognitive, and physical development (UNICEF, 2005–2010). The plan asserts the leading role of government in formulating, implementing and monitoring the progression of early childhood development regarding the social, health and educational needs of children. Non-governmental and community-based organisations have been identified as an effective and efficient integrated approach to early childhood development programmes for marginalised children in South Africa. In order to achieve the goals established by the National Integrated Plan at a national, provincial and local level, the policies and decisions are guided

by principles of excellence, access, equity, diversity, accountability and community-driven provision to ensure synergy of service delivery and improved early childcare, early stimulation and learning, health and nutrition, water and sanitation (UNICEF, 2005–2010).

ORPHANED AND VULNERABLE CHILDREN

The relationship between care-givers and young children plays a vital role in helping children understand the world around them through the creation of an emotional bond (Bamford, 2019). The global epidemic of HIV/AIDS increased the number of children living without a mother, father or both biological parents in South Africa (UNAIDS, 2018). Vulnerable children are specifically targeted by the National Integrated Plan for Early Childhood Development. This includes: orphaned children, children with physical disabilities and incurable diseases, children affected and infected by HIV, children from dysfunctional families, children in homes headed by other children, and children from poor households and communities. Pillay (2018) asserts that early childhood education is the main vehicle to address the concerns of orphans and vulnerable children.

The Presidents Emergency Plan for AIDS Relief is a global response to orphans and vulnerable children impacted by HIV and AIDS (Coulibaly-Traore, et al., 2012). Programs are initiated and funded by government and civil society interventions. Sustainable local systems provide support to overwhelmed families and communities. The six fundamental domains of child wellbeing (figure 10), supported by economic strengthening, address individual needs and improve families' ability to provide critical support and child protection. Building community capacity, where volunteers and community groups provide swift and critical support, is essential (Carpenter, et al., 2007).

Figure 10: The Six domains of Child Wellbeing. Source: Author, 2020.

The LIV Village Early Childhood Development Centre in Verulam (figure 11), KwaZulu-Natal address the problem of HIV, orphaned children, and children removed from their biological homes due to social circumstances. Early childhood development is integrated into the village community centre comprising of a Community Hall, Clinic, Social Development Offices and a school. This addresses all aspects of early childhood development (Education, Health and Social) outlined by the Integrated Development Plan. The LIV Village Early Childhood Development Centre provides an example of the village concept where a non-institutional, holistic approach addresses childcare for children who unable to be supported by their family unit (Cloete, 2016).

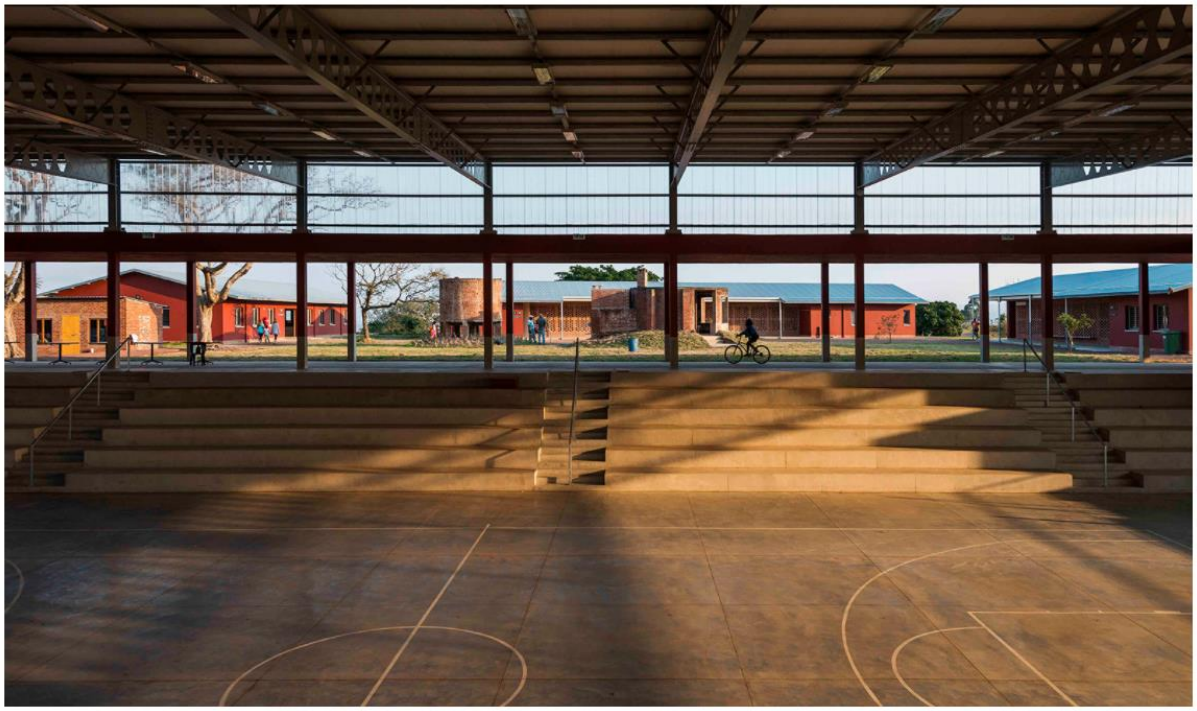

Figure 11: LIV Village Early Childhood Development Centre. Source: https://www.designworkshop.co.za/project/liv-village#

2.2.3. SOCIAL JUSTICE BY DESIGN

"To achieve our fundamental goal of driving positive change through the power of design, we have to empower those who have been too long ignored. We have to create spaces that allow everyone to become their best selves through the power of design."- William Bates, 2019

Architecture and architects have the essential role in advancing social justice by helping to close the divides of class, gender, and race through the power of design (Bates, 2019). Designing for social justice is explicitly motivated by the goal of equitable distribution of opportunities and resources to enhance human capabilities. The dominant relationship between community and design, is informed by, and seeking to ratify, social justice. Human-centered design emphasises the users' needs, desires, culture, resources and limitations while promoting economic growth and social development (Leydens, et al., 2014).

The concept of community architecture is defined as architecture implemented with the active participation of the end-users and self-help initiatives (Grigorescu, 2015). The outcome of community architecture yields social and economic benefits that were previously unavailable to marginalised communities (Moatasim, 2005). Professionals, and community members, improve their environment through democratic practises that includes the local people managing, maintaining, and improving their environment to support the functional and spiritual needs of the community. Participatory techniques such as group interaction, brainstorming, workshops, and public forum practices have a transformational impact on service delivery and achieving socially just objectives (Gibson, Hard, & Press, 2013).

Self-reliance techniques (figure 12) allows communities to reduce their individual and collective dependence on government through economic development strategies. The concept of self-reliance, discussed by Hope (1983) requires beneficiaries to secure human and natural resources, maintain values and traditions, and enhance quality of life for all members of the community. Principles of self-reliance allows communities to disconnect from systems that foster historical inequalities and prioritise economic activity for service provision and the alleviation of poverty (Hope, 1983) .

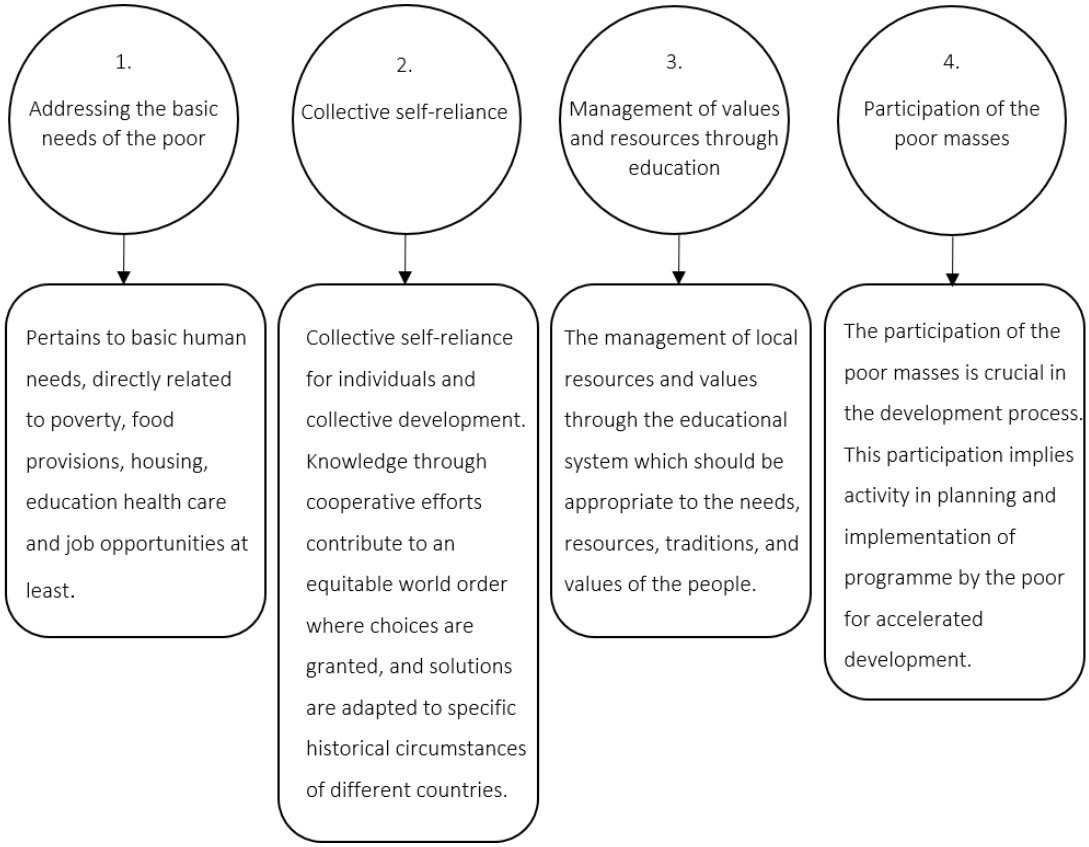

Figure 12: The Framework of Self-reliance. Source: Author, 2020.

2.2.4 RURAL EDUCATION ARCHITECTURE

Figure 13: Gando Primary School: More with Less. *Source: https://www.archdaily.com/785978/primary-school-in-gando-extension-kere-architecture*

Gando Primary School in Burkina Faso is a prime example of rural education architecture. The school uses traditional building techniques that embrace community resources in the design and construction process. Architect, Diébédo Francis Kéré, reinvests his knowledge of architecture back into his home village as an ethnographic address to the challenges of poor access to educational infrastructure that he experienced as a child. The school is inspired by the minimal materials, resources and cultural practices of the community it serves (The Kéré Foundation, 2016). Kéré revives traditional building methods and materials and combines them with a modern and innovative design approach.

The school was built with stabilised and compressed mud bricks as the primary material for the walls. This sensitively assimilates the materials of the existing surrounding buildings. The clay walls allow for a cooler interior than most conventional concrete buildings. The traditional man-made mud brick structure is supported by columns and beams to ensure structural stability. The roof structure was designed to be assembled on site by locals and by hand, negating the need for heavy machinery (Figure 14), while the lightweight steel roof is raised from the structure, allowing air to naturally ventilate the interior spaces (Figure 15) (The Kéré Foundation, 2016).

Figure 14: The installation of a light-weight roof structure. Source: https://morewithlessdesign.com/en/gando-primary-school/

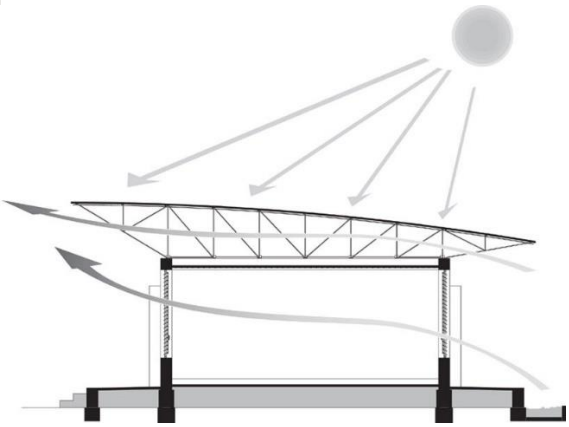

Figure 15: A direct response to local climatic conditions. Source: https://www.moma.org/interactives/exhibitions/2010/smallscalebigchange/projects/primary_school.html

Through the process of participation, knowledge is shared and experience helps to address new obstacles (Chansomsak & Vale, 2009). Cost, climate, resource availability and construction feasibility are the key factors influencing the choice of materials with the aim of achieving sustainability. Not only does the community-focused design of Gando Primary School keep costs manageable, but it also exudes almost zero carbon emissions and responds to its context.

The adopted use of clay/mud brick hybrid construction was taught to the community and used for phase two of the project – the school library extension (The Kéré Foundation, 2016).

Through community involvement and construction methods, the community is able to address their needs through their own actions and abilities with the help of local citizens and professionals (Chansomsak & Vale, 2009). The mobilisation of community resources under its own initiative is essential for the correction of injustices and overcoming shared challenges (Hope, 1983). Society becomes responsible for meeting individuals' rights and ensuring fair distribution of resources (Goel, 2014). Empowering communities, through education and skills development, allows marginalised groups to reject powerful structures influenced by capitalism, and uphold values of human dignity (Jost & Kay, 2010).

Children grow emotionally, intellectually and physically through their relationships and interaction with people in their community. For children, community involvement and engagement produces long term benefits in life. It is crucial as it may allow children to feel a sense of belonging and establish a sense of identity (Munthali, et al., 2014). The notion of community extends further than the involvement of parents in a school, it also relates to the concept of ownership and identity. The African proverb "It takes a village to raise a child", emphasises presence of community to ensure the well-being of children (Grobbelaar, et al., 2012).

2.3. THE FOUNDATIONS FOR LIFELONG LEARNING

"In the least developed countries, where a majority of the world's children reside, it is estimated that only 65 percent of students who enrol in Grade 1 reach Grade 5. In part, this consequence has been linked to poor-quality primary school environments. Poorly trained teachers, poor facilities and the oldest classrooms have been linked with drop-out rates in Grades 1 and 2. Improving the quality of ready schools is an important aspect in maintaining school enrolment."- United Nations Children's Fund, 2012

The significance of early childhood development cannot be overstated. From birth to seven years of age, there is a period of rapid physical, mental, emotional, social and moral growth. During this time children acquire the skills for learning, writing, basic numeracy and other concepts needed for lifelong learning (UNICEF SA, 2006). The early years is the ideal phase for helping disadvantaged children to their full potential as many South African orphaned and vulnerable children are transitioning into school without the appropriate development and skills needed to excel (UNICEF, 2012).

The structure, function and capacity of a developing child's brain is influenced not only by genetic inheritance but also by psychosocial and biological factors (Bamford, 2019). Success in school is affected by a range of abilities relating to physical well-being, social and emotional development, cognitive development and fine-motor skills. Learning begins at birth and extends beyond the classroom. Therefore, parenting and the socio-economic context affects a child's ability to develop (UNICEF, 2012). Children are dependent on stimulation, nutrition and support from their parents to enhance brain development. Orphaned and vulnerable children are usually exposed to harmful environments and absent care-givers, which has adverse effects on their cognitive development (Frost, et al., 2012).

2.3.1. THE THEORY OF COGNITIVE DEVELOPMENT

Cognitive development involves rapid growth over a short period of time where there are qualitative changes in how children think and perceive their environment. Cogitation refers to capabilities including memory, thinking and reasoning. It involves spatial processing, problem solving, language and perception (Richland, et al., 2016). The psychologist, Jean Piaget, stated that children are not less intelligent than adults but have different thought patterns and views.

Theories of cognitive development seek to understand the processes that involve the growth of the human brain and the way in which it develops from birth (Belyh, 2019).

Jean Piaget's theory of cognitive development focuses on understanding how children acquire knowledge as well as understanding the nature of their intelligence (Cherry, 2020). Piaget's discoveries relating to cognitive development were born from observations of children, especially when they played (Belyh, 2019). Children participate in order to learn, interacting with the world around them while making observations and learning. Children are able to receive and process new information and adapt previous knowledge regarding their surrounding environment (Cherry, 2020). Piaget divided child development into four stages (figure 16), the sensorimotor stage, preoperational stage, concrete operational stage, and the formal operational stage. Each stage of child development represents distinct forms of acquiring new knowledge. Piaget uses age as an indicator of development rather than a criterion (Lurchychyn, 2014).

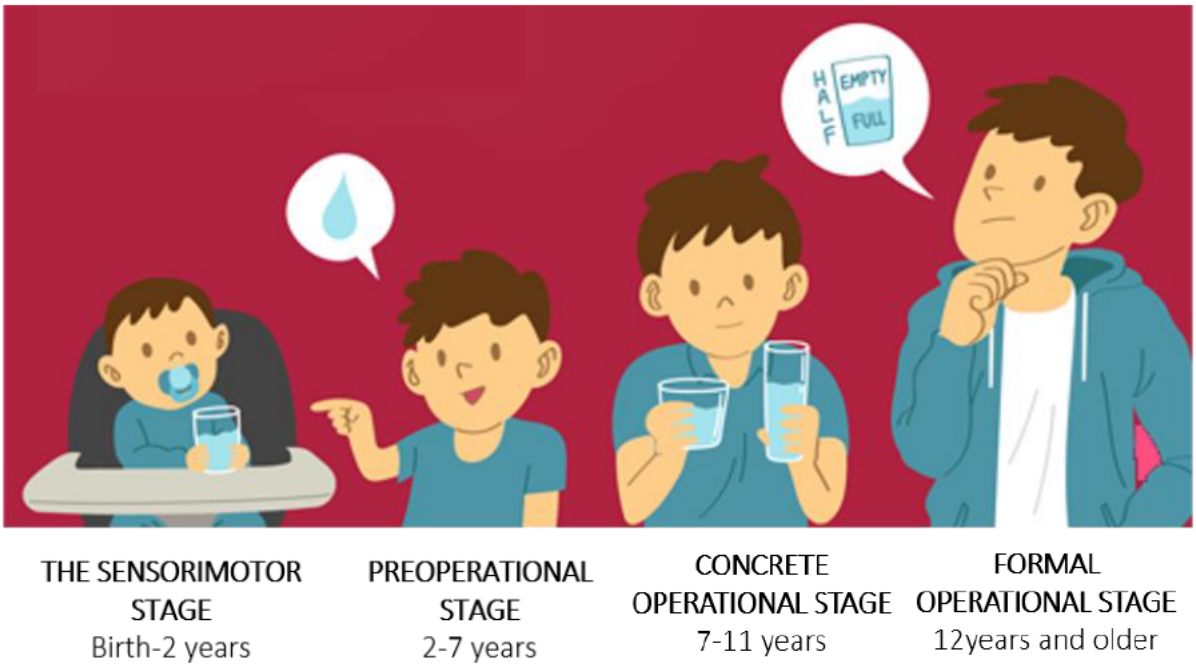

Figure 16: The Four Stages of Child Development.
Source: https://www.verywellmind.com/piagets-stages-of-cognitive-development-2795457 (adapted by author).

For the purpose of this dissertation, the sensorimotor stage and preoperational stage are the targeted age group. Infants are able to use the abilities that they are born with – sight, hearing, smell, taste and touch – combined with physical capabilities that they continue to develop – touching, grasping, and tasting – to discover and interact with the world around them (Cherry, 2019). Infants are also able to engage in the first stage of physical and manipulative play shortly

after birth and by the age of 2, they are fully mobile, capable of running and climbing (Frost, et al., 2012). The extract from *Play and Child Development Fourth Edition,* in the appendix of this dissertation, provides a synthesis of the sub-stages of the sensorimotor period and the role of adults in ensuring healthy and appropriate development.

Jean Piaget's analysis of play and intellectual development concludes that play is a critical component of cognitive development. According to Piaget, play follows development, therefore different types of play represent stages of development (Frost, et al., 2012). Sara Smilansky (1989) built on Piaget's work and focused on how children learn through play and the impact it may have on their future academic success. Smilansky suggests that children engaged in four types of play that contribute to social, emotional, physical and cognitive development. Figure 17 provides a brief explanation of each type of play.

FUNCTIONAL PLAY

Playing simply to enjoy the experience like smiling and squeezing toys helps young children understand the world through their senses, supports social-emotional development, and strengthens motor skills.

CONSTRUCTIVE PLAY

Playing that is goal orientated, like building, crafting and drawing promotes creativity and problem solving and gives children a sense of accomplishment.

EXPLORATORY PLAY

A child examines something closely to learn something more about it. This encourages cognitive and language concepts such as shape, size, colour, function and spatial awareness.

DRAMATIC PLAY

Also known as symbolic or pretend play where a significant cognitive shift occurs. Understanding that objects, actions, or ideas can represent other objects, actions, or idea brings imaginations to life.

Figure 17: Sara Smilansky's Four Types of Play. Source: Author, 2020.

2.3.2. LEARNING THROUGH PLAY

The safety, learning, social development and essentially the enjoyment of childhood depends on the quality of play spaces and opportunities for play (Frost, et al., 2012). Environments for play need to be imaginative, innovative, and stimulating to enrich the lives of children. Successful play spaces are not traditional jungle gyms; they require thought, planning and

continuous maintenance to provide the best possible play opportunities. In a rural setting, local materials and geographical features can be used to add play value. For example, Balmaha Play Landscape (figure 18), embraces the natural contours of the hillside and reflects the colours found in the natural surroundings. The play equipment is carefully chosen to fit the setting with the rounded granite boulders and indigenous plants reflecting the important features of the landscape (Ball, et al., 2009).

Figure 18: Balmaha Play Landscape. Source: http://www.freeplaynetwork.org.uk/designforplay/principle01/dfp03.htm

PERMANENT INTERVENTIONS:	TEMPORARY INTERVENTIONS:
1. Sensorimotor planting circle	1. Ice blocks
2. Plantings at the arch climber	2. Wind chimes
3. Plantings at the bridge of the main play structures	3. Overhead canopy
4. Plantings in the asphalt area	4. Water troughs
5. Unmown grass area	5. Movement of playhouse
6. Steppingstones	6. Sand buckets
7. Boulders	
8. Two vegetative rooms. Two 1.5m x 1.5m	

Figure 19: Permanent and Temporary Inventions for Playscapes (Dudek, 2005, p. 222)

Playscapes focusing on nature provide an academic learning venue for pedagogic concepts, the investigation of scientific principles and experiences (Carr & Luken, 2014). The concept of 'playscapes' introduced by Frost (1992) is an alternative to traditional playgrounds. Immersing young children in nature encourages development in cognitive, physical, language, social and emotional areas. The playground is seen as an arena for motor ability and fitness training where cognitive development is encouraged through the exploration of sensory paths.

Children are capable of following paths, elements and structures that guide their understanding of the environment (Herrington, 2005). Figure 19 provides permanent and temporary inventions, and when paired with birds chirping, the smell of blooming flowers, moving water etc., a sensory experience is created for children (Dudek, 2005).

The concept of 'affordance', developed by James Gibson in 1979, examines what the environment offers the individual child i.e. if a rock is big enough to lift and throw, the environment affords grasping and throwing, or if a tree has branches that are climbable, it

affords climbing (Fjørtoft, 2001). Children are able to access the task at hand, taking on the risks that they feel equipped to handle (Dudek, 2007). For instance, the old tree in Güell Park, Barcelona (figure 20), allows children to sit, climb and explore its unique form. A sensuous shape becomes the centre of activity that encourages spirited action and enriches learning experiences. Narrative play allows children to take temporary ownership of the unintentional ambiguities that the natural landscape provides (Dudek, 2005).

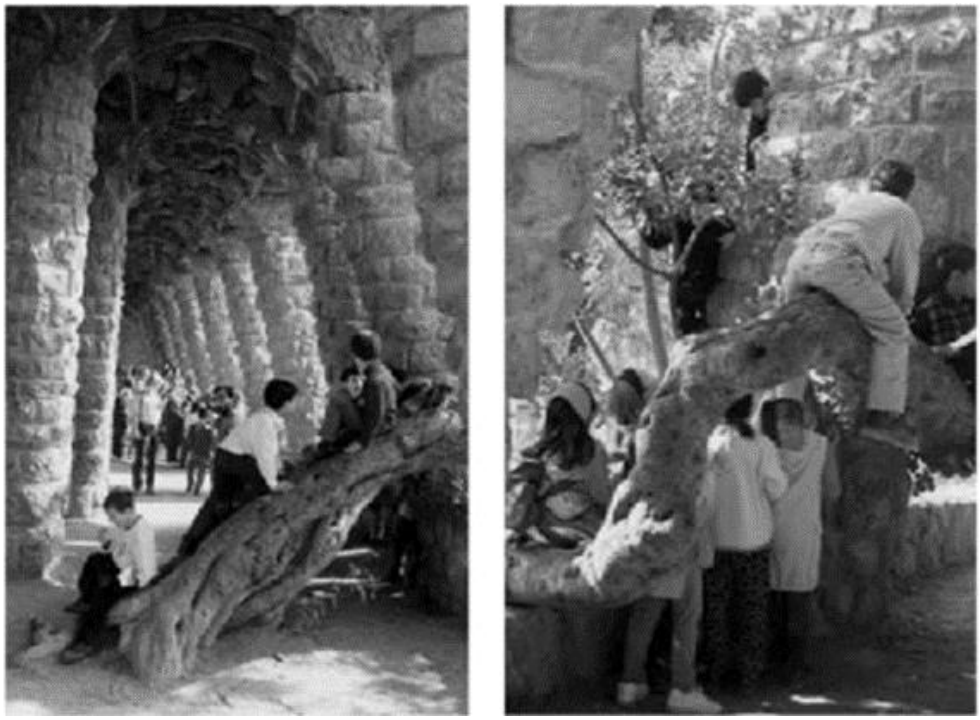

Figure 20: A Wonderful Tree in Güell Park, Barcelona. Source: Dudek, 2005. Photos: Michael Laris.

The natural features of the outdoor environment offers opportunities for early learners to observe, explore, and interpret the phenomena around them (Wallin, 2017). Through play in less structured venues of outdoor spaces, children are presented with diverse opportunities for decision making that stimulates problem solving and creativity thus encouraging cognitive processing. Research suggests that these types of activities lead to increased future academic performance, concentration and other markers of cognitive functioning. Direct experiences with nature allows for spontaneous and unplanned immersion that inspires the necessary development for children (Bento & Dias, 2017).

2.3.3. IMMERSIVE LEARNING ENVIRONMENTS

Immersive learning environments, commonly referred to as active, personalised or project-based learning, integrates teaching strategies with adaptive and flexible learning spaces for learners with diverse and dynamic learning needs (Wilkinson & Stevens, 2016). The idea of more than one teacher in the room encourages student-led participation, improving attention, retention and the understanding of new concepts. The learning process engages with a creative atmosphere that merges interaction, collaboration, modernised curriculum, and the enhanced integration of technology to accommodate a variety of ways in which students learn. Non-traditional, Immersive Learning Environments, or "Learningscapes," are designed around the five distinct types of learning activities: individual study, collaborative small group, breakout lecture, community classroom, and exploratory workshop spaces (Minero, 2018).

Each type of learning activity has different specifications in terms of space, layout, technology, furniture, acoustics and lighting. The relationship and configuration of these spaces are critical in developing immersive learning environments for children. For example, individual study areas are intimate and are designed for individual investigation, critical thinking and assessment. Whereas collaborative small group areas are designed to accommodate flexible team spaces for project-based learning and collaboration. Workshop areas provide a space for allow for children to gather for short discourses and distant learning. The community classroom areas are shared spaces, planned for social learning and co-planning in group (Wilkinson & Stevens, 2016).

Minero (2018) provides five common design principles – technology integration, safety and security, transparency, multi-purpose space, and outdoor learning – for the architecture of ideal learning environments (figure 21).

TECHNOLOGY INTEGRATION

The innovative use of a staircase as a multi-purpose theatre allows learning to take place in a circulation space. The extended carpeted seating, overhead projector and sound system becomes a popular space for lectures and presentations.

SAFETY AND SECURITY

Student bullying is an everyday issue for teachers and children. Open, transparent design, emphasising windows and clear lines, reduces bullying opportunities and improves the learning environment for vulnerable students. In the event of an intruder, safety relies on the multiple layers of security shaped by architecture.

TRANSPARENCY

The visual connectedness between adjacent spaces makes learning communal, promotes collaboration and creates a public forum for celebrating and observing the student and their work.

MULTI-PURPOSE SPACE

Enclosed, single-use spaces connected via long hallways are no longer required in the design of schools. Corridors are widening to become an extension of the classroom; stairs are seating spaces and walls are canvases for artwork. Type single-use rooms like cafeterias and libraries are now being designed to function as hybrid theatres, makerspaces and media centres.

OUTDOOR LEARNING

Outdoor learning encourages discovery, experimentation and learning about the natural environment. Improved creativity and reduced stress has been highlighted as a benefit of outdoor learning. Outdoor learning environments could be a group of benches, an amphitheatre or a classroom where children are provided a fresh perspective, especially for those who spend most of the school day indoors.

Figure 21: The Design Principles for Learningscapes. Source: Author, 2020.

2.4. MEANINGFUL SPACES FOR CHILDREN

Research suggests that architecture and quality design have the potential to encourage the creativity, cognitive and socio-emotional development of children. Young children need buildings and places that are welcoming. Places that are not exploitive are conceived and planned to show love (Day, 2004). A child centre is an environment for activities and learning, not just a building with walls. These places should be beautifully planned and must consider materiality, daylighting colour, scale and nature from the child's perspective (CABE, 2008).

2.4.1. PERCEPTIONS IN PHENOMENOLOGY

Phenomenology is the interpretive study of the human experience. It aims to examine human situations, events, meanings and experiences as they occur spontaneously through the course of daily life (Seamon, 2000). The theory is based on the philosophical method of inquiry where the human experience is guided by visual, tactile and aura sensations of architectural practice (Pallasmaa, 1996). This approach provides a complex understanding of the multi-dimensioned structure of the person-environment relationship (Seamon, 2000). Sensory perception, integrated as a function of the built environment, allows the human spirit to bond and connect to spaces creating memorable encounters (Guanzhong, 2011). The change in colour, materials, and light and shadow forms the environmental temperament that shapes the human perspective. The user experience is guided by architecture to establish a sense of being and greater connection to the world (Pallasmaa, 1996).

The founding father of phenomenology, philosopher Edmund Husserl, aimed to establish a new realm of consciousness and one of essence to provide meaning and enthusiasm. Building on the work of Husserl, Christian Norberg-Schulz believed that in order for architecture to be experienced in totality, a multitude of micro and macro perceptions are needed to establish environmental character (Vermeersch, 2013). Architect and professor, Juhani Pallasmaa (1996) refers to architecture as relating, mediating, and projecting meaning beyond the built form. The human body fuses memory, imagination and sense of one's self with the experience of the world. Multi-sensory qualities of space, measured by the eye, ear, nose, skin, tongue and skeleton of the body, provide a man-made realm for an existential experience (Pallasmaa, 1996).

The investigation of intriguing spaces inspires developing children to problem solve to better understand the environment around them (Koch, et al., 2009). The way in which a child interacts with their environment, if positive, allows the creation of memories and encourages advanced mental processing (Strong-Wilson & Ellis, 2007). Children are sensory beings and are sharpening their senses with visual, auditory and tactile opportunities (Saieh, 2010). Design based on social interaction, playful learning and nature should be imagined from a child's perspective. Spaces for children should offer a rich environment where there is access to a wide variety of play experiences (Ball, et al., 2009).

Curiosity, creativity, persistence and imagination are important dispositions for learning during the early years. Sensory architecture entices discovery learning, and learning through play, stimulating an emotional response, allowing children to assume meaning. This transforms sensations into memories (Saieh, 2010). Different kinds of play require different levels of cognitive sophistication. Therefore, different types of play should feature in the built environment to be impactful and meaningful for children (Kerich & MomanyiOkioma, 2015). Ball, Butler, Doyle, & Shackell (2009) provide suggestions for considering play in the built environment (figure 22). Spaces for children are to consider the safety, comfort and sensory stimulations of curious and explorative children to promote higher levels of learning (Dudek, 2007)

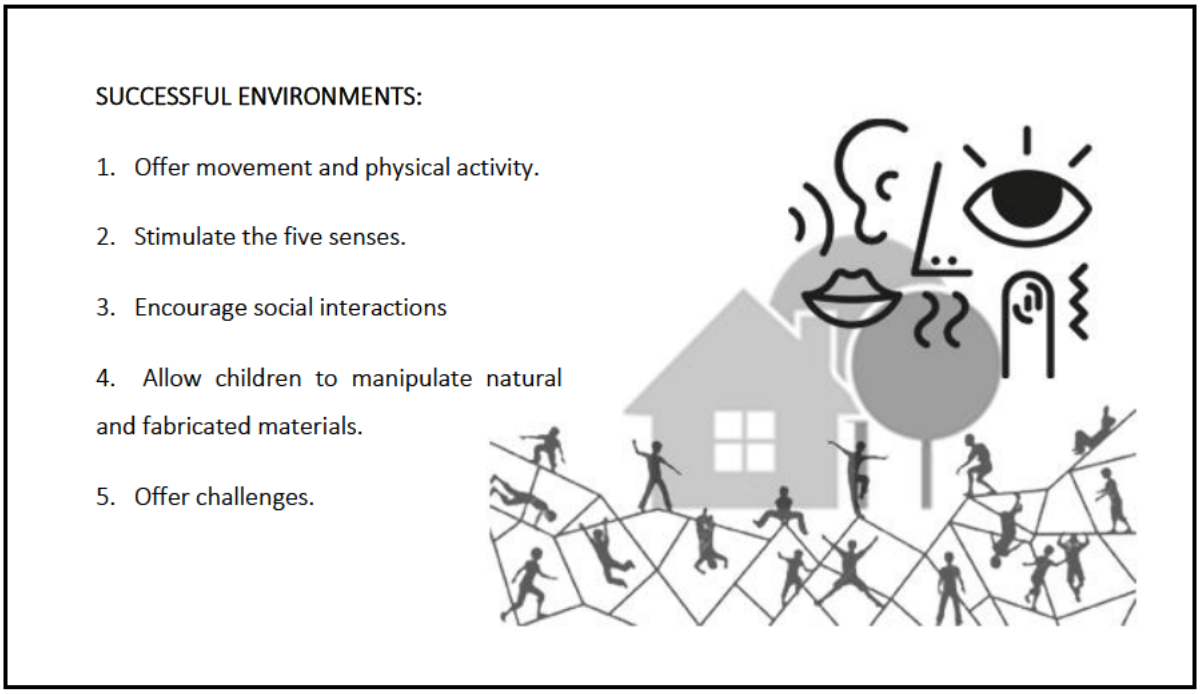

Figure 22: Built Environments for children. Source: Author, 2020.

The Swiss architect, Peter Zumthor, believes that the architecture encountered as a child contributes to the multitude of factors that shape adulthood (Dobbins, 2018). Zumthor is inspired by childhood memories and strives for a truly meaningful architecture of place and experience. The concept of atmosphere, conceived by Zumthor (2006), seeks to provoke an emotional response, by recalling existing memories to bring meaning to new ones. The mood, feeling of being present, harmony and beauty inspire the creation of atmospheres. From the composition and presence of materials to the intended proportions and play of light, the poetics of architecture shape a spiritual experience that recapitulates the process of design (Zumthor, 2006).

Figure 23: The Therme Vals .
Source (all images): ***https://www.archdaily.com/13358/the-therme-vals***

For example, The Therme Vals by Zumthor (figure 23) holds memories of human's play in water. An informal internal layout of the spaces models a path of circulation that leads bathers to predetermined points but also encourages the exploration of other areas by themselves. The perspective of the user is always controlled. It either ensures or denies views (Lalonde, 2012). Stone tucked within the mountain – for darkness and light – as well as reflection on water, steam saturated in icey cold air and the acoustics of bubbling water in a stone world are notions that guided Zumthor's design process. The combination of light and shade, open and enclosed spaces, and linear geometries shape a highly sensuous and restorative experience (ArchDaily, 2009). Figure 24 provides the determinants of form in relation to Peter Zumthor's Therme Vals.

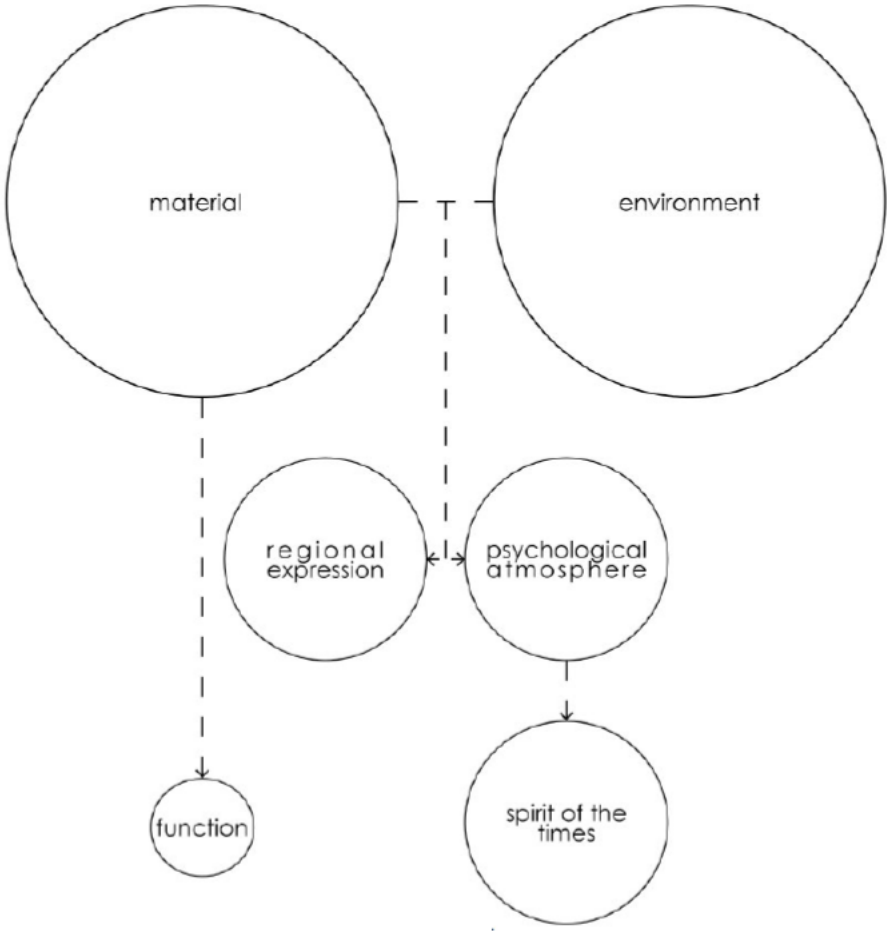

Figure 24: Peter Zumthor's Considerations of Form. Source: Lalonde, 2012

The concept of intertwining developed by Steven Holl (1996) is an interpretation of phenomenological philosophy that translates into the realm of architecture. During his architectural journey, the 'idea-force', 'phenomenal properties' and 'the site-force' interact with one another. The interaction involves the formation of an abstract idea, concept and transformation into a spatial reality on a physical site (figure 25). The physical, cultural and historical references of the site help establish a 'limited concept' where an order, field of inquiry or limited principle can be generated for each architectural project. The experience of light regarding overlapping perspectives of space, material textures, or sound, is the phenomenology of architecture. The change in arrangement of surfaces define space as a result of the change in position of the viewer. Architecture is redefined with reference to the moving human body that is constantly changing perceptions of space (Aravot & Neuman, 2007).

Multiple dimensions of form, space, light and sound weave together to provide intimate contact to phenomenological aspects of architecture and enhance atmospheric complexity (Schoof, 2017). Experimentation, inquiry and research is encouraged through the weaving of phenomenological details that enhance the lived experience for users, providing opportunities for active exploration (Dudek, Children's Spaces, 2005). Holl discusses the idea of three fields at play: the foreground, middle ground and distant view (figure 26). The human body and mind is inspired and curious when all three fields overlap to form an intimate experience of architecture (Holl, 1996).

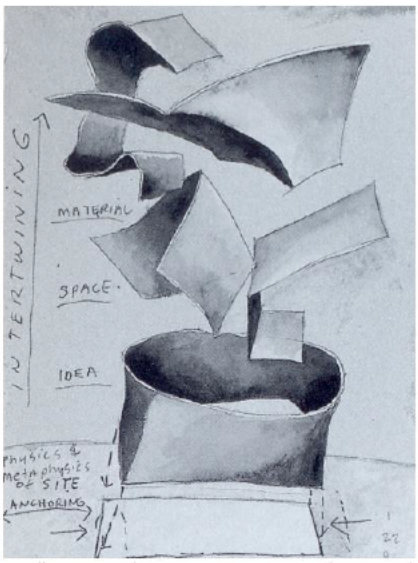

Figure 25: Idea, Concept and Material Intertwining in architecture Source: Steven Holl, Intertwining (New York: Princeton Architectural Press, 1998), p.14.

Figure 26: Rubenstein Commons, Institute of Advanced Learning. Source: http://www.stevenholl.com/projects/rubenstein-commons

2.4.2. THE ENVIRONMENT AS THE THIRD TEACHER

The human body is an active, living entity with capabilities that allow it to relate to its surroundings through senses and movement (Fraser, 2012). The environment in which a child lives and develops has a profound impact on the human developmental process. Children flourish in indoor and outdoor spaces that inspire them to investigate, think, create, and make sense of their experiences – especially in complex and intriguing spaces. The way in which environments 'speak' and promote interaction influences the creation of memories and creativity promoting healthy development in children (Strong-Wilson & Ellis, 2007). Flexible and responsive environments encourage motor, fine motor and cognitive skills, fuelling brain

development and higher levels of thoughtful learning in preparation for formal schooling and adult life (Atmodiwirjo, 2014).

The Reggio Emilia approach to education establishes high quality environments through aesthetically rich and open-ended materials that invite children to communicate their ideas in many ways (Mastrangelo & Robson, 2007). Open-ended materials, figure 27, can be used in numerous ways, indoors and outdoors. Babies, toddlers and young children can easily move, carry, combine or redesign in whichever way a child decides (TCS, 2017). The teacher, the child and the environment are considered as the three educators in the classroom. Children are natural communicators and should be encouraged to communicate by any means necessary therefore words, movements, drawings, paintings, and other avenues should be promoted through aesthetic and intellectual stimulation (Strong-Wilson & Ellis, 2007).

Figure 27: Multiple Applications of Bamboo. Source: Author, 2020.

The Reggio Emilia approach developed by psychologist Loris Malaguzzi in 1946, reconceptualises space as a key source of educational provocation and insight. It extends into the concept of the environment as the third teacher, which draws deeply on how children use and perceive space to create their own understanding of the world around them (Mastrangelo & Robson, 2007). Thoughtfully arranged spaces may enrich day-to-day learning through a range of stimuli and opportunities for diverse learning experiences. Fraser (2006) identifies eight Reggio Emilia principles (figure 28) in defining the environment as the third teacher: aesthetics, transparency, active learning, flexibility, collaboration, reciprocity, bringing the outdoors in, and relationships.

1. AESTHETICS

The details of the creation of every aspect of space.

2. ACTIVE LEARNING

Encouraged through rich & stimulating environments with a variety of materials to investigate and discover.

3. COLLABORATION

Providing opportunities for group activities and play.

4. TRANSPARENCY

Achieved through use of materials such as glass, mirrors, internal screens etc.

5.RELATIONSHIP

The relationship between objects and materials.

6.BRINGING OUTDOORS IN

Helping children to connect to their roots and create a sense of belonging in their world.

7. FLEXIBILITY

Accommodative and flexible with space, time and materials

8. RECIPROCITY

An environment that is open to change and responsive to children, parents and community.

Figure 28: Design Principles for The Environment as The Third Teacher. Source: Author, 2021.

2.4.3. DESIGNING FOR CHILDREN

An early childhood development centre (creche, kindergarten or nursery school) is defined by a social programme to prepare children for the future and real-life conditions (CABE, 2008). These centres can challenge the status quo and provide nutrition, care and learning experiences – irrespective of ethnicity, religion, or sexual orientation – for struggling families. It can encourage high quality education, healthier lifestyles, higher earnings, and greater participation in society (UNICEF, 2013). These places should be thoughtfully planned and must consider materiality, daylighting, colour, and scale in order to create a built environment for children (CABE, 2008).

Figure 29: An Exploration of Material Ethics as Aesthetics. Source: Author, 2021.

Through intentional teaching, materials can be used for child guided experiences. Materials need to interest children. They should be age and health appropriate and be arranged in a way that encourages independence and creativity (Knopf & Welsh, 2010). Toys and materials chosen for early childhood environments should be culturally relevant, developmentally appropriate, linked to children's interests and varied activities, while closely relating to learning outcomes. It is vital for materials to reflect and respect racial, ethnic, cultural, linguistic and family diversity of the program and the boarder community (VLS, 2020). Traditional and cultural aspects are able to connect with tacit wisdom, penetrating consciousness and becoming components of our own existence (Pallasmaa, 1996).

The architectural experience of materiality is visual, tactile and aural. Materials that are rich in their natural properties intensify the haptic realm of architecture. Age, history and the story of origin are characteristics of natural materials encouraging the experience of time in construction (Pallasmaa, 1996). Material ethics as aesthetics, figure 29, an idea discussed by Reyner Branham in the 1950s, embraces honesty in structure and materials. 'Critical

materiality' promotes material efficiency and sustainability that is responsive to context, tradition and culture, holding more meaning and value for its community (Loschke, 2016).

Figure 30: Chapel of St. Ignatius Collage. Source: Author, 2021.

Daylighting plays a significant role in the process of learning and is directly related to educational performance. In the absence of daylight, people may experience depression, fatigue, irritability and a lack of concentration (Dudek, 2007). Steven Holl artistically implements natural light to develop the "spirit of the building". Light is a fundamental tool that encourages the user to connect with the passing of the day and seasonal changes. In the design of Holl's Chapel of St. Ignatius (figure 30) visual interest and atmospheric density is created through the use of complimentary colours on the exterior walls. This reflect different hues of colour into the building. As the clouds and sun move during the day, the combination of pure light and reflected colour adopt a robust character creating constantly changing interior spaces (Minner, 2011).

Research highlights the benefits of colour in the development of the brain, creativity, productivity and learning (Boya, 2017). The effect of colour can be varied and, in learning environments, it may improve visual processing, reduce stress and promote brain development. Colour can enhance or impair learning, as well as affect behaviour, therefore selected colours should maximise retention and stimulate learner participation (Walstra, 2014).

Children are more sensitive to colour than adults and need to be educated in environments that boost creativity and imagination. Colour carries critical importance in the development of cognitive and motor skills as they use their sense of sight with visual environmental factors to

communicate (Boya, 2017). The use of colour in space can define the purpose of a learning environment or create atmosphere, such as in a quiet relaxing space or in a collaborative, energetic environment. Research shows that there is a direct correlation between negative/ positive feelings and colour. This reiterates the value of colour in spatial design (Walstra, 2014).

Children thrive in colourful environments (figure 31) that are useful in attracting learner's attention. Warm, mild and soothing colours with bright accent colours used for walls and furniture to create bright and vibrant environments are recommended. Reds, oranges, yellows are interpreted as happy and inviting colours. Excessive use of reds, oranges and blues in learning environments commonly causes overstimulation (Boya, 2017). Bright colours are able to assist children in understanding different areas of a room. For example, blue cushions in a corner may denote reading and relaxation, whereas red tables in another area may signify free-play space. Blues, greens and purples encourage feelings of calmness, relaxation, happiness and comfort and are paired best with neutral wall colours.

Figure 31: Colour in Children's Environments. Source: Author, 2021.

'I therefore began to study a pattern of school furniture that was provided to the child and that corresponded to his need to act intelligently. I had tables built in different shapes, that did not rock, and so light that two four-year-olds could easily carry them. Chairs, made of straw or wood, also very light and beautiful, and which were a miniature reproduction of adult chairs, but provided for children' - Montessori, 2017, pp. 51-52

The ideal environment is customised to suit the scale of a child (figure 32). This positions children as participants rather than observers (Aleksic, 2015). The environment should be dimensioned in proportion to children. It should safely encourage independent activities. Children's furniture can either (1) facilitate a relationship between the caregiver and child, or

(2) allow children independent use. The difference is that type 1 is adapted to the ergonomics of the adult, while type 2 is designed for the child proportion (Migliani, 2020).

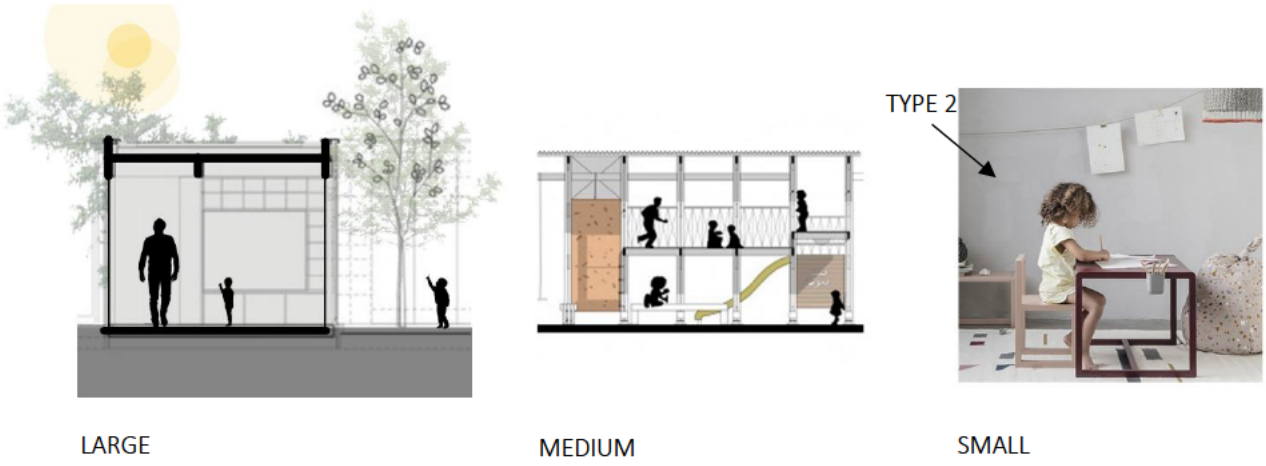

Figure 32: Proportions for Children. Source: Author, 2021.

2.5. CONCLUSION

Although adjustments to policy and programme relating to poverty and access early childhood development services have been made by the national and international communities, it is evident that the rights of many children are still in violation. In the case of failure from government, it is essential for communities to overcome socio-economic structures and political institutions to ensure the well-being and education of their children. Understanding people in their context, the prevention of the problems they face and celebrating human diversity is where the pursuit of social justice begins. Community architecture, driven by community and self-reliance techniques, mobilises community progression and harvests the power and resources of local people to support their own functional and spiritual needs. Through community participation and engagement, socially just objectives may be achieved.

The literature reviewed in this chapter discusses the inherent relationship between early childhood development and the built environment. Even though the reality of rural communities is shaped by poor infrastructure and impoverished learning environments, Social Justice by Design provides an example of cost, climate, resource availability and construction feasibility to redefine traditional building techniques that are inspired by the minimal materials, resources and cultural practices of the community it serves. Empowering communities, through education and skills development, not only promotes community development but

also aids in service delivery. Society becomes fully capable of meeting the needs of their developing children while rejecting powerful structures of capitalism.

Cognitive development and its relation to play is critical in understanding the period of early childhood development. It has been established that children learn through play during their formative years. This is when the foundations for social, emotional, physical and cognitive development are laid. Academic and lifelong success depends on the development of children during these vital years. Therefore, environments in which children play need to enrich their lives and stimulate their imagination. Promoting outdoor play in nature promotes cognitive development and provides an alternate venue for learning. The exploration of unintentional ambiguities of the natural landscape provides a sensory experience for children to better understand the world around them.

The phenomenological aspects of architecture consider the impact of space on user perception. The human experience of architecture is guided by visual, tactile and aura sensations that encourage the human body and mind to connect to spaces, creating memorable encounters. Sensory architecture entices discovery learning and learning through play by generating curiosity, creativity and imagination through the built form. The weaving of light, material, form and space creates an intimate experience of architecture that fosters learning through aesthetic and intellectual stimulation. Thoughtfully designed spaces can enrich day to day learning by providing an array of stimulus. The concept of The Environment as The Third Teacher provides key principles for approaching architectural design for learning environments.

CHAPTER THREE: PRECEDENT STUDIES

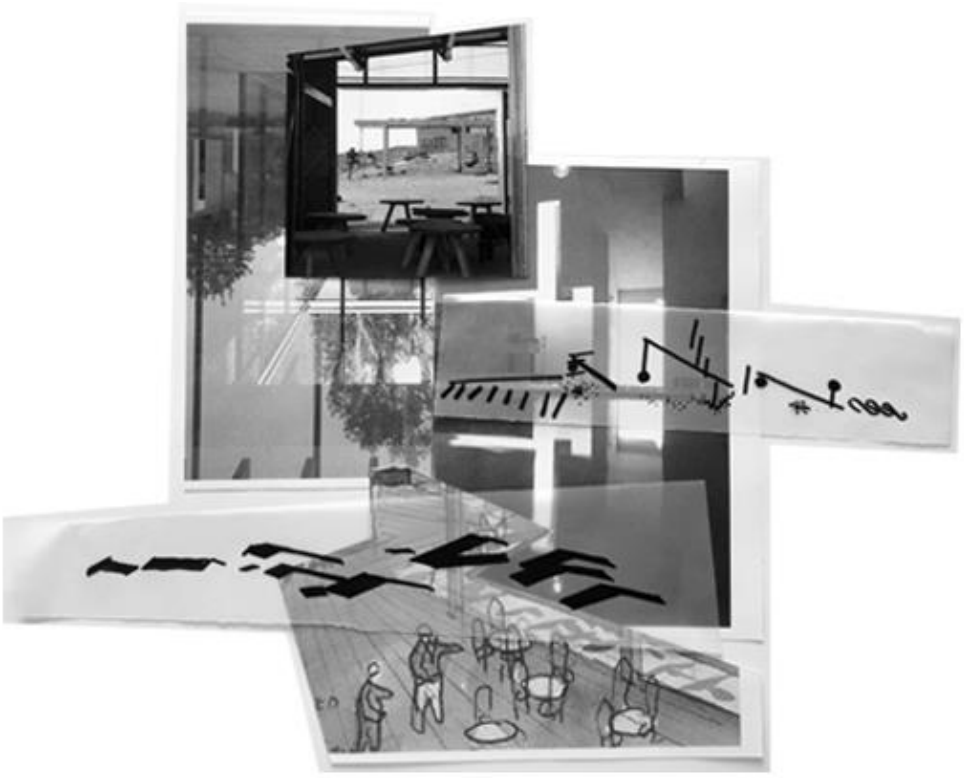

Figure 33: Overlapping Form, Void, Daylight and Materials. A collage inspired by the literature review, precedent, and case studies. Collage by Author, 2020.

3.1. INTRODUCTION

This chapter is a review of two precedent studies that were selected in response to the problem statement, theoretical framework, and literature review. The information derived from the precedent studies supports the themes previously discussed in the literature review and will contribute towards the design development. The precedent studies respond to the research question regarding how architectural environments may stimulate early learning development in both a rural and an urban context. The chosen precedent studies, listed below, are responsive to the physical, psychological, and social needs of children during their foundational years.

1. Silindokuhle Preschool, Port Elizabeth, South Africa
2. Kinderkrippe Nursery School, Hamburg, Germany

The precedents have been analysed using the sub-concepts established in Chapter 2 (figure 34). It is anticipated that the precedents will suggest how architecture can support and enhance the period of early childhood development. The rationale for Silindokuhle Preschool is in its design for marginalised children in South Africa. Kinderkrippe Nursery School was selected due to its profound implementation of phenomenological design principles.

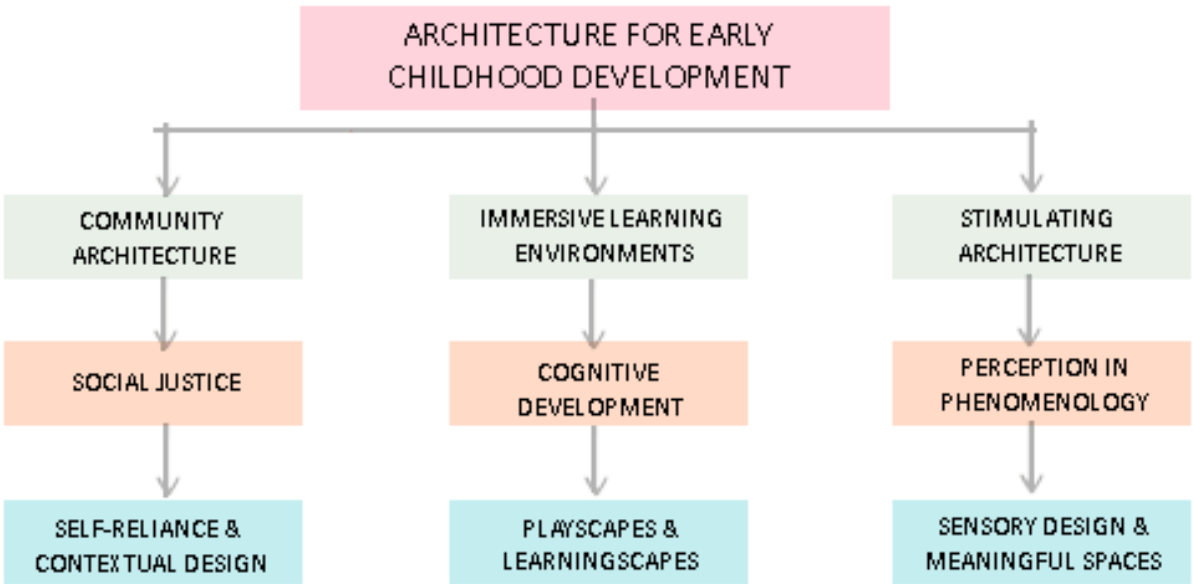

Figure 34: Connection to Concepts and Theories. Source: Author, 2020.

3.2. SILINDOKUHLE PRESCHOOL, PORT ELIZABETH, SOUTH AFRICA

Architect: Collectif Saga

Year: 2017

Area: 220m^2

3.2.1. INTRODUCTION & JUSTIFICATION

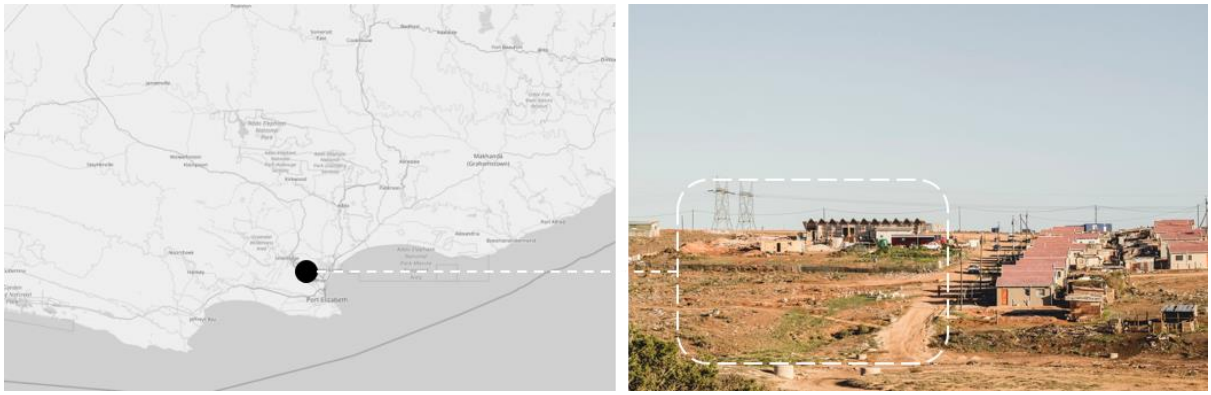

Figure 35: Silindokuhle Preschool Location. Source: Author, 2020.

Silindokuhle Preschool provides daily care for 100 children living in the community of Joe Slovo West, an informal area in suburbs of Port Elizabeth, South Africa (figure 35). The preschool has a soup kitchen with a communal canteen, three classrooms, an office and ablutions with gardens for community agricultural farming. Founder and Principal, Patrica Piyani, is a local community member who aspires to improve the precarious life conditions of all the children living in Joe Slovo West. The development of Joe Slovo is also supported by the Reconstruction and Development Programme that aims to replace the existing self-built shacks with basic concrete units of 36 square meters (ArchDaily, 2017).

The design process included the close involvement of the community and professionals who worked together to transform the experience of a learning environment for children (figure 36). The involvement of the local community not only creates a place that community members can be proud of, but also provides an opportunity for skills development.

3.2.2. COMMUNITY ARCHITECTURE

The experimental approach to design relies on community participation and engagement to inform, guide and help during the construction and design process (ArchDaily, 2017). Local refurbished and reclaimed materials are collected from all over the city to provide an appropriate shelter born from a generous initiative. French architectural firm, Collectif Saga, along with the community of Joe Slovo and surrounding areas, address the challenges of basic

education, food and minimal resources. The team have implemented two projects within the Joe Slovo precinct, starting with Silindokuhle Community Hall in 2015 (figure 37) and then Silindokuhle Preschool in 2017 (figure 38) (Stevens, 2017).

Figure 36: Collaboration with the Community of Joe Slovo West. Collage by Author,2020. Images available: https://www.designboom.com/architecture/collectif-saga-silindokulhe-preschool-joe-slovo-west-south-africa-07-28-2017/

Figure 37: Silindokuhle Community Hall. Source: https://architectureindevelopment.org/project.php?id=568

Figure 38: Silindokuhle Preschool. Source: https://www.designboom.com/architecture/collectif-saga-silindokulhe-preschool-joe-slovo-west-south-africa-07-28-2017/

The preschool provides a shelter and allows for new experiences for children. It offers views of the surrounding landscape and exposes the raw materials used in construction. Raw materials are assembled to form three large classrooms that are naturally ventilated. The canteen, adjacent to the outside playground, provides a shared space for children and community members to tell stories, play games and other interactive activities. The building represents the story of the school and in its construction contains a multitude of collective stories (ArchDaily, 2017). Figure 39 provides more insight into the planning, climate, function and how the building responds to the context. The building is responds to the site by stepping down the slope and further invites maximum natural light into the internal spaces (figure 40).

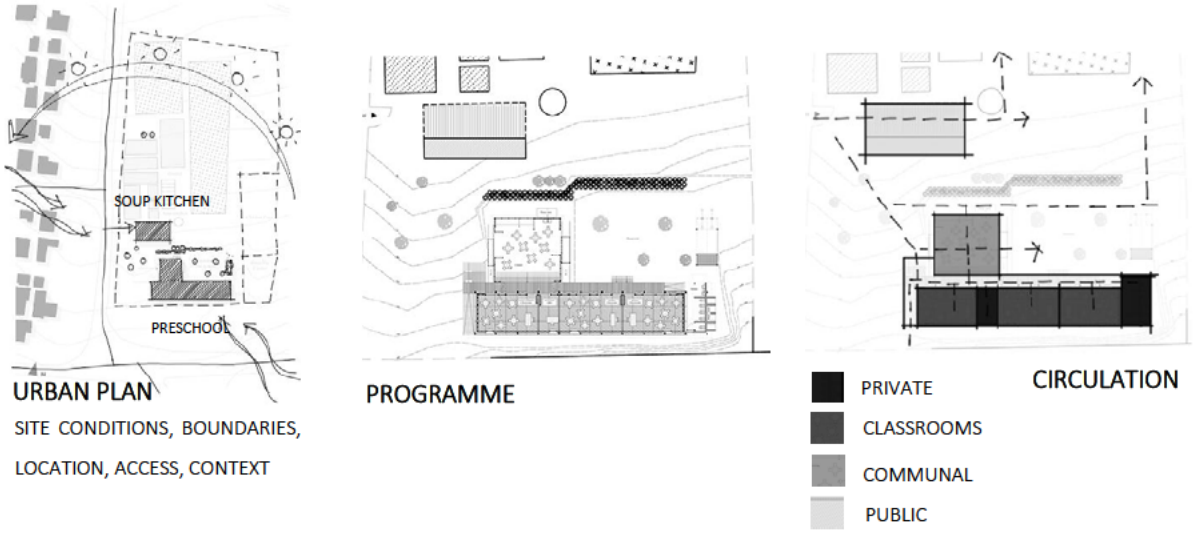

Figure 39: Analysis of Silindokuhle Preschool. Source: Author, 2020.

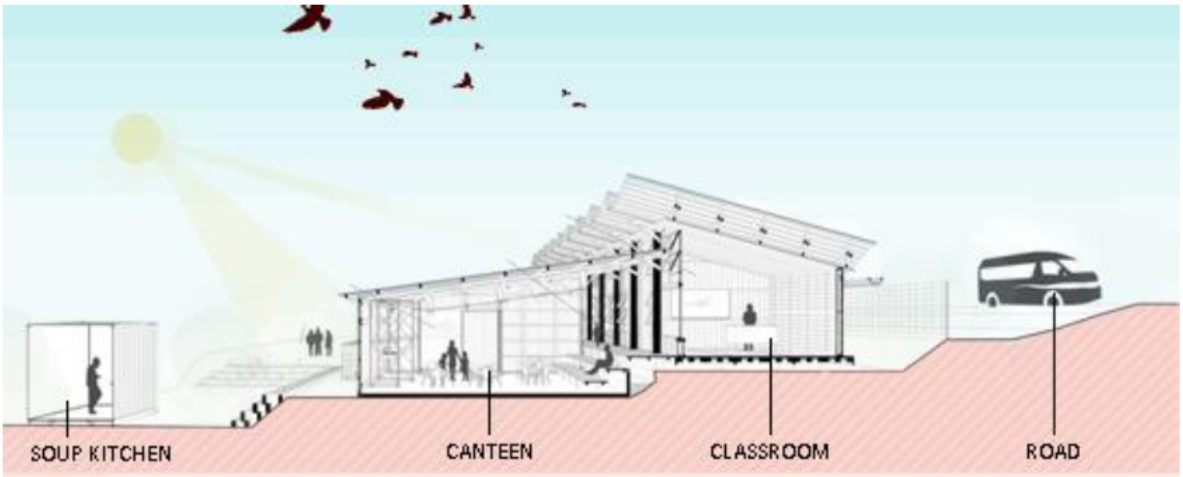

Figure 40: Cross Section. Source: Author, 2020.

Raw materials and objects are distorted, reused and reimagined to create a spectacular form (figure 41). The design process started with a survey of what was already there, what could be used and transformed, who could work on the project and what needed to be bought. IRB sheeting, papercrete plastering, plywood, pallets, reclaimed window frames, reclaimed wood and recycled cardboard recycled tubes are altered and assembled to offer sanctuary. Cost effective materials generate an exciting experience of form and materiality (figure 42) (Stevens, 2017).

Figure 41: Materials Coming to Life. Source: https://www.domusweb.it/en/news/2017/08/02/preschool_by_saga.html

Figure 42: Roof Detail. Source: https://urbannext.net/silindokuhle-preschool/

Figure 43: Transformation of Materials. Source: https://www.archdaily.com/875103/silindokuhle-preschool-collectif-saga

Figure 44: Roof Structure. Source: https://www.archdaily.com/875103/silindokuhle-preschool-collectif-saga

The inventive use of recycled and refurbished materials creates multi-sensory experiences for children. Wood, glass, corrugated plastic sheets, and aluminium roof sheeting challenge traditional construction by experimenting with various methods and combinations (figure 43-45). The change in materials, texture and light enriches the experience of the building and creates a sense a space for children. Further, these aspects spark delight and curiosity (figure 46). The intricate design of the canteen sliding door uses a mundane wheel to create thrilling

and interactive elements of architecture for users (figure 47). Transparency is achieved through glass and clear corrugated polycarbonate sheeting.

Figure 45: Innovative Construction Methods. Source: https://urbannext.net/silindokuhle-preschool/

Figure 46: The Play of Light, Shadow and Materials. Source: https://urbannext.net/silindokuhle-preschool/

Figure 47: Creative Use of Materials. Source: https://urbannext.net/silindokuhle-preschool/

3.2.3. IMMERSIVE LEARNING ENVIRONMENTS

Children are provided with a better and safer learning environment in a place where there is normally insufficient access to educational infrastructure and resources. The innovative design harvests the energy of the local community and the available resources to create warm and engaging environments for children. Due to the socio-economic circumstances of Joe Slovo West, technology integration was not a priority as the entire community, including children, rarely had access to proper internet and advanced technology. A safe and secure environment has been established through commendable architectural design where children are not only a priority of the schoolteachers, but also the local community members who find themselves in the soup kitchen, canteen or agricultural fields.

Visual transparency (figure 47-48) offers wide spanning views of the surrounding site in context and shapes small moments of joy where children are able to exchange smiles and interact from the classroom and external corridors. The canteen (figure 49) is a multi-purpose space that can easily be reconfigured for different children's activities or for community events such as meetings or small gatherings. The inclusion of people from the surrounding areas creates a sense of pride and ownership for community members, parents, staff and children.

The incorporation of the soup kitchen, canteen and agricultural fields not only addresses poverty and starvation, but also provides an array of learning opportunities that occur outside of the traditional classroom. Children are able to watch fruit and vegetables grow, harvest them with fellow community members and enjoy them as their lunch. The process of farm to table teaches children life-long skills as, unfortunately, many do not have access to nutritious food due to financial constraints (ArchDaily, 2017).

Figure 48: Visual Connection between Learners
Source (figure 40 & 41):https://urbannext.net/silindokuhle-preschool/

Figure 49: Canteen.

3.2.4. STIMULATING ARCHITECTURE

The role of play in early childhood development, highlighted in Chapter Two, discusses how design may offer early learning opportunities through play. An outdoor playground with natural terrain, play equipment, a chicken coop, and vegetable gardens allow children to explore and engage in physical activities. The natural environment including plants, animals

and natural objects, encourages creative and intellectual development in children. The built environment showcases material change, texture and colour offering stimulation for children to investigate or simply to enjoy.

The preschool is surrounded by vegetable fields, gardens and the chicken coop where children are able to interact and explore nature with direct access from the classrooms (figure 50 & 51). The transparent north façade gives learners visual access to the crop fields and the external playground, which sits adjacent to planted gardens, encourages sensory play and explorative play guided by elements of the landscape.

Figure 50: Surrounding Vegetation in Silindokuhle Preschool. Source: https://urbannext.net/silindokuhle-preschool/

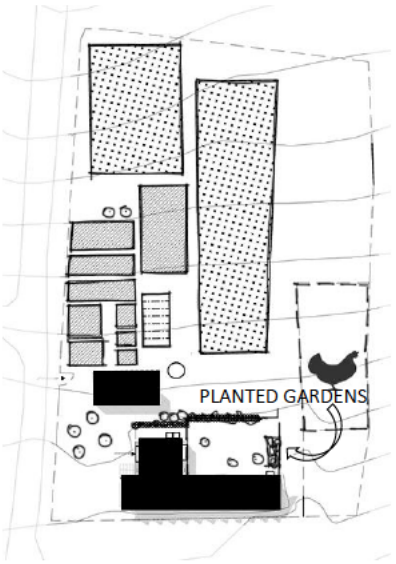

Figure 51: Farming Fields and Chicken Coop. Source: Author, 2020.

Reciprocity can be defined as a social construct where people respond to a positive action with another positive action (Falk & Fischbacher, 2000). Silindokuhle Preschool, despite the poor socio-economic context, responds to the surrounding community and invites people to participate in collective practices that ensure community progression. The soup kitchen not only ensures nutrition for learners but also for community members – some of whom do not have access to food on a daily basis. The inclusion of crop fields and self-sustainable techniques allows communities to address their needs through their own actions and abilities (Chansomsak & Vale, 2009).

3.2.5. CONCLUSION

Figure 52: The Commendable Attributes of Silindokuhle Preschool. Source: Author, 2020.

Silindokuhle Preschool responds to a need in the community. The community members actively contribute to a cohesive society to allow future generations to overcome social and economic obstacles and lead more successful lives. Professionals and individuals from various disciplines participate in a community initiative and promote the transfer of knowledge and skills. The construction process involved people of different ages and backgrounds collaborating to create a better environment for children, parents and disadvantaged community members. Replicable building techniques encourage community members to start their own projects and easily maintain the existing buildings. Through education, skills development, and community engagement, stronger communities are built. A new public life has been created and sustained through collaboration, social interaction and innovation.

The commendable attributes of Silindokuhle Preschool (Figure 52) include:

- The design and construction of waste and low-cost materials advocating relevant skills and affordable materials.

- The collective creation of a building that inspires pride and a sense of belonging in the community.
- The contextual and climatic response is essential for sustainability and reduction of costs i.e., rainwater collection and minimal artificial lighting.
- The arrangement of materials, textures and daylight for sensory experiences. Innovative design and experimental use of materials are essential for the creation of stimulating environments, especially in marginalised communities.
- The inclusion of a soup kitchen and community farming to basic needs of food are met through collaboration and volunteerism.

3.3. KINDERKRIPPE NURSERY SCHOOL, HAMBURG, GERMANY

Architect: Kraus Schönberg Architects

Year: 2015

Area: 420m^2

3.3.1. INTRODUCTION & JUSTIFICATION

Kinderkrippe Nursery School is a day care centre for children ranging from new-borns to three years old. The woodland nursey is nestled in the forested city's north-eastern Ohlstedt neighbourhood – a residential suburb in Hamburg, Germany (figure 53). It is a located within large grounds and is surrounded by mature trees where nature is part of the school's pedagogic concept. Children play amid mature trees and Kraus Schoenberg Architects celebrates the relationship between the learner, the built environment and the natural landscape (ArchDaily, 2016). The phenomenological aspects of architecture encourage children to investigate, think and make sense of their interactions with the built, and natural, environment to gain a better understanding of the world.

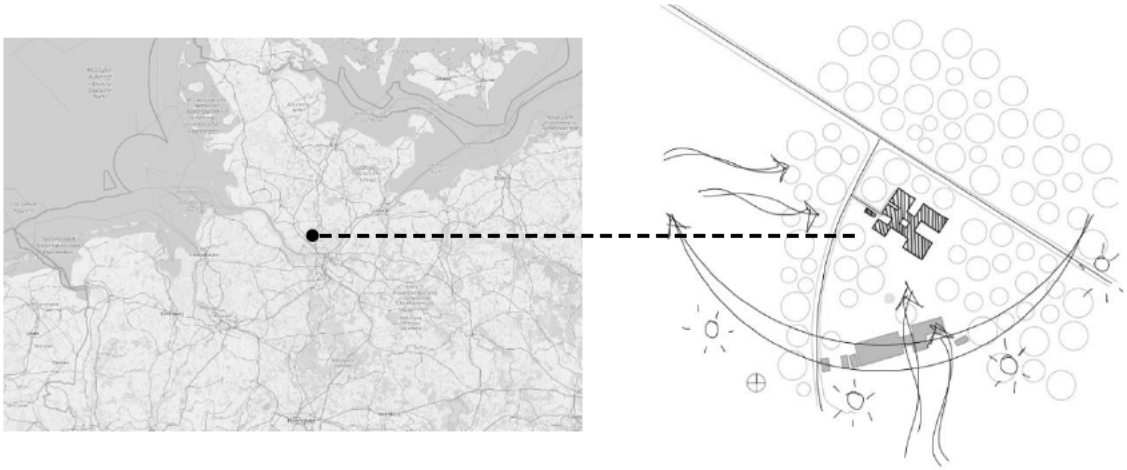

Figure 53: Kinderkrippe Nursery School Location. Source: Author, 2020.

3.3.2. COMMUNITY ARCHITECTURE

The building is inspired by the surrounding small-scale fabric of the neighbouring single-family homes. It has been apportioned into smaller sub-units linked by exterior courtyards (Griffiths, 2016). The classrooms, kitchen and the auxiliary spaces are grouped around a shared space for both active play and circulation (figure 54). The heart of the nursery, the atrium, connects all programmatic functions and is reminiscent of a cloister. Each classroom has an adjoining quiet room and bathroom, with access to the surrounding gardens.

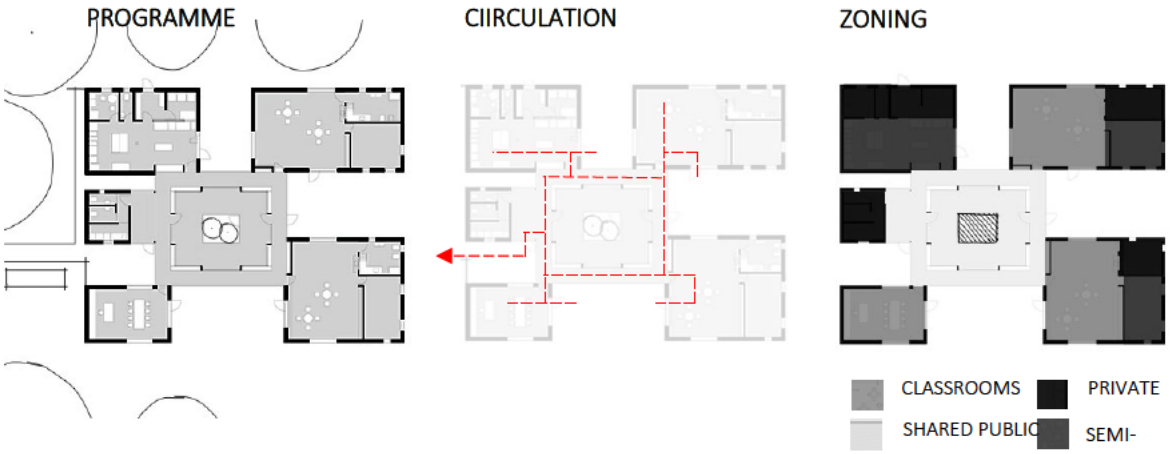

Figure 54: Diagrammatic Exploration of Kinderkrippe Nursery School. Source: Author, 2020.

Figure 55: Cubby Holes and Benches.

Source:https://www.archdaily.com/786695/kinderkrippe-nursery-school-kraus-schonberg-architekten)

Figure 56: Exterior Façade. Source: https://www.archdaily.com/786695/kinderkrippe-nursery-school-kraus-schonberg-architekten)

Materials encountered in the natural context are transformed and used for multiple applications in the built environment. Rough-sawn, un-edged larch board form the external cladding of the building (figure 56) where imperfections of the facade blend in with the rich tone and texture of the bark of the surrounding trees. Furthermore, glue-lam beams are visible throughout the design and the roof structure consists of primary and secondary beams that are supported by eight solid-timber columns. Plywood is used for the built-in cubby holes (figure 55) and benches for children and parents (Griffiths, 2016). The relationship between the building and the context is celebrated through the multiple applications of wood (figure 57).

Figure 57: Relationship Between Materials and The Built Environment.
Source: Author, 2020.

Glass, wood and nature overlap to create a minimalistic canvas where the context is as important as the built environment. Solid, void, transparency, materialiality and nature are used to define a built environment immersed in greenery and foliage. Strong vertical and horizontal elements of form (the repetition of horizontal and vertical glue-laminated beams and horizontal exterior cladding) contrasts the organic and undefined surroundings and generates rhythm and visual stimulation (figure 58). The atrium is the central point of focus and it is equally as aesthetically appealing as it is functional (figure 59). The delicate glass box allows light to engulf the interior multi-purpose space. It further creates a connection among children – like two pedestrians on opposite sides of a street.

Figure 58: Entrance Façade. Source: https://www.archdaily.com/786695/kinderkrippe-nursery-school-kraus-schonberg-architekten

Figure 59: Central Atrium. Source: https://www.archdaily.com/786695/kinderkrippe-nursery-school-kraus-schonberg-architekten

3.3.3. IMMERSIVE LEARNING ENVIRONMENTS

Safety and security are prioritised for children and teachers. Therefore, the designers, Kraus Schönberg Architects, create transparency across interior spaces. Cubbyholes, seating nooks and shelves are integrated into the structure of the walls and the use of glazing ensures that all staff members have complete visual access (Griffiths, 2016). From the built environment perspective, there is no technology integration. However, close interactions with the natural landscape encourages free play and exploration (Mastrangelo & Robson, 2007).

Transparency is a significant design principle. There is transparency between teachers and learners, learners and learners, and learners and the woodland. This close relationship encourages children to explore their environment confidently and learn from each other's interactions. By incorporating big windows and an internal garden atrium, a sense of connection is achieved. The large windows and openings encourage children to take interest in the activities taking place in other classrooms or gaze at the surrounding foliage. The use of glass enables one to see through the entire building and enjoy the context wholly (figure 560).

Figure 60: Transparency.
Source: https://www.archdaily.com/786695/kinderkrippe-nursery-school-kraus-schonberg-architekten

The cloister space invites parents to sit and converse while waiting for their children. It provides children with a stimulating interior playground that is submerged in natural sunlight. The glass boxed garden atrium brings nature into the building, allowing the change of season and time of day to decorate the internal spaces. This accentuates the school's pedagogic concept. Children have direct access to a space where they may explore the pattern of leaves, play with small natural objects and breathe the fresh woodland air.

The environment creates a warm and comfortable space for children to interact with each other in a constructive and playful manner. Children are encouraged to participate in activities through the engagement with nature, enhancing the social environment. The environment is also impacted by the teacher's attitudes, beliefs and ideas. Therefore, the design is inclusive of the needs of teachers and provides organised spaces optimal for learning.

3.3.4. STIMULATING ARCHITECTURE

Kinderkrippe Nursery School encourages nature-based early childhood education where learning occurs in the context of nature. The forested kindergarten approaches teach children with nature pedagogy i.e. nature is the core of the curriculum. The line between indoor and outdoor space is blurred and children spend extensive amounts of time outside where natural materials, objects and playscapes inspired by seasonal changes are explored. This close interaction and engagement with nature encourages cognitive, social and physical development in young children. Transparency, materialiality, void and solid create complex spaces for active learning. The detailed planning of each aspect encourages the user to bond with the built environment creating memorable encounters.

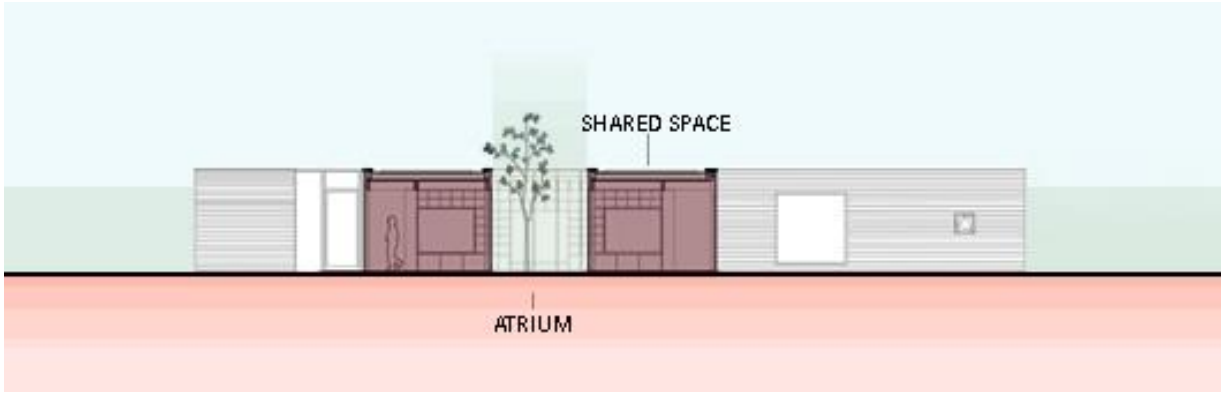

Figure 61: Cross Section Highlighting Space for Collaboration. Source: Author, 2021.

The multi-purpose cloister space encourages children from different class groups and ages to engage with one another and form friendships (figure 61). This collaborative environment affords older children to interact with younger children. These meaningful exchanges, whether it be conversation or playing, teach children kindness, consideration and the ability to share with one another.

The phenomenological aspects of architecture implemented in Kinderkrippe Nursery School encourages children to make sense of their interactions with the built and natural environment. The overlapping perspectives of space, material, textures and light enhances

atmospheric complexity creating intriguing spaces for children to inhabit (figure 62). Architecture enriched with a range of stimuli and opportunities for diverse learning experiences fuels brain development and thoughtful learning in preparation for school and eventually adult life. The built environment in which early childhood development takes place, fosters learning through aesthetic and intellectual stimulation. The environment responds to the development milestones of which children need to achieve.

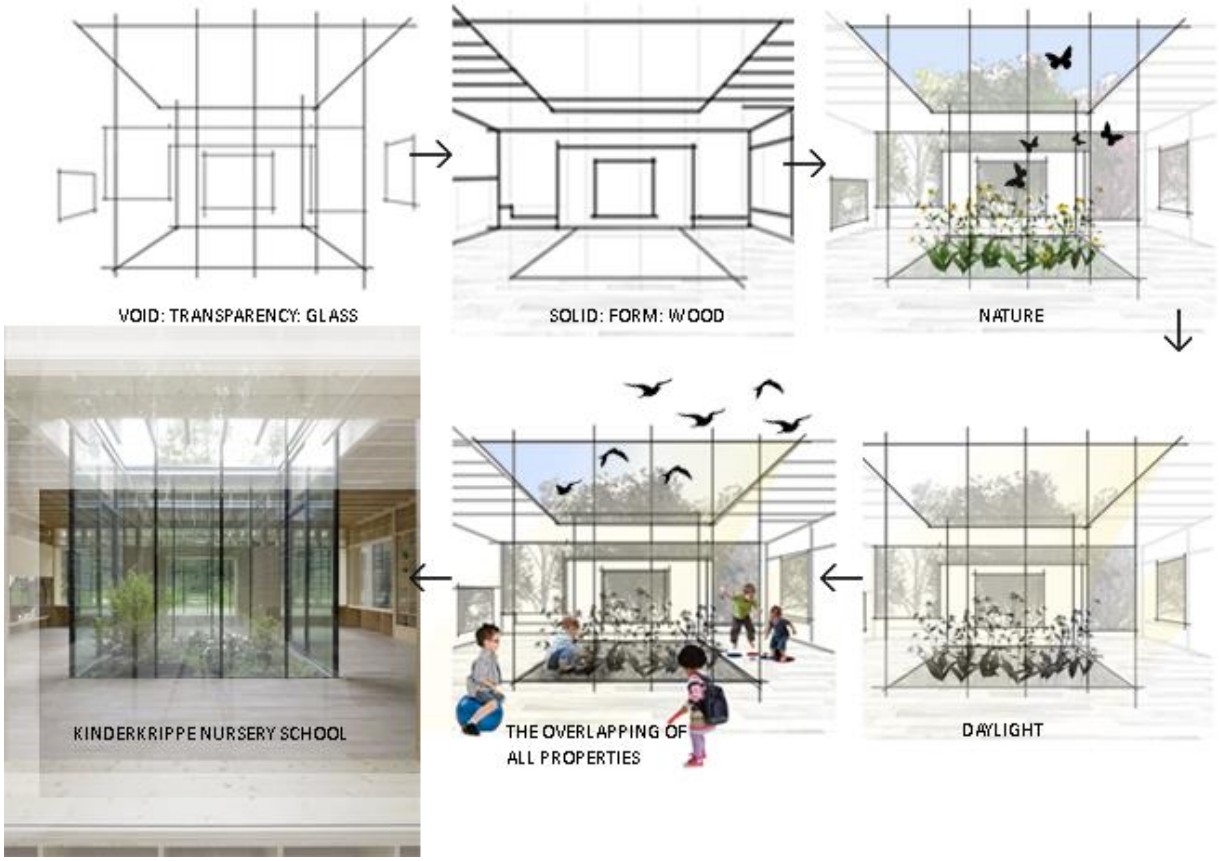

Figure 62: Overlapping Phenomenological Aspects of Architecture . Source: Author, 2021

3.3.5. CONCLUSION

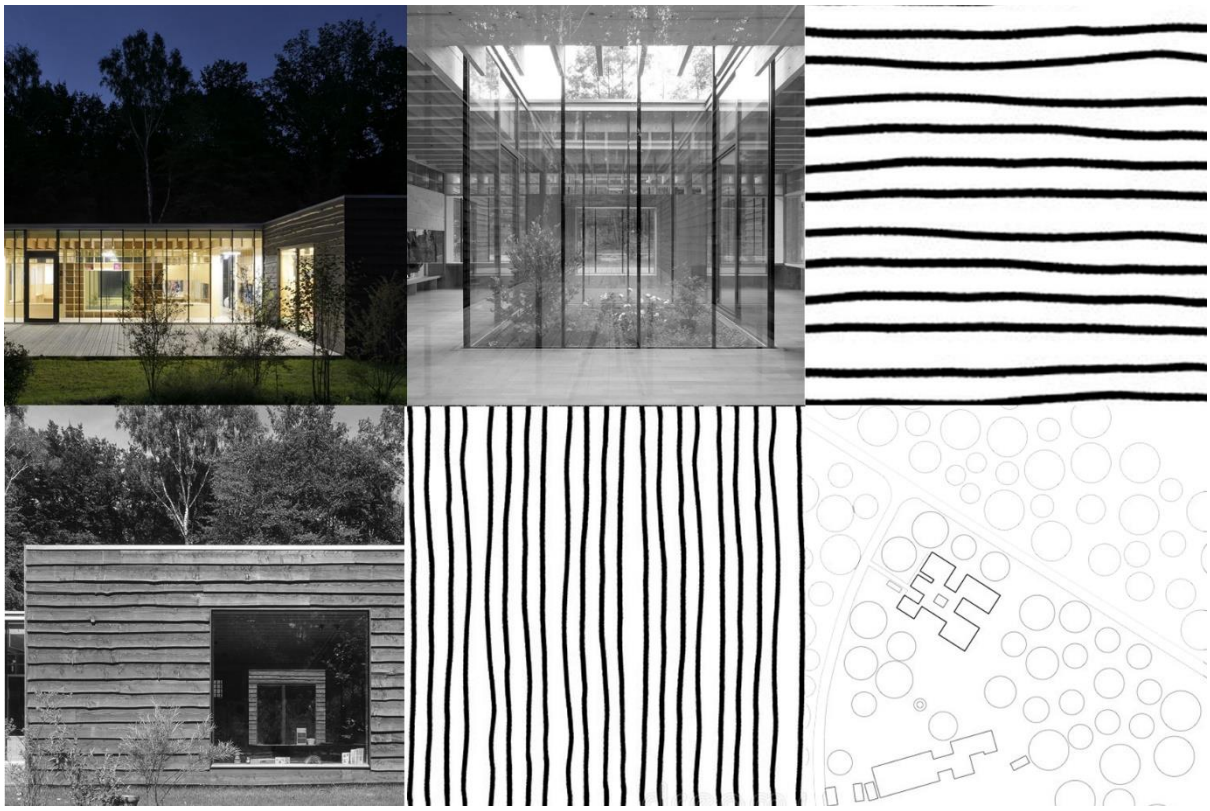

Figure 63: The Commendable Attributes of Kinderkrippe Nursery School. Source: Author, 2021.

The commendable attributes of Kinderkrippe Nursery School (Figure 63) include:

- The various applications of wood in relation to the natural environment.
- The inclusion of nature as an interactive and investigative element of space.
- The use of glazing to create transparent and connected spaces.
- The multi-purpose use of circulation as an indoor play area with built-in services.
- The efficient interior design that prioritises functionality, efficiency and aesthetics.
- The repetition of vertical and horizontal elements to create rhythm and visual stimulation.
- The overlapping of phenomenological aspects of architecture.

Kinderkrippe Nursery School is dedicated to architecture as an agent of active learning and social engagement. The human experience of nature, in harmonious balance with the built form, stimulates discovery learning and social interaction where children gain knowledge from each other and their environment. Spatial experiences intensify the relationship between child and the natural environment. Their perception of architecture is moulded by their five senses and through the investigation of the built environment, a sensory experience enhances

stimulation and active learning. Robust elements of form weave together with nature, daylight, and space to create an intimate and gentle experience of architecture.

3.4. CONCLUSION

The exploration of both precedent studies responds to the research question in numerous ways. Although both located in vastly different social contexts, the developmental impact of architecture on children is emphasised.

The following are teachings gained from the investigation of the selected precedent studies:

- In the rural South African context, sustainable architecture relies on its community and vice versa.
- Community participation and resources are a tool in meeting the basic needs of children and disadvantaged people.
- Collaboration between learners, parents and community members is essential for the promotion of quality early childhood development.
- Nature and the surrounding environment is crucial and must form part of the built environment pedagogy. Architecture needs to encourage and celebrate the relationship between children and nature by shaping seamless interior and exterior spaces.
- Materials should be chosen appropriately and should consider the context, budget, function and longevity of the building.
- Materials (glass, wood, aluminium etc), form and void overlapping with organic nature create visually and cognitively stimulating environments.
- Although technology integration is highlighted in the review of literature for immersive learning environments, both precedent studies show that it is not essential in providing quality early childhood development opportunities.

The subsequent chapter will investigate the selected case study, iKhethelo Children's Village, for a greater understanding of orphaned and vulnerable children in rural KwaZulu-Natal.

Figure 64: Nature-Context-Building: A Collage Relating to iKhethelo Children's Village. Source: Author, 2020.

4.1. INTRODUCTION

The key research question has been formulated as: **In what ways can the built environment support the development of children aged 0-6 living in rural areas in KwaZulu-Natal?** The theoretical and conceptual framework enhances the notion of the built environment as the third teacher when considering spaces for early childhood development. This chapter is a review of iKhethelo Children's Village. It explores key concepts such as community architecture, immersive learning environments and stimulating architecture. The case study provides insight into the lives of orphaned and vulnerable children in rural KwaZulu-Natal as well as those of their care-givers, local community members and the supporting organisation. This chapter contextualises how the current facilities for orphaned and vulnerable children at iKhethelo Children's Village respond to early childhood development.

The data presented in this chapter was collected through site visits, observations, informal conversations and semi-structured interviews. The information was conducted with consideration of the rules and regulations prompted by COVID-19. Photographs and analytical sketches will be presented in this chapter and all the information captured will contribute towards the design development in Part Two of this dissertation.

4.2. IKHETHELO CHILDREN'S VILLAGE, OUTER WEST DURBAN, SOUTH AFRICA

Architect: Unknown

Year: 1995

Area: 50-acres

4.2.1. INTRODUCTION & JUSTIFICATION

iKhethelo Children's Village was founded 25 years ago in response to the plight of street children. As the HIV/AIDS pandemic grew, so did the need for a residential home for orphaned and vulnerable children. Today the Village provides temporary shelter for 52 children from birth to 18 years who are either orphaned or removed from their biological families due to social ills. Most children are from low socio-economic backgrounds therefore the Village provides a safe place and simulates a family environment. The early childhood development services are only available to children who are placed into one of the Village Foster Homes by social workers.

The Village is Christian based and operates as an NGO. Funding for projects and resources are based on donations from individuals, businesses, local and international sponsors. Many services are provided by volunteers who, like the staff members, are provided with on-site accommodation. The Village provides a non-institutional, holistic approach to childcare for children who are unable to be cared for by their families and guardians.

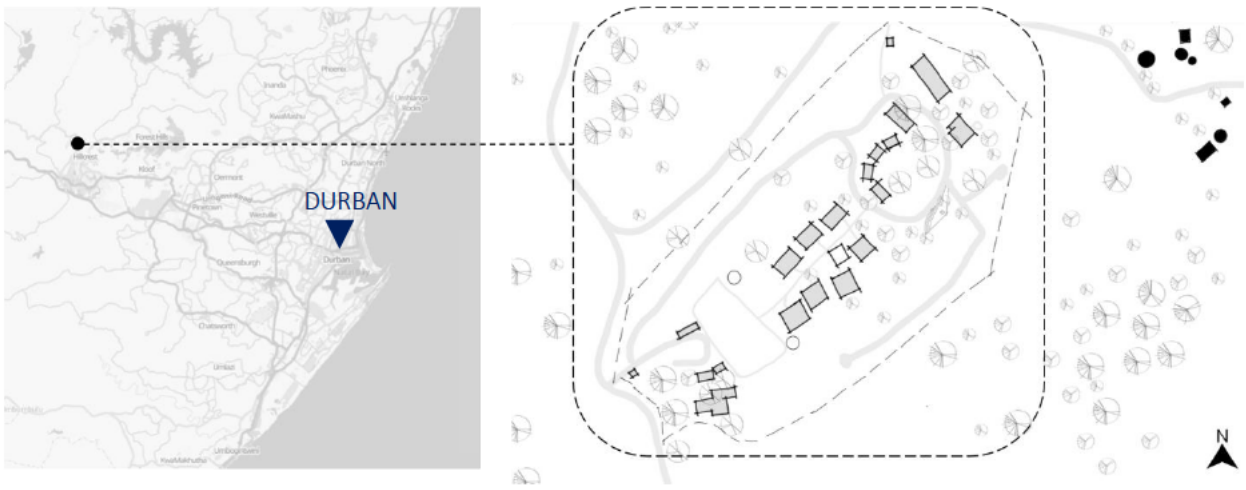

Figure 65: iKhethelo Children's Village Location. Source Author, 2020.

iKhethelo Children's Village is located on the peak of a hill in Valley of 1000 Hills, Outer West Durban (figure 65). The land is approximately 50 acres in size. The physical location provides a calm and natural setting, submerged within the rolling hills, with views of the Inanda Dam and

surrounding landscape (figure 66). The Village is not densely populated similar to the clusters of settlements and small informal townships along the surrounding main routes.

Figure 66: iKhethelo Children's Village Context. Source: http://drpaulgrant.blogspot.com/2018/03/return-to-south-africa.html

4.2.2. THE VILLAGE MASTER PLAN

iKhethelo Children's Village is 54 kilometres away from Durban. The route between the N3 and the Village has many tourist attractions including small local shops, arts and crafts, cafes, viewpoints, cultural/religious landmarks etc. (figure 67). The village can only be accessed from the main road, Zulu Reserve Road, which leads onto a gravel road, D826 Manqoba Drive. This gravel road is rarely maintained by the local municipality making it difficult for visitors and service providers to utilise. The Village regularly experiences challenges with running water and electricity, therefore, rainwater harvesting and electrical generators are essential for the Village to remain open.

Figure 67: Access. Source Author, 2020.

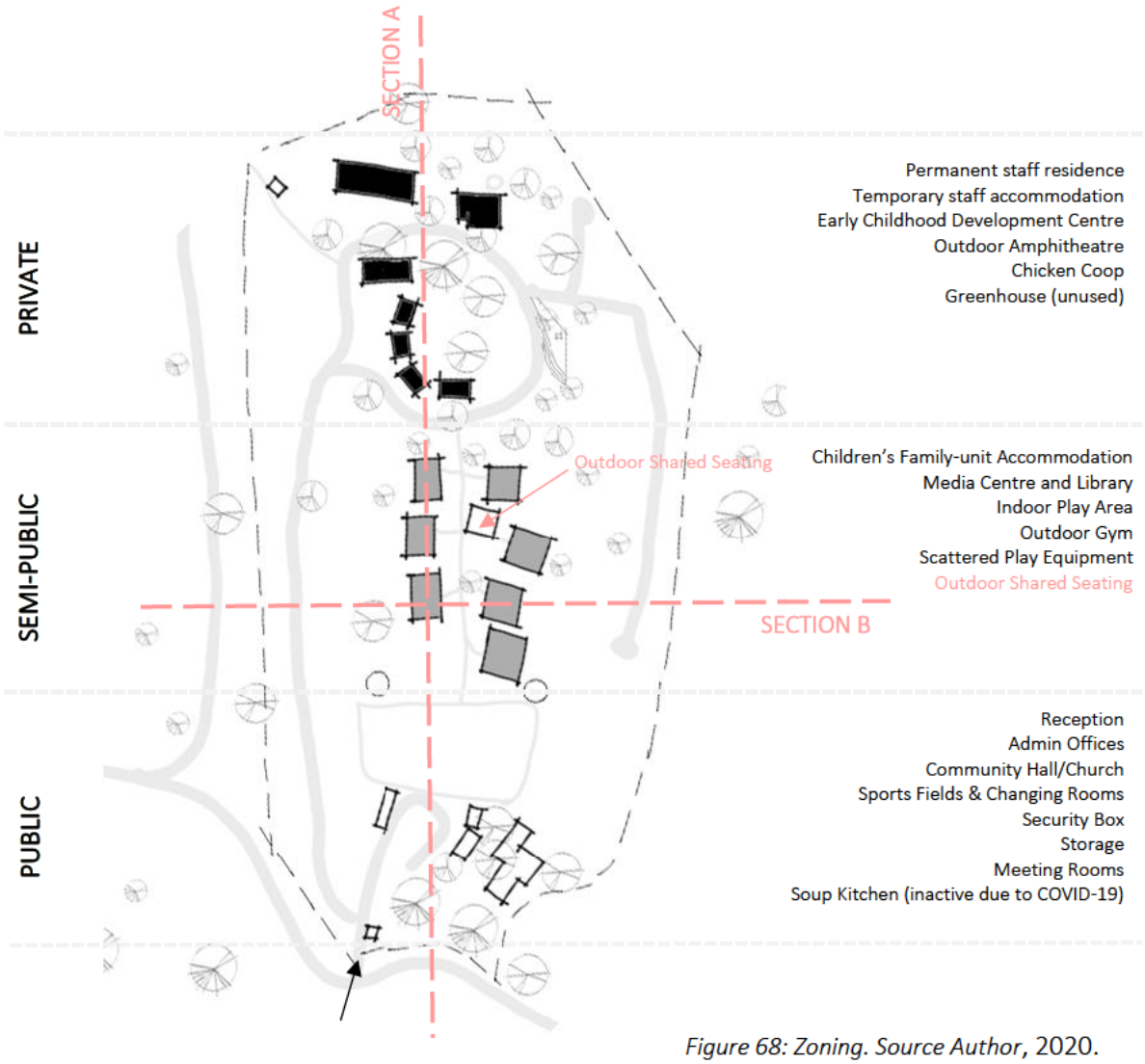

Figure 68: Zoning. Source Author, 2020.

The village community is comprised of a Community Hall/Church, Sports Fields, children's homes, an early childhood development centre, staff accommodation, offices and services – all of which are scattered upon the site. The plot is divided into three zones: public, semi-public and private (figure 68). The public zone is located close to the main entrance gate, Community Hall/Church and Sports Fields allowing for easy vehicular and pedestrian movement. However, access can only be granted via authorisation at the entrance gate. Vehicles have access to the private zone, where the volunteer and staff accommodation is located, via a perimeter route to ensure that the semi-public space is safe, at all times, for children. The semi-public zone is prioritised for pedestrians and children and has play activities i.e. trampoline, playgrounds, communal seating areas etc. Figure 69 & 70 indicate the vehicular and pedestrian movement that is dictated by the spatial planning of the site.

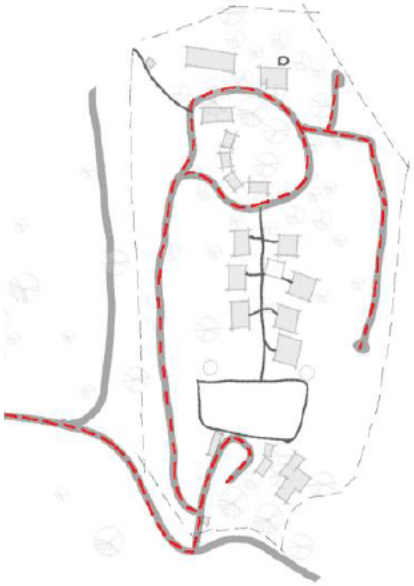

Figure 69: Vehicular Routes. Source Author, 2020.

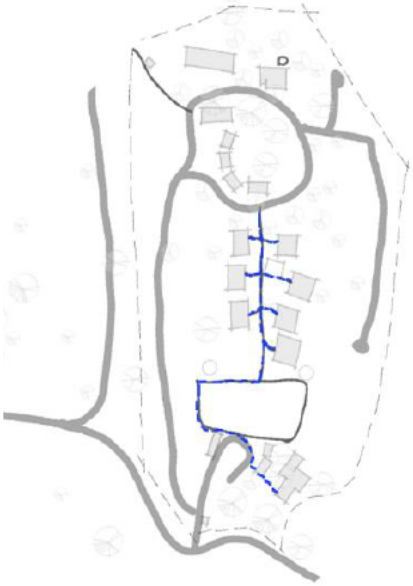

Figure 70: Pedestrian Routes. Source Author, 2020.

The Village has seven double storey units, which are divided into girls and boys grouped according to ages. This maintains a family-type living situation therefore each unit is run by a House Mother who plays the role of a real mother. The units are simplistic in form and basic construction methods have been applied. The layouts are similar in each unit, however, the function is determined by needs of the village. The programmatic functions include an open plan kitchen/dining/ lounge area, four bedrooms and two bathrooms (figure 71 & 72). Basement/ ground floors have varied functions – some are used for storage, indoor playrooms, arts & crafts, a library and a computer room etc.

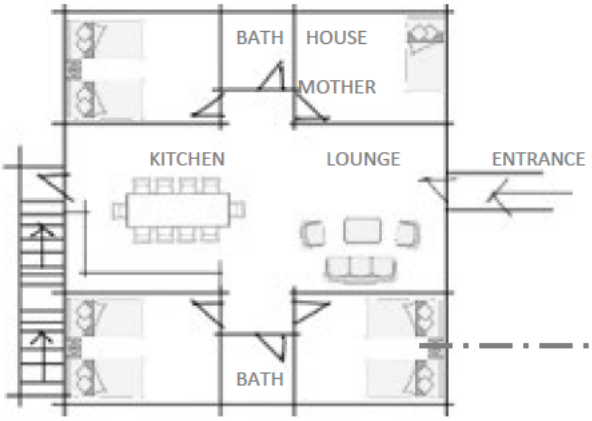

Figure 71: Typical Layout. Source: Author, 2020.

Figure 72: Girls' Bedroom. Source: Author

The colourful rectangular units overlap to create a poetic pattern language that reflects the surrounding context and dense nature. The private and administrative buildings represent the same architectural dialect in colour and form, only at a smaller scale. The combination of simple form and change in roof pitch creates a composition reminiscent of the rolling hills (figure 73).

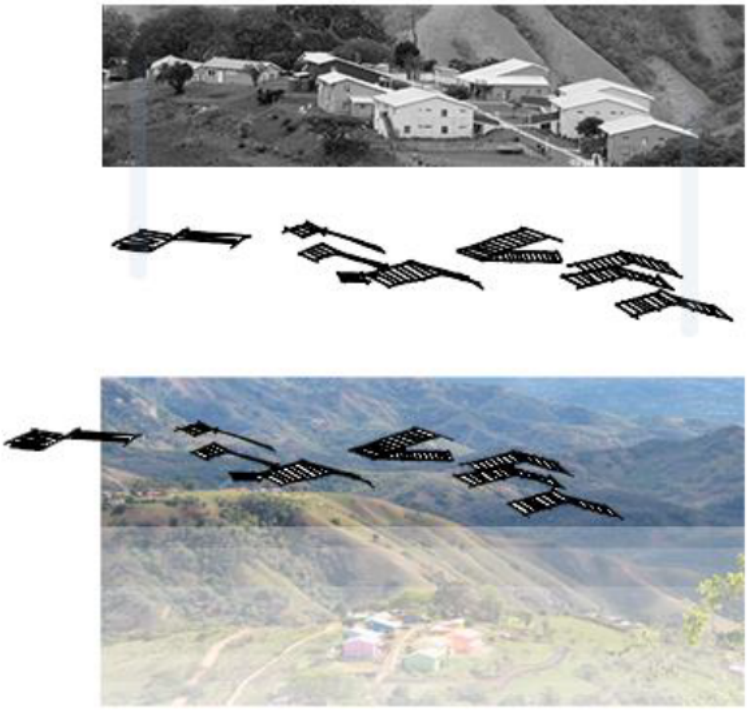

Figure 73: Poetic Composition of Form. Source Author, 2021.

iKhethelo Children's Village Creche

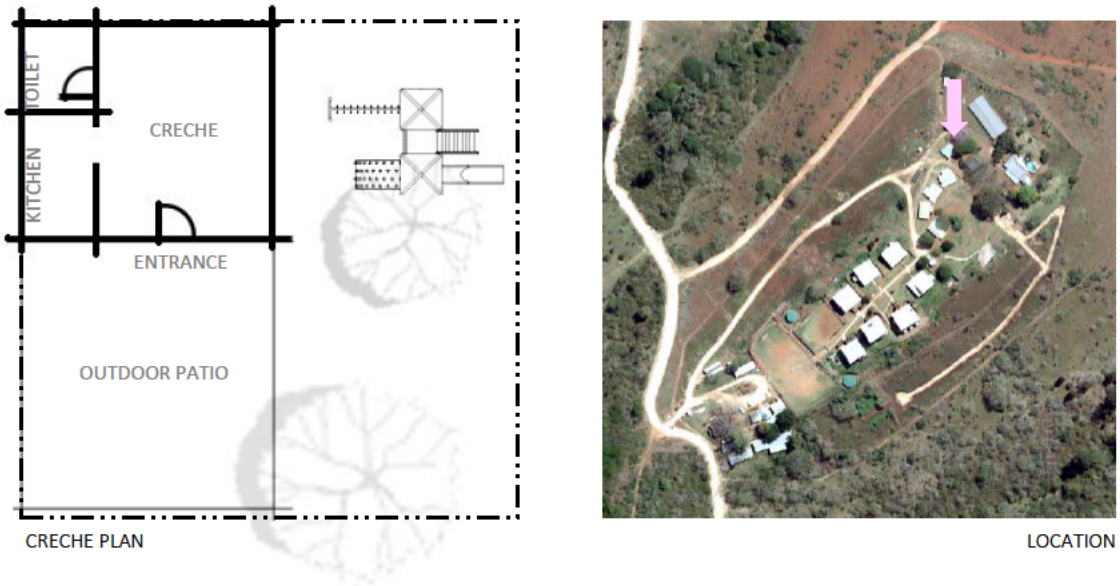

Figure 74: Creche Location. Source Author, 2020.

The creche is located in the private area of the Village where there is restricted access for children (figure 74). The small facility is run by community volunteers who look after children between 0-6 years old before they are placed in a new home or attend formal pre-schooling outside of the Village. Village Manager, Graeme, expressed concern for the premises as it is failing to provide toddlers and infants with a safe environment. Figure 75-80 showcase

photographs of the facility. Although it has basic amenities, the spaces are not suitable for children. Both the indoor and outdoor spaces do not present opportunities for various types of play therefore hindering the process of cognitive development. Although the walls are brightly coloured with murals, the built environment stimulate children through the use of materials, transparency, daylight etc.

The Early Childhood Development Centre consists of the following:

- Exterior covered patio for children to eat or play;
- Jungle gyms and play apparatus;
- Working kitchen and toilet with running hot water;
- Electricity;
- Toys, books, puzzles, tables and chairs;
- Plants and trees;
- Brightly painted walls and murals.

Major concerns observed are as follows:

- The facility is poorly lit and has very little natural light.
- Children cannot see out the windows and thus cannot experience the context within Valley of 1000 Hills.
- The toilet is adult size and there are no toilets or basins appropriately sized for children.
- There are no nappy stations, cots or beds for children to rest in.
- The floor finishes are not suitable for crawling, walking or falling children.
- The garden and outdoor playground is poorly maintained and unsafe for children between 0-6 years.
- Spaces are unstimulating and inadequately maintained.
- The resources and built environment do not afford healthy teaching or active play.
- There is no furniture for staff.

Figure 75: Outdoor Area and Entrance.
Source Author.

Figure 76: Kitchen.
Source Author.

Figure 77: Creche Interior.
Source Author.

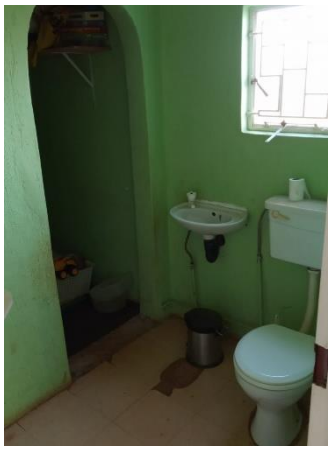

Figure 78: Toilet.
Source Author.

Figure 79: Creche Interior.
Source Author.

Figure 80: Playground.
Source Author.

4.2.3. COMMUNITY ARCHITECTURE

The buildings of iKhethelo Children's Village are small in scale – similar to the neighbouring informal family homes. The buildings and sports fields are staggered in response to the steep contours in the topography and there are various activities tucked into the hillside (figure 81). Brick, mortar and stone are used with simple construction methods. Although the architecture of iKhethelo Children's Village does not reflect the construction methods or materials, the Village has a strong relationship with the surrounding community. The daily workers are also all located in the adjacent communities and the Village often donates food (figure 82) and other resources to their community and functions as a soup kitchen from the Community Hall every Tuesday.

Figure 81: Site Sections. Source Author, 2020.

Figure 82: Community Initiatives and Prayer. Source: https://www.facebook.com/ikhethelochildren

4.2.4. IMMERSIVE LEARNING ENVIRONMENTS

It is evident that, based on observations of the Early Childhood Development Centre, it does not provide a space in which immersive learning may take place. However, the Village does provide a safe and interactive environment.

The village is surrounded by electric fences and monitored by security to ensure the safety of everyone on site during the night and day. (figure 83 & 84) Safety and security is also provided in the family-unit by House Mothers who provide protection and care for the children – many

of whom are victims of rape, child abuse and extreme neglect. Love and emotional support is essential for children to feel safe in order for the healing process to begin.

Figure 83: Perimeter fencing. Source: Author.

Figure 84: Unit fencing. Source: Author.

The Village places huge emphasis on technology integration as it is a basic life skill in society today. WIFI is available in every corner of the village and each child is given 10 gigabytes of data each month provided they have mobile phones. Should they require more data, they are allowed to purchase more from the technical staff with the pocket money that is given to children on a weekly basis from the Village. A new media centre and computer room with new desktops and a projector was recently donated to the Village. Figure 80 & 81 are photographs of Dave, a long-term volunteer, who is teaching computer lessons to some teenagers and staff. During a site visit, children were seen working on their homework, watching videos, and listening to music in the air-conditioned room.

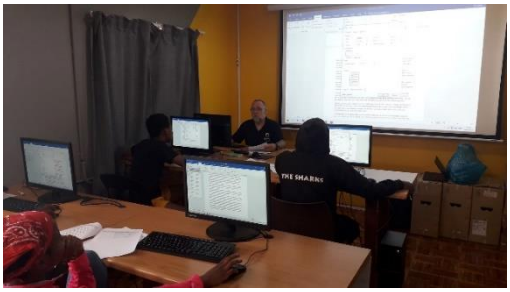

Figure 85 & 86: Computer Lessons with Dave. Source: https://www.facebook.com/ikhethelochildrensvillage/photos

The Village prepares children for life by teaching them essential life skills. Children are expected to participate in chores and are reprimanded for bad behaviour. Children are required to make the beds, clean the spaces and take turns to make school packed lunches. Responsibilities are

age appropriate. Vegetable gardens and the chicken coop are also maintained by the children who collect and distribute eggs to House Mothers. Figure 88 illustrates the available activities. Many children who come to the village have learning difficulties. These activities give them the opportunity to thrive in other areas such as sporting or gardening.

The multi-purpose outdoor seating area is the hub of activity (highlighted in figure 65). This space is used for extra tuition, homework, braais, church on Sundays as well as other activities (figure 87). The shelter offers children, House Mothers, staff, visitors and volunteers a venue to gather and enjoy each other's company.

Figure 87: Outdoor Shared Space.

Source: https://www.facebook.com/ikhethelochildrensvillage/photos

Figure 88: iKhethelo Children's Village Activities. Source Author, 2020.

4.2.5. STIMULATING ARCHITECTURE

Even though the creche does not provide a stimulating environment for infants and toddlers, the Village does. The collage (figure 89) explores aesthetics, active learning, collaboration, relationships, bringing the outdoors in, flexibility and reciprocity in relation to iKhethelo Children's Village as a whole.

AESTHETICS
The Village is surrounded by beautiful hills and trees that are celebrated in the architecture.

ACTIVE LEARNING
Active learning is encouraged through play activities for children who are able to investigate their surroundings that are colourful and immersed in nature.

TRANSPARENCY
Transparency is achieved through small glass windows.

COLLABORATION
Collaborative spaces are scattered throughout the village (figure 83). The computer room, homework centre, outdoor shared space, sports field are some of the venues that support collaboration.

RELATIONSHIP
Stones collected from site are used for special applications i.e. the plinth and exterior walls of the Church.

BRINGING OUTDOORS IN
Children connect with nature and gather vegetation to use for arts and crafts projects. The landscape and natural features are assets for activities.

FLEXIBILITY & RECIPROCITY
The Village provides flexible and accommodative spaces for children, staff and the community. It is responsive to the needs of children and open to change. The Village is a beacon of hope and everyone is given an equal opportunity to participate and enjoy.

Figure 89: Stimulating Environments. Source Author, 2021.

4.3. CONCLUSION

The Case Study of iKhethelo Children's Village has provided an example of the Village concept discussed in the literature review. Although the surrounding traditional architecture is not considered in the design and construction of the Village, the simplicity of the architecture does not impose itself on the site and responds to the natural features.

The study originally focussed only on the Creche but the site visit and initial investigation indicated that the Creche within the Village context has more value. The significance of this case study lies in the potential of the school project within the Village setting. The role of the natural environment has proven to be invaluable as it provides visual and tactile learning and play experiences for children.

It is evident, based on photographs, illustrations and observations, that the Creche does not have the necessary resources and infrastructure to support learning environments for early childhood development. Staff and teenage volunteers are unable to provide appropriate pedagogy due to their lack of training. Further, the poor infrastructure poses significant health and safety risks to children. Research explored in the review of literature suggests that this may lead to poor quality early childhood development resulting in poor performance in school and higher drop-out rates. However, the design and construction of a community-based early childhood development Centre on site can provide more children with the essential tools for long life learning.

CHAPTER FIVE: PRESENTATION OF DATA AND ANALYSIS

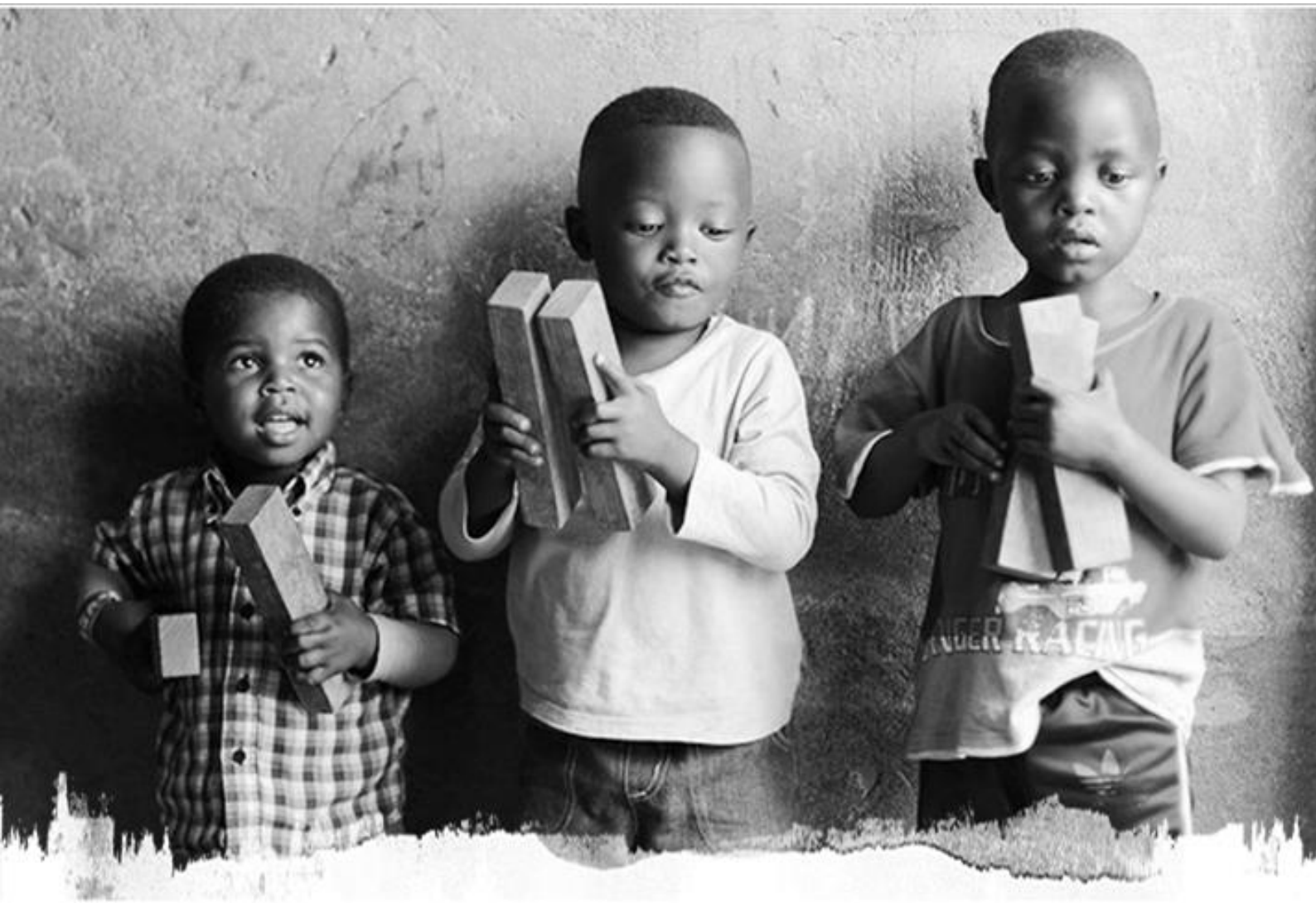

Figure 90: Rural Childhood in South Africa. Source: https://theirworld.org/news/south-africa-poorest-children-miss-out-on-early-years-care-childhood-development

5.1. INTRODUCTION

This chapter provides a description of the primary data collected and analysed. Semi-structed interviews with key informants were conducted, thereafter the information was organised thematically in order to interpret the data. The chapter aims to analyse the data thematically by continuing the discussion from the literature review, precedent studies and case study. This data will contribute towards answering the key questions of this dissertation. Moreover, it contributes towards defining a set of design guidelines to inform the development of a community based Early Childhood Development Centre. Semi-structured interviews with two key informants, Graeme and Zanele, from iKhethelo Children's Village will be reviewed.

Graeme is the Village Manager, CEO, and a qualified teacher. His journey with children began in London where he worked with troubled youth for 15 years. When he moved back home to support his local community, he decided to volunteer at iKhethelo Children's Village. After two and a half years, in 2015, he took over the managerial duties in the Village. Graeme and his family now live in the permanent residence on site.

Zanele has been at iKhethelo Children's Village since 2015 and has 14 years of experience in the role of a House Mother. Her dream growing up was to become a social worker and to help children who have experienced challenges similar to those she faced. Zanele grew up in her grandmother's home and, due to financial constraints, she was unable to complete her studies to become a social worker. However, she attended a 'learnership' where she became a House Mother and Care Giver. She now has a NQF Level 4 in Child and Youth Care Work.

5.2. THEMATIC ANALYSIS

5.2.1. THE NEEDS OF ORPHANS AND VULNERABLE CHILDREN

"They need a stable environment with love and care. Most of our children come from extreme situations. They need a safe place to sleep and feel like they are protected." – Zanele

Figure 91: Hope Workshop with Children living in iKhethelo Children's Village. Source: https://www.facebook.com/ikhethelochildrensvillage/photos/3653201434707040

Many orphaned and vulnerable children are exposed to neglect and abuse before being placed in children's villages. The transition into a new and unfamiliar environment is very difficult for children and care-givers because many children exhibit severe behavioural problems. One of the biggest challenges that Zanele faces is integrating new children into her family unit. Some children come from more extreme circumstances than others, therefore, each child needs appropriate support. Zanele provides children with a stable environment and cares for each individual, however, she does feel overwhelmed when she is unable to address specific concerns. She finds it hard to treat each child equally because some children need more love, care and attention. This tends to take time away from the other children. She says that the children who come to iKhethelo Children's Village need extra help and guidance to cope with their trauma.

"They need access to professional help. We try to send children for therapy if the situation is extreme but most of the time they receive counselling from the staff. Most of them need the professional help but we don't have the finances for it. "-Graeme

Children who are suffering from extreme trauma need treatment to guide the healing process. The role of the village is to provide support and counselling. However, the financial implications restrict children from receiving professional treatment. Irrespective of age, the physical and physiological effects of trauma hamper a child's development. Therefore, children usually arrive at iKhethelo Children's Village with learning difficulties. Graeme believes that if these learning difficulties are not addressed immediately, it makes it harder to integrate these children into formal schooling environments. If not dealt with during the early stages of life, children may have developmental problems and learning difficulties, which persist into adulthood, creating a range of social, psychological and economic challenges i.e. poverty, unemployment, depression, low self-worth etc.

"When children arrive, at whatever age, they usually already have learning difficulties. Sending them to normal schools is not an option sometimes. We have a little girl who threw a chair at a teacher because she got so frustrated. It's our fault. We sent her to an English school, and she is only fluent in Zulu."- Graeme

Rural children have different backgrounds to those who grew up in urban areas. Therefore, the approach to education should be culturally and contextually relevant. Although the goal for iKhethelo Children's Village is to integrate children into society and provide them with equal schooling opportunities, some children are not ready or familiar with these learning environments. Thus, there is a disruption regarding the learning process, which may hamper their self-esteem. Strategies for improving numeracy, reading, language and social skills need to be incorporated in the village's approach to childcare in order to support a smooth transition into formal schooling. Considering that the Village has capacity for 52 children (with hopes to expand), an onsite educational therapist who is trained to help children with learning challenges and behavioural issues is essential.

The key in transforming the lives of orphaned and vulnerable children is understanding the needs of the individual child and designing a specific support structure that may address the areas of concern.

5.2.2. SERVICE PROVISION

Figure 92: Service Provision at iKhethelo Children's Village. Source: Author 2021.

"Sometimes the electricity gets turned off for days. That's okay, we can make do in most situations. We have a backup generator that has the capacity to keep the village running for a few days. Water on the other hand is a challenge. We didn't have water for almost a week once. It was shut off because we didn't pay our bill in time. I was really worried because we have sick children and they need running water."-Graeme.

As previously highlighted in the review of literature, many South African rural communities are deprived of resources and services that are constitutionally mandated. Although iKhethelo Children's Village receives a social maintenance grant per a child, it does not come close to covering the expenses of an individual child. The village cannot depend on the resources and financial support provided by the South African government. Therefore, donations from individuals, businesses, local and international sponsors help to provide alternative solutions for service provisions. Graeme focuses his attention on securing funding and finding sustainable ways to maintain the Village. He has managed to secure two large rainwater tanks, an electricity generator and a bore hole in order to become less dependent on public services and to become more self-sufficient.

> *"The Village is meant to provide a temporary home before children are placed in permanent homes or reunited with their families. We don't have the capacity or*

resources to be a permanent home but some children never leave or they keep coming back."- Graeme

The Village relies on volunteers, who are from all over the world, as well as the local community to fill in when there are absent teachers, care-givers and parents. The volunteer programme promotes a better support network for children to practise and develop social skills while strengthening their bond with the surrounding community. As more support is provided to the Village from volunteers and sponsors, more support and resources are distributed to the surrounding community. Although volunteerism is a great asset to the Village, most volunteers are untrained and do not have the relevant qualifications pertaining to childcare and development. This results in the Village being unable to provide the appropriate support for early learning therefore hampering the development of young children.

"I would like to receive regular training and education to become a better House Mother."- Zanele.

Staff and volunteers rarely have access to formal training programmes and skills development opportunities. Zanele believes that improvements in education for care-givers and long-term volunteers will build village capacity for helping children who are troublesome or who have lived through extreme circumstances. Care-givers and volunteers are unable to achieve the educational and social milestones before formal schooling because they do not know how to provide the appropriate stimulation during the important development phase. Graeme also mentions that there is a shortfall in skills development due to financial constraints.

5.2.3. EARLY CHILDHOOD DEVELOPMENT

"We really need a proper Early Childhood Development Centre so that we can help more children at a younger age. This will increase their chances of being adopted too"- Graeme

Figure 93: Early Learning Opportunities for Children. Source: https://www.facebook.com/ikhethelochildrensvillage/photos/

iKhethelo Children's Village is in dire need of an Early Childhood Development Centre. Similarly, many rural early childhood development centres in KwaZulu-Natal exist within a built environment that is not ideal for early learning opportunities. The absence of learning materials, qualified teachers and infrastructure poses significant health and safety risks for children. Graeme says that the current facilities are detrimental to the development of children and as a result they have started sending their children to external creches. This has placed financial strain on the village, and house mothers, because children only attend creche from 9am-2pm. Thereafter, children are looked after by their House Mothers who have many other responsibilities.

"We need to incorporate some form of therapy into the Village. Play therapy, cognitive-behavioural therapy, even talk therapy….things like that. Some babies and toddlers are so under stimulated and non-responsive when they arrive, you can really see that they have been neglected."- Graeme

Orphaned and vulnerable children are often exposed to absent care-givers and neglect, which has adverse effects on a child's cognitive development. As previously discussed in this dissertation, this hinders their intellectual capabilities needed to excel in school. Learning

begins at birth. Therefore, these children have an unfair start to life from the time that they are born. The Village needs to target the early years of childhood by investing into high-quality environments, teachers and resources. This will help improve the educational outcomes for young children. Preparing children for formal schooling in this context requires staff to address key areas of concern where development has not taken place and target those specific areas. For infants, toddlers and pre-schoolers this often means learning through play.

"We need a design that we can show the board and sponsors."-Graeme

While discussing the need for an early childhood development centre, it was decided that iKhethelo Children's Village is the site selected for the design component of this dissertation. Figure 94 shows a workshop session with Graeme during which time the site and requirements for the project were discussed. The intention of the design of the Early Childhood Development Centre in iKhethelo Children's Village is to establish plans, sections, elevations and three-dimensional drawings that can be displayed on their website for international and local sponsors to see. This will aid in securing funding before proceeding with construction.

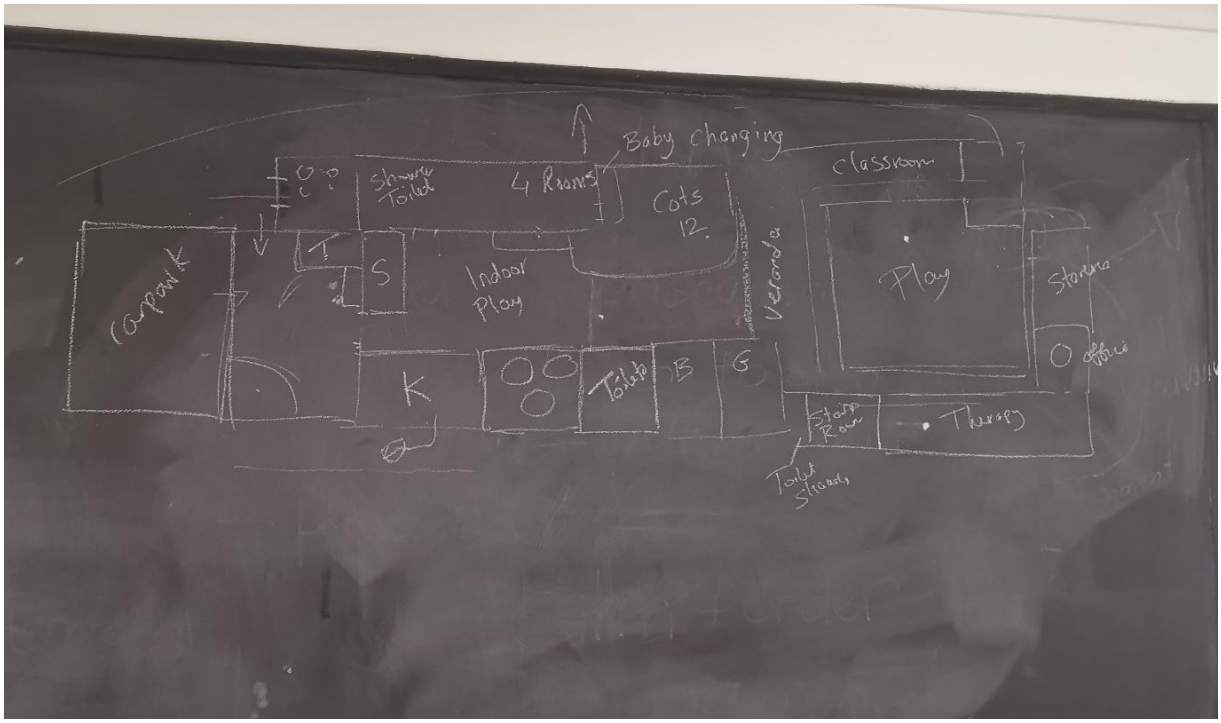

Figure 94: Brainstorming Session for the New Facilities. Drawing by Graeme Wright.

5.3. CONCLUSION

This chapter discusses the primary data gathered through semi-structured interviews with key informants who helped to facilitate and contextualise the research problem. The thematic analysis refers to orphaned and vulnerable children, early childhood development and architecture. It also refers to the overall aim of the dissertation that is to explore architectural design that supports early childhood development in rural KwaZulu-Natal. The respondents are representative of the perspectives needed to formulate design guidelines for an early childhood development centre in iKhethelo Children's Village. Through the discussion of key emerging themes from the data, it is clear that a new facility will transform service delivery of the Village.

Orphaned and vulnerable children are victims of extreme trauma and require professional treatment and therapy options to address areas of concern. Each child is different, therefore, treatment needs to be provided individually in a private and safe setting. This need for permanent counselling and treatment can be met with new infrastructure. However, architecture is not the sole solution. Financial difficulties place strain on service provision. Thus, alternative solutions must help to provide children with the relevant treatment to overcome past obstacles and experiences. Skills development and education for staff and volunteers is also essential in building Village capacity in dealing with neglected and abused children.

Both respondents share similar perspectives when discussing early childhood development within iKhethelo Children's Village. The narratives reinforce the need for early childhood development infrastructure and services that supports the development of children. Early learning difficulties and behavioural problems have been identified as the main challenge in the Village. Therefore, the vision for a new early childhood development centre must help to improve the quality of life for all children in the Village by providing emotional, mental, physical and social benefits.

CHAPTER SIX: RECCOMENDATIONS AND CONCLUSIONS

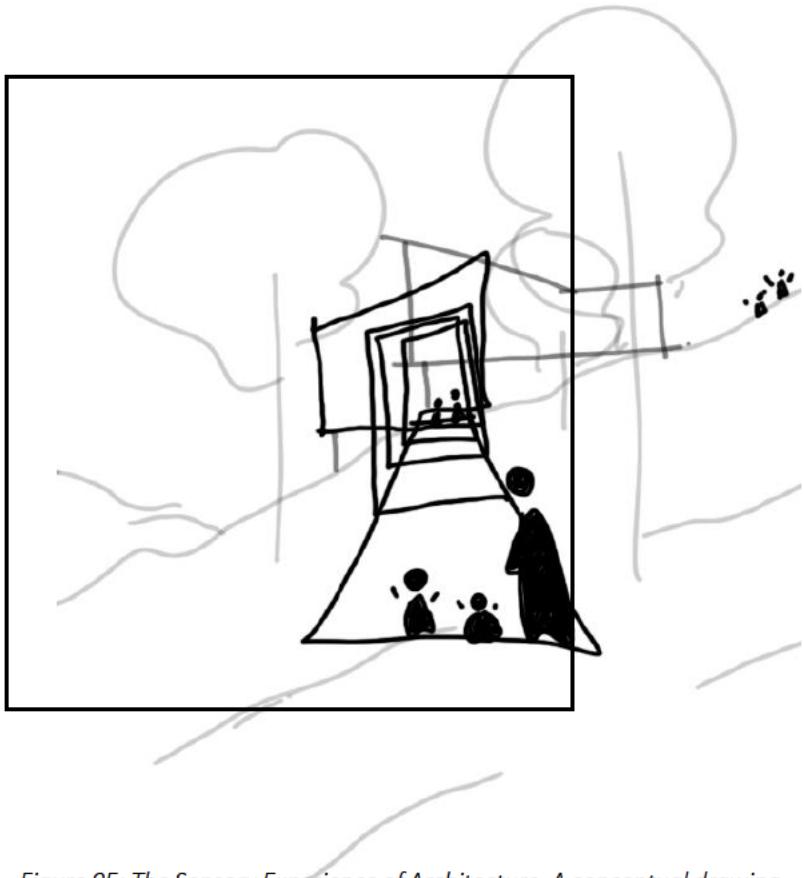

Figure 95: The Sensory Experience of Architecture. A conceptual drawing of iKhethelo Children's Village's Early Childhood Development Centre. Source: Author, 2021.

6.1. INTRODUCTION

Through the analysis presented in this dissertation, it is clear that the outcomes of early childhood development facilities in rural South Africa have failed policy aims. The development of children is dependent on their support system. The socio-economic conditions endured during childhood have life-long effects. In order to fulfil the rights of children, and provide them with a fair chance in life, community development and capacity are needed. By designing for social justice, communities are able to become self-reliant and prioritise resources to support the period early childhood development for their children. Empowering communities through education and skills development shapes stronger socio-economic contexts for children to grow emotionally, intellectually and physically.

The environment in which a child grows, and lives should encourage the human development process and provide early learning opportunities. In order to support cognitive development in children, the built environment should provide countless opportunities to experience the sights, scents, sounds, and textures of the natural environment. Early Childhood Development Centres are a venue for learning where pedagogic concepts, principles and experiences are shaped by sensory encounters. The built environment, through aesthetic and intellectual stimulation, promotes active learning to help children achieve their full potential.

The following recommendations are based on the analysis of the preceding primary and secondary data.

6.2. MEETING THE OBJECTIVES

The problem has been identified as poor-quality built environments that hinder the development of orphans and vulnerable children living in rural communities. In response, the literature review, theoretical and conceptual framework embedded within, precedent studies, case studies and key informants have answered the research questions posed at the outset of the dissertation. The aims and objectives of this dissertation have been met through answering the key questions.

How can community engagement aid in service provision and resources for early childhood development infrastructure?

Community has proven to be a valuable resource. During the process of community participation and engagement, professionals and community members work as a collective group to prioritise the provision of high-quality early childhood development infrastructure. Through community participation, rural communities are able to shape healthier and stronger socio-economic environments in order to provide children with the best possible foundation for life-long success.

The notion of community architecture (figure 96) initiates self-reliance principles where service provision and poverty alleviation can be addressed by the local community. This allows

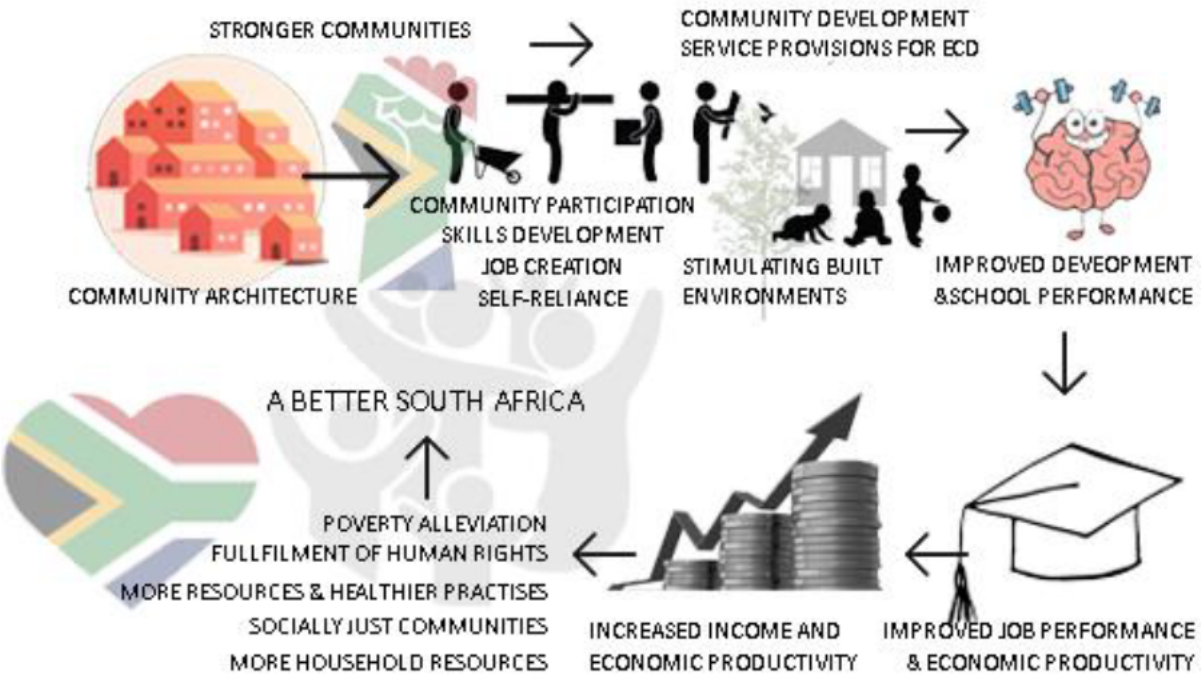

Figure 96: Shaping a Better South Africa for all Children. Source: Author, 2021.

communities to disconnect from national systems that foster historical inequalities and support the development of children through their own actions and abilities.

How does the South African socio-economic context of rural communities impact the development of children?

In rural South Africa, orphaned and vulnerable children are exposed to various forms of neglect, abuse, poverty and absenteeism. Exposure to these harmful environments has adverse effects on all aspects relating to child development in hindering their intellectual capabilities needed for formal schooling. Many rural early childhood development centres lack an appropriate architectural response to support various forms of learning. The absence of learning materials, qualified teachers, infrastructure and other crucial amenities pose significant health and safety risks. It further threatens the long-term developmental outcomes of children.

How can the built environment provide opportunities for early learning?

Experimental design and the innovative use of affordable materials create stimulating environments where children are afforded the opportunity to learn, play and engage in activities in order to develop in a healthy manner. Children learn through play. Thus, the built environment needs to offer a variety of play experiences for children. Play spaces have the role of providing a learning environment for pedagogic concepts, principles and experiences. The idea of the environment as the third teacher requires architecture to promote higher levels of learning through intentional guided experiences. Hence, spaces for children must be thoughtfully arranged to suit their needs, scale and curiosity.

How does light and shadow, texture, materiality and sensory aspects of the built environment support the development of children?

Experiences guided by visual, tactile and aura sensations allow children to connect to their environment and form memorable encounters. Successful environments offer movement and activities; stimulate the five senses; encourage social interaction; offer challenges; and allow children to become researchers and explorers. The phenomenological aspects of architecture encourage children to investigate, think and make sense of their interactions with the built and natural environment.

The overlapping/ layering of space, material, textures and light produces intriguing spaces for children to inhabit. Architecture, enriched with a range of stimuli and opportunities for diverse learning experiences, encourages brain development and thoughtful learning in preparation for school and, eventually, adult life (figure 97). The built environment, in which early childhood development takes place, needs to foster learning through aesthetic and intellectual stimulation. Materiality, daylighting, colour and scale need to respond to the developmental milestones of which children need to achieve.

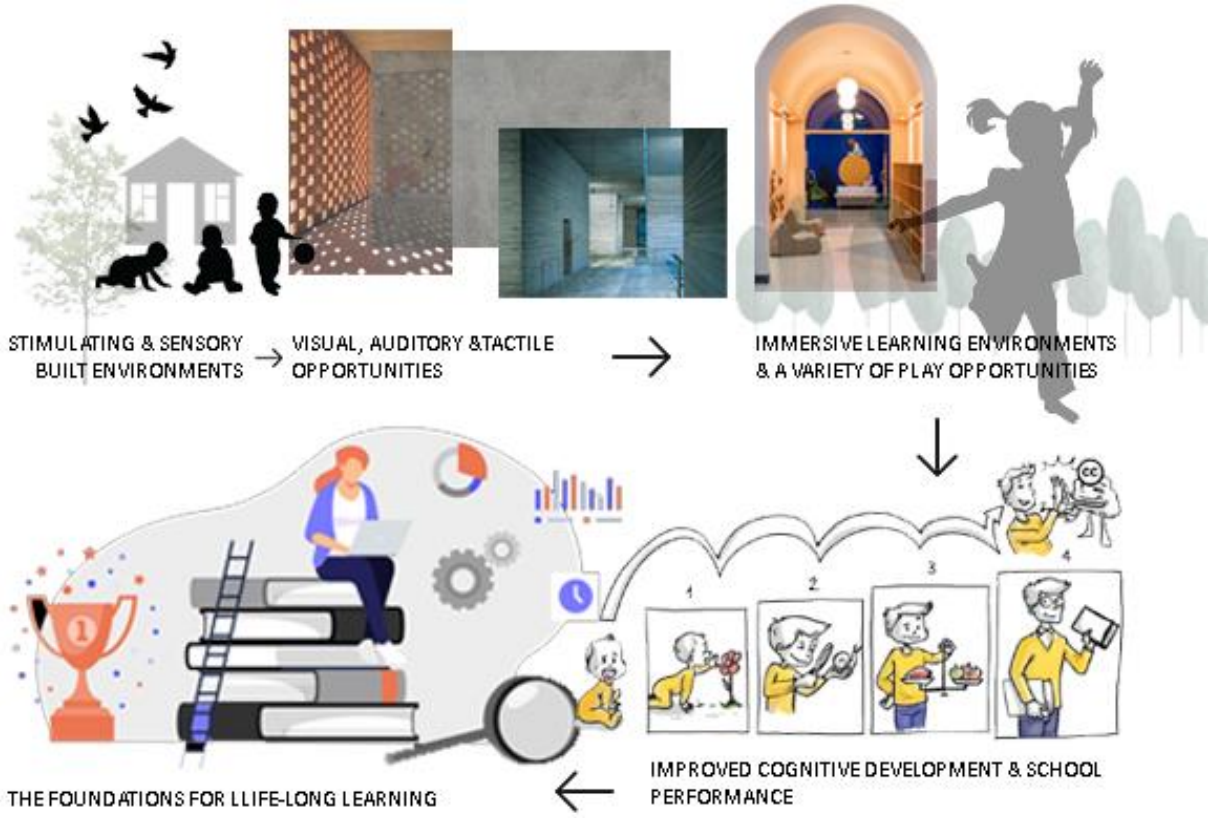

Figure 97: Spaces to Support Child Development. Source: Author, 2021.

6.3 RECCOMENDATIONS

6.3.1 GUIDELINES FOR ADDRESSING SOCIAL JUSTICE

In order to maintain social justice in societies, challenges regarding poor education and low economic status need to be addressed. By shaping learning environments in which children are able to play, learn and develop better mental and physical capabilities, a contribution may be made to the social and economic growth of their local community. ***Community participation*** *(figure 98)* ***and skills development*** *(figure 99)* are principles present in community architecture. This will encourage iKhethelo Children's Village, and the surrounding community, to address their needs for an early childhood development centre. Empowering communities through education and skills development is essential in the pursuit of social justice in South Africa.

Figure 98: Community Participation. Source. Author, 2021.

Figure 99: Skills Development. Source. Author, 2021.

6.3.2 GUIDELINES FOR CHILD DEVELOPMENT

It is imperative to target the early years of childhood to provide orphaned and vulnerable children with the best possible foundations for life-long learning. Children learn through play. Therefore, the built environment should offer a variety of indoor and outdoor play experiences (figure 100). Sensory experiences shaped by nature, animals and the built environment encourage cognitive development in children and provide an area for physical activity.

Collaborative environments encourage social interaction and, thus, encourage the development of a child. Collaboration (figure 101) between learners will be prioritised by providing opportunities for group activities and play. Furthermore, collaboration will be implemented on a meso and macro level. Collaboration must translate into the broader community and extend to supporting organisations and sponsors to truly transform service delivery for early childhood development services at iKhethelo Children's Village.

Figure 100: Indoor and Outdoor Play. Source. Author, 2021.

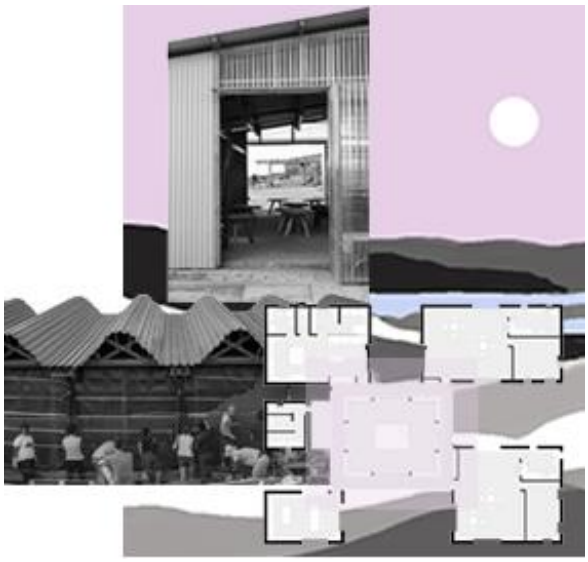

Figure 101:. Source. Author, 2021.

6.3.3 GUIDELINES FOR THE DESIGN OF iKHETHELO CHILDREN'S VILLAGE

Visual Connectedness and Transparency

The use of glass, internal screens and mirrors will be implemented throughout the design in order to enhance visual connectedness. Transparency between adjacent spaces allows learning to become communal while connecting children to the surrounding site in context (figure 104). Children are able to interact from different classrooms and spaces while teachers and care-givers are able to ensure the safety of every child. Views will be framed for children to create moments of awe and intensify the relationship between interior and exterior.

The Application and Use of Local Materials

Through intentional design, materials will be used to guide children's learning experiences. Open-ended and local materials will be used internally and externally in various applications and will reflect on, as well as respect, the ethnic, cultural and linguistic diversity of children. The relationship between materials and objects (toys, furniture, light fittings etc.) provides a

rich textural and visual stimulation for children (figure 102). This will further encourage active learning. Materials found on site and readily available will be used e.g. Stones collected from site or wood from the surrounding forest.

Sensory Design

Bringing the outdoors inside (figure 103) helps children to establish a sense of belonging in their world and allows them to explore nature directly from the spaces in which they learn and live. The inclusion of nature as an interactive and investigative element promotes nature as a

Figure 102: Design Principle: Materialiality. Source. Author, 2021.

Figure 103: Bringing the Outdoors In. Source. Author, 2021.

Figure 104: Transparency. Author, 2021.

pedagogic concept where natural elements of the landscape afford various physical and intellectual development opportunities. The rural context and landscape of iKhethelo Children's Village will be embraced as a tool for learning. Nature and the experience of sights, scents, sounds, and textures support the human development process. These experiences with man-made and natural space may better prepare children for formal schooling

Passive Design

The design shall respond directly to the natural energy such as sunlight and wind to reduce and eliminate energy consumption. Natural ventilation, window shading, roof gardens and rammed earth walls will provide comfortable interior spaces for children to learn and play in. The superior thermal mass regulates temperatures and buffers out loud noise while being low maintenance, fire protecting and environmentally friendly.

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LIST OF FIGURES

APPENDICES

APPENDIX A: GATEKEEPERS LETTER

Mr Graeme Wright

iKhethelo Children's Village

D826 Road Manqoba Drive,

Bothas Hill, Outer West Durban

3610

12 September 2020

Dear Graeme

Miss Akshi Behari is a Masters student in the School of Built Environment and Development Studies formally requests permission to interview staff in your institution and use iKhethelo Children's Village as a case study.

The data collected will be used for her Masters Research Project entitled *The influence of early childhood development on architecture: Towards the design of a community child development centre in rural KZN, South Africa* and the findings will be shared with the Department of Education if requested after the study has been completed.

Thank you and Kind regards

Ms Magdalena Cloete

Supervisor

School of Built Environment and Development Studies

Email: Cloete@ukzn.ac.za

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IKHETHELO CHILDRENS VILLAGE
P.O Box 689, Botha's Hill, 3660
Reg. No. 2001/004117/08
Sec 18A Charity, NPO 215-074

Mr Graeme Wright

Manager and CEO of iKhethelo Children's Village

Email: graeme@ikhethelo.org

Tel number: +27 (0) 31 020-0221

Appendix B: Interview Schedule : House Mother

Occupation: House Mother/ Care Giver

Qualifications:

Experience in Field: X years

- How did you become a House Mother?
- What are your qualifications?
- What are your responsibilities daily and how many children do you look after?
- What do you think the children need the most?
- Have you looked after any children 0-6 years of age?

- What do the children do daily? Where do they spend their free time?
- What do the children enjoy doing most?
- What words would you use to describe the children here?
- What are the biggest challenges faced by you and by the children living here?
- What do you think makes the children most happy?

- Where are you from? How often do you go home?
- Do you have children? If yes, where do they live? Who takes care of them? How often do you see them?
- What improvements do you need?
- What is the favourite part of your week and your job?

Appendix C: Interview Schedule: Graeme Wright

Occupation: Village Manager/CEO

Qualifications:

Experience in Field: X years

- What are the major challenges for the village and for children? How do you address them?
- Where do most children come from? How do children end up here?
- What is the demographic of the children (age/sex/race) that live here?
- What are the responsibilities of iKhethelo?

- How many children are currently living here? How many under 6 years of age?
- How does the village provide a home for children aged 0-6 years? What do they need?
- How does the village approach early childhood development? Do children attend creche or preschool?
- What does the village need in terms of ECD facilities?

- How does iKhethelo respond to the surrounding community? (employment, opportunities, social integration)
- What activities are available for children outside and inside of the village?
- Have children been adopted from the village?
- What is needed for more children to be adopted?
- What role does Vukile Sentane play?

Appendix D: Extract

EXTRACT FROM: Frost, J. L., Wortham, S. C., & Reifel, S. (2012). *Play and Child Development Fourth Edition*. New Jersey: Pearson Education. (page 99-100)

FIGURE 4.2 Cognitive Development and Play: Piaget's Substages

Substages of the Sensorimotor Period	Examples of adult roles and Strategies	Materials
Stage 1: Simples reflexes (birth to 1 month) Infant uses sucking, looking, listening and grasping.	Dresses infant in clothes that encourage movement. Responds to infant's periods of alertness Sings and talks to infant.	Crib and nearby walls are decorated attractively. Objects are placed visually near the crib. Music is played at appropriate times.
Stage 2: Primary circular reactions (1 to 4 months) Infant begins to adapt reflexes to the environment (reflexes are adapted to specific objects; sucking is used with nipples and pacifiers; Repeats actions that please the adult Gazes at hand.	Provides change in the infant's environment. Carries and holds infant in different positions. Places toys in the infant's hand or within reach. Turns on musical toys. Initiates movement in crib toys.	Mobiles, rattles, musical toys. Objects that are safe to go in the infant's mouth and can be grasped and lifted.
Stage 3: Secondary circular reactions (4 to 8 months) Repeats actions that involve objects, toys, clothing, or people. Repeats an action over and over to experience the result. Repeats an action that elicits a positive reaction from an adult.	Responds to infant actions on crib toys and provides materials that encourage repetitive actions. Initiates actions with toys and waits for the infant to respond. Reacts with smiles and other facial expressions in response to the child.	Blocks, dolls, ball, and other toys. Use objects with contrasting colors, different sounds, and a variety of textures.
Stage 4: Coordination of secondary Circular reactions (8 to 12 months) The infant coordinates behaviors. Behaviors are goal directed. Emerging motor skills enable the child to involve more of the environment. The infant might try to reach a forbidden object, retrieve a hidden object, or use different vocalizations to hear the sounds.	Plays hide-the-object, puts objects under a blanket or behind the back. Verbalizes what is being done.	Toys, visually attractive objects.

Substages of the Sensorimotor Period	Examples of adult roles and Strategies	Materials
Stage 5: Tertiary circular reactions (12 to 18 months). Toddlers become creative and experiment with new behaviors. Tries different ways to vary a behavior. Experiments in how to use 2 objects (example: filling and emptying a bucket with different objects, throwing stones in the ocean).	Plays more complex forms of hide-the-object. Asks questions like, "Where is it?" or "Can you find it? Watches the toddler's responses and praises actions. Provides experiences in creative play with water toys. Encourages toddler to pretend sleeping, eating, talking on a cell phone.	Blanket, toys, play dishes, water toys, water basin, container with toys of different shapes and sizes.
Stage 6: Mental combinations (18–24 months). The toddler can engage in true problem solving. The toddler can anticipate what might happen if certain actions are taken. More advance understanding of object permanence. Can use pretense such as pretending to be eating.	Observes toddler's actions with toys with respect to how the toy was used. Identifies and responds to toddler's interests. Provides clothes, materials, and toys that promote pretend play.	Toys that require actions on the part of the child. Pegboards and pegs, matching and sorting games, nesting, stacking, and ordering materials.