Cape Peninsula
University of Technology

GAMEFUL DESIGN FOR SKILLS DEVELOPMENT AMONG URBAN YOUTHS IN SOUTH AFRICA

by

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Thesis submitted in fulfilment of the requirements for the degree

Doctor of Philosophy: Informatics

in the Faculty of Design and Informatics

at the Cape Peninsula University of Technology

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District Six
March 2023

DECLARATION

I, Chinonye Leuna Obioha, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

28/03/2023

Signed **Date**

ABSTRACT

Numerous youths residing in marginalised urban communities in South Africa lack the necessary skills to obtain employment in a digital economy that requires highly skilled individuals. The fourth industrial revolution (4IR) further exacerbates the situation for these youths if they remain unskilled. While training with digital technologies has become the norm, motivating and engaging youth to learn new skills remains a challenge. Gameful design can be an effective tool for creating engagement and motivation, but there is a dearth of literature on how to use gameful design to train youths in non-formal education contexts in marginalised communities, particularly in developing countries. Additionally, designing a system for "effective use" necessitates a comprehensive understanding of the complexities surrounding these youths in their context. As a result, this study aimed to investigate the considerations, both social and technical, required to design a gameful system that can motivate and engage youths in marginalised urban communities in South Africa to acquire skills, thereby mitigating the challenges of skills acquisition for opportunities in the digital era and supporting the goal of the national development plan for 2030.

The study drew on the theoretical perspective of constructivism, a learning theory, and explored what gameful elements can engage and motivate youths in marginalised communities to learn employable skills and how these elements can be incorporated into a system from the participants' perspectives and lived experiences. Design anthropology was used as the methodology, and a series of workshops were conducted with some youths from Mfuleni, Western Cape, South Africa, which included observations and self-reflective tasks. The first two workshops highlighted the complex challenges facing the youth and how these could be transformed into solutions. The youths also reflected on the games they played and social media applications they used to identify gameful elements that resonated with them. Further workshops were conducted to understand how to incorporate these gameful elements into the gamified system.

The research study identified thirty-one factors grouped into six themes as complexities surrounding the youth group: Knowledge and use of technology, Funding and capital, Resources for upskilling, Training and education, Opportunities, and Physiological and psychological issues. Furthermore, the study found twenty-three system-based gameful design elements and three non-system-based elements to engage and motivate youths. Using these findings, the study proposed a conceptual and user flow framework demonstrating how to incorporate and combine these elements in a gameful designed system. The results provide valuable insights for gameful designers, development centres, and policymakers involved in youth skills development.

ACKNOWLEDGEMENTS

“To You, O God, I give thanks and praise, for You have given me wisdom and strength”

To my supervisor, Prof Izak van Zyl, thank you for your support and guidance throughout this research. Your contributions are invaluable to the quality and completion of this study.

My sincere gratitude to Prof Lorna Holtman for your input and assistance in proofreading this work.

I wish to also thank my parents, Mr Silas and Mrs Rita Obioha, for their continuous encouragement and prayers throughout this research journey.

My family, especially my siblings – thank you for your understanding throughout this period even when I do not respond quickly to your messages.

Steve and Reuben – you are the best colleagues anyone could ever ask for.

My former students from AFDA now turned into professionals, who assisted in one way or the other, I really appreciate you all.

A special thank you to Afrika Tikkun at Mfuleni and the alumni who took the time to participate in this study.

DEDICATION

To my favourite and personal person, onye nke m, my wife Juliet

and

My kids – Akachi and Munachi

Thank you for sticking it out with me

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GLOSSARY

Terms/Abbreviations	Definition/Explanation
4IR	Fourth Industrial Revolution
Community	In this study, the focus of 'community' is on urban marginalised geographic communities (in localised spatial communities).
Community informatics	CI is an interdisciplinary discipline that focuses on community contexts toward the effective use, design, and possible consequences of digital technologies for community development
Constructivism theory	The theory posits that the construct of new knowledge and skills by individuals are formed by the interaction of the internalised ideas from the individual previous experience and the information around the environment of the individual.
Digital divide	A term used to categorise communities with inequalities in accessing information and communication technologies (ICTs)
DWYPD	Department of Women, Youth and Persons with Disability
Employment	In this study, refers to employment in an established business entity or self-employment (entrepreneurs)
Enskilment	A term Ingold (2000) uses to describe the process of skilling individuals that affords participants as skilled practitioners rather than mere consumers of a system or product.
Gameful design	The use of game design elements to achieve a psychological state that is goal-oriented (gameful experience) in order to increase users' engagement, motivation, and participation in a non-game context.
GD4D	Gameful Design for Development
ICT4D 3.0	Viewed as the third version of information and communication technology for development (ICT4D) and in this study, it is geared towards digital-for-development (D4D).
ISPs	Internet Service Providers
Marginalised urban communities	This term is used to refer to communities in urban areas that are historically racially segregated and still underdeveloped due to the past apartheid era in South Africa. These communities are often referred to as 'townships' or 'locations'.
MDA	Mechanics, Dynamics, and Aesthetics
NDP	National Development Plan
NQF	National Qualifications Framework
NYP	National Youth Policy
QCTO	Quality Council for Trades and Occupations

Skilled practitioners	The notion that skills are not transmitted to end-users but rather regrown in each end-user, integrated into their modus operandi as “developing human organism through training and experience in the performance of particular tasks” (Ingold, 2000:5).
Unemployed persons	In this study, includes those referred to as discouraged work-seekers – people without employment and available for work during a referenced period but “did not take active steps to find work or start a business during the last four weeks, provided that the main reason given for not seeking work was any of the following: no jobs available in the area; unable to find work requiring his/her skills; lost hope of finding any kind of work” (Stats SA, 2018:16).
Unskilled or low-skilled youths	In the context of this study, these are youths who do not possess digital and creative skills (termed as high skills) that could increase their chances of being employed in the digital economy of South Africa.
Youth	In the South African context, this is defined as young people between the age of 15 – 35.

CHAPTER ONE
INTRODUCTION

1.1 Overview

This chapter lays the background and argument for the research study. The chapter starts by introducing the research background and context, especially regarding the challenges that the youth (defined in South Africa as young persons aged between 15 – 35) in marginalised urban communities face in both gaining employment as well as acquiring skills relevant to the current digital era. This introductory chapter presents the motivation for equipping these youths with employable digital skills through the effective use of available technologies using gameful design. Gameful design in this study is described as the application of game elements in non-game context to achieve a psychological state that is goal-oriented (gameful experience) as a way to increase users' engagement, motivation, and participation.

This following sections of this chapter presents the research statement, the research question and sub-questions. Subsequently, the aim and objectives of the study are outlined. A summary of the research design and methodological considerations are outlined with the contribution of the research. Lastly, the chapter outlines the chapters of this thesis.

1.2 Background of the research

The continuous growth and the idea of globalisation through this current era of digitisation have brought about significant economic advantages, opportunities, and benefits (Magwentshu et al., 2019). The world has experienced digital transformations across different industries via the impact of the Fourth Industrial Revolution (4IR). Notwithstanding these incredible developments, the progress seen in the improvement of the speed of the internet and connectivity to the Web has not directly translated into the broader development of the lower socio-economic or marginalised communities in South Africa (Hootsuite, 2022). Within the context of this study, marginalised communities denote communities in urban areas that are historically racially segregated and still underdeveloped as a result of South Africa's apartheid era. These communities are often referred to as "townships" or "locations". The concept of the *digital divide*; refers to the idea of identifying and categorising communities with identified inequalities in accessing information and communication technologies (ICTs) (Castells, 2001; Wilson, 2006 and Bornman, 2016). The digital divide status of a community sometimes equates to the general state of unemployment of youths in these communities (VPUU, 2019; Mlaba, 2021).

Gurstein (2003:1), however, criticised the term digital divide to be a “marketing campaign for Internet service providers (ISPs)” to expand internet connectivity. Carlson and Isaacs (2018) say the term is “contested and outdated”. Carlson and Isaac proposed a new term ‘technological capital’ as a replacement. Gurstein (2003) in his view, argued that the emphasis should not just be on having access to ICT but also on the *“effective use”* of ICT which is drawn from community informatics (CI); making ICT a necessary tool for everyone in the digital economy. This perspective of community informatics is what I will both present and frame this thesis research within. I discuss in more detail the case for CI and the move towards ICT4D 3.0 in chapter 2, section 2.2.

In South Africa (SA), the economy has been under the same technological advancement pressures as the rest of the world. This in itself has also increased the demand for highly-skilled individuals, whereas a considerable number of the working-age population (especially the youth) are generally not skilled enough for these opportunities (Magwentshu et al., 2019). The proper context of this particular challenge in SA is historical. These trends reveal an increase in unemployment among individuals residing in marginalised communities who lack education, specifically a high school certificate, and digital skills, particularly after the apartheid era, from 1990 onwards (Leibbrandt et al., 2010; May 2010; Anderson, 2012; Mayombe & Lombard, 2016; De Lannoy et al., 2018).

The high skills shortage was in part caused by the South African economy’s shift towards a technology-led and high-productivity growth path between the late 1990s and the early 2000s that “was intended to stimulate investment in skills development and higher wages…” and occurred at the “same time as an increase in the still largely unskilled labour force and a shift away from labour-intensive agriculture” (Graham & Mlatsheni, 2015:51). This result was a decline in the need to hire unskilled labour and also resulted in fewer youths living in marginalised communities gaining opportunities for employment (Graham & Mlatsheni, 2015; Graham & De Lannoy, 2016).

The unemployment rate in South Africa was 34.9% in the third quarter of 2021 (Stats SA, 2021). Statistics SA (the SA National Statistics Service) indicated that this rate increased to 46.6% (if the expanded definition of the unemployed is considered). This extended definition includes discouraged work-seekers (people without employment who did not take active steps to find work during the last four weeks). The term *unemployed* used in this study includes discouraged work-seekers. Young people aged 15 – 34 years make up 46.3% of the unemployed population in the country (Stats

SA, 2021). In other words, almost one out of two youths in SA is unemployed. One of the many factors noted as contributing to an individual's unemployment status is an individual's skills and educational level (Graham & De Lannoy, 2016; Magwentshu et al., 2019; NYP, 2020; StatsSA, 2021). Many unemployed individuals are young people living in marginalised communities who find it difficult to gain employment since they are primarily unskilled or low-skilled (Leibbrandt et al., 2010; Graham & Mlatsheni, 2015; De Lannoy, Leibbrandt & Frame, 2015).

While the above statistics demand an intervention, Magwentshu and colleagues (2019) at McKinsey noted that with the introduction of digitisation, SA has the potential to create an additional 1.2 million jobs by 2030 within this technological advancement era. However, these jobs would require high digital, technical and creative skills (Magwentshu et al., 2019; Maule, 2019; VPUU, 2019). Presently and in the Future of Work, youth will have to be better prepared for new jobs that require highly skilled labour. Most youths who are in the low or un-skilled category are mostly from marginalised communities; many of whom are in urban cities and are called townships or locations (Leibbrandt et al., 2010; May 2010). These communities have seen consistent population growth due to migration from rural to urban areas, thus increasing the number of unemployed people in cities (Leibbrandt et al., 2010; Mayombe & Lombard, 2016). Many opportunities in urban regions require individuals with a high skills level, whereas migrants are typically unskilled and cannot fill this category of labour demand (Lam, Leibbrandt & Mlatsheni, 2008; Burns, Edwards & Pauw, 2010; Yu, 2013; Graham & De Lannoy, 2016; NYP, 2020). Most of those who migrate to cities in search of opportunities are young people (between the ages of 15-34 years old) (De Lannoy et al., 2018). The National Youth Policy (NYP) for 2020-2030 states that this situation has "reached crisis proportions in South Africa" and is a significant challenge facing the country (NYP, 2020:13). Hence, the need to focus on upskilling the youths living in marginalised urban communities. For a more detailed discussion on this subject, see chapter two, section 2.2.2.

Graham and Mlatsheni (2015) argue that skills development interventions can enhance youth groups' employability; being skills and characteristics that make individuals more employable in an industry. This thesis also subscribes to Graham and Mlatsheni's (ibid) suggestion that the focus of research should be on unskilled youths with less than a matric (high school) qualification, as they contribute to a higher unemployment rate when compared to the absorption rate of employment among post-secondary qualifications. The suggestion is in line with the National Planning

Commission's (National Planning Commission, 2012) recommendations to find ways to improve skills, especially for young adults in poor communities.

While it is established that South Africa needs to focus more on developing highly skilled youths for its economy; engaging and motivating these youths can be challenging (Glover, 2013), especially if they find the purpose unclear. In addition, using digital technologies to train for highly technical skills can further add to this challenge if youths find it non-engaging (ibid). According to Glover, learning is an active process requiring engagement to start, remain motivated and be engaged to complete the learning process. In this context, gameful design was introduced to increase interaction with digital interfaces, improve user experience, create engagement and motivation, and increase user satisfaction with a service or product (Deterding, Sicart, et al., 2011; Botha, Herselman & Ford, 2014). This study proposes that gameful design can motivate and engage youths and bring about a significant change in behaviour toward learning skills, as seen in other environments (Huotari & Hamari, 2012; Botha, Herselman & Ford, 2014).

Most studies on gameful design in learning focus on formal education, institutions of learning or teachers within formal education (see Lee & Hammer, 2011; Simões et al., 2013; Botha, Herselman & Ford, 2014; Adukaite et al., 2017; Mårell-Olsson, 2021). However, there is a dearth of studies and therefore a knowledge gap on how gameful design can be used to engage and train youths for skills in a non-formal education context in marginalised communities. This is especially relevant to developing countries. Therefore, it is important to understand what gameful design elements designers can use to engage and motivate youths in marginalised communities to learn skills. As Nacke and Deterding (2017) noted, studies should address how gameful design can be applied in various areas. Schöbel and colleagues (2017) further assert that designers should not force game elements on systems but rather allow them to unfold from a given context being studied.

Ingold argues that for technologies used for skills development, the goal is to design these technologies for communities as tools rather than machines (Ingold, 2001; Kilbourn, 2006). To do this, the users of these technologies have to be viewed as 'skilled practitioners' whose contexts are considered and not just passive users of an adopted technology (Ingold, 2000; Gunn & Donovan, 2012). Therefore, using the adopted theory, namely, constructivism (see chapter 2, section 2.2.3 for more details), this study considers understanding these insights from the perspective of the youth group discussed above. To design a gameful learning platform that can be effectively

used by youths in marginalised urban communities, it is essential to consider four key components. These are in alignment with the adopted theory. They are, 1) the youths' previous experience, 2) factors surrounding them such as social, environmental and technical factors, 3) motivation and engagement to learn, and 4) the means of facilitation (Hein, 1991; Woo & Reeves, 2007; Amineh & Asl, 2015; Anderson, 2016). Consequently, this study uses these components to frame the research objectives and sub-questions.

1.3 Research problem statement

Many youths living in marginalised urban communities are either unskilled or low-skilled in terms of gaining employment in an economy which is increasingly becoming digitised and requiring high-skilled individuals. The 4IR further exacerbates the future of work for these youths if they remain unskilled. Training with digital technologies is becoming the norm but engaging and motivating youth to learn skills is challenging. Gameful design, when effectively used, can create engagement and motivation. However, there is little or no body of knowledge on how gameful design can be used to engage and train youths for skills in a non-formal education context in marginalised communities, especially in developing countries. Furthermore, to design a system that is for the 'effective use' by the youth group, there is a need to understand the complexities surrounding these youths within their context.

Thus, the study explores the following questions and sub-questions in the next section.

1.4 Research question and sub-questions

1.4.1 Research question

What are the social, environmental and technical considerations to design a gameful designed system for youths living in marginalised urban communities to mitigate the challenges of skills acquisition and unemployment?

1.4.2 Sub-questions

1. What are the complexities and contributing factors (social, environmental, cultural, and technical) to consider for designing meaningful experiences for these youths?
2. What gameful design elements can be identified and adapted from the youths' lived experiences?
3. How can the identified elements be incorporated and used in a gameful designed system?

1.5 Research aim and objectives

1.5.1 Aim

The central aim of this study was to explore the considerations (social, economic and technical) needed to design a gameful designed system for youths in marginalised urban communities in South Africa to motivate and engage them to acquire skills. The intent was to mitigate the challenges of skills acquisition for opportunities in the digital era as well as to promote achieving the national development plan goal for 2030 in youths' skills development and employment.

1.5.2 Objectives

The following objectives were set to achieve the research aim:

- Understand the social context and complexity of the social issue to design (for) meaningful experiences.
- Identify gameful design elements that will be incorporated and utilised to promote motivation for skills acquisition and development within the social context of the community.
- Understand how best to incorporate these elements to achieve motivation, engagement and participation of the youth in the gameful designed system.
- Identify the appropriate technological platform(s) for use by the youths.

Table 1 summarises the research questions, research objectives and the methods used during the research.

Table 1: Summary of the research questions, methods and objectives

Research question	What are the social, environmental and technical considerations to design a gameful designed system for

	youths living in marginalised urban communities to mitigate the challenges of skills acquisition and unemployment?	
Research sub-questions	**Research method(s)**	**Objectives**
1. What are the complexities and contributing factors (social, environmental, cultural, and technical) to consider for designing meaningful experiences for these youths?	Focus group workshops and literature review	Understand the social context and complexity of the social issue to design (for) meaningful experiences.
2. What gameful design elements can be identified and adapted from the youths' lived experiences?	Focus group workshops and participants self-reflection	Identify gameful design elements that will be incorporated and utilised to promote motivation for skills acquisition and development within the social context of the community.
3. How can the identified elements be incorporated and used in a gameful designed system?	Focus group workshops	Understand how best to incorporate these elements to achieve motivation, engagement and participation of the youth in the gameful designed system. Identify the appropriate technological platform(s) for use by the youths.

1.6 Research design and methodology considerations

Research design is the detailed plan of how the research project would be conducted, including the data collection and analysis (Bhattacherjee, 2012; Manheim, 1977). It is the "conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data" (Kothari, 2004:31). Research methodology is the aspect of research that evaluates and depicts the thinking behind research procedures, methods and tools employed to investigate the research questions and thus, achieving the aim of the study (Welman, Kruger & Mitchell, 2005). Kothari (2004) further notes that in research methodology, context of the research should be considered and the researcher should use methods (logically) that best fit the described context.

This study aimed to explore the considerations (social, economic and technological) needed to conceptualise a gameful-designed system for youths in marginalised communities in South Africa, to motivate and engage them to acquire the required

skills to mitigate the challenges of skills acquisition and the associated development needed for employment. The study called for a more extensive understanding of the youth group and their experiences, perceptions, and social contexts. Furthermore, it examined how the latter considerations could help create a more transformative, community-based innovative and engaging technology for employable skills using gameful design. The summary of this study's research design and methodology considerations are discussed below. Chapter three has further details on the research design and methodology.

1.6.1 Research philosophy (paradigm)

The study is based on subjectivist ontological assumptions in line with the research aim and the research question. The ontological part of research looks at the nature of reality, how the researcher sees the nature of reality, and the researcher's assumptions of the nature of reality (Guba & Lincoln, 1994; Göktürk, 2005; Saunders, Lewis, & Thornhill, 2009; Bhattacherjee, 2012). Saunders, Lewis, and Thornhill (2009) highlight ontology as either subjectivism or objectivism. Social constructionism or constructivism is often associated with subjectivism (Flick, 2009; Saunders, Lewis, & Thornhill, 2009). There are three fundamental considerations Creswell (2009) alludes to in determining the research approach choice, namely the researcher's personal experiences, the problem presented by the research and the people for whom the thesis will be written.

The premise of epistemology is to know the nature of the connection between the units of observation (or analysis) and what is to be studied (Guba & Lincoln, 1994). It is how the researcher comes to know the nature of reality (Saunders, Lewis, & Thornhill, 2009). The epistemological assumptions of interpretivism were adopted to understand the nature of the context being studied. The interpretivist philosophy enabled the researcher to "explore the subjective meanings motivating the actions of social actors (youths living in marginalised urban communities) for the researcher to be able to understand these actions" (Saunders, Lewis, & Thornhill, 2009:111) and be in a position to interpret it. It is based on the premise that social reality is shaped by the social context and experience and as such should be studied within its context by "reconciling the subjective interpretations for its various participants" (Bhattacherjee, 2012:103).

1.6.2 Research Approach and Strategy

With the above philosophical underpinning considered, the researcher followed an inductive approach; as the nature of the research is of the interpretivist philosophy. By following an inductive approach, researchers develop hypothetical and theoretical

concepts and patterns from analysis to data collected from participants. The inductive approach is described by Saunders, Lewis and Thornhill (2009:126) as an approach "to get a feel of what is going on, to understand better the nature of the problem". The adoption of an inductive approach for this study thus facilitates the need for qualitative research (Creswell, 2009).

The goal of qualitative research is to gain an extensive insight of a phenomenon through observation and interpretation of meanings in context. This research method provides contextual information and gives rich insight with meaning and purpose into the phenomenon being studied (Guba & Lincoln, 1994). This study relied on the view of the participants on the phenomenon being studied using generic and broad questions to facilitate communication for a 'constructive meaning' (Creswell, 2009).

The research strategy choice is guided by the research aim and the research question, the unit of observation/analysis, the philosophical underpinnings, the amount of time and other resources available, as well as the level of current knowledge (Saunders, Lewis, & Thornhill, 2009; Bhattacherjee, 2012). Identified strategies linked with qualitative research include phenomenological research, case studies, grounded theory, narrative research, and ethnographies (Creswell, 2009). These strategies should not be considered mutually exclusive (Saunders, Lewis, & Thornhill, 2009). In this study, the youth group discussed above in South Africa is the unit of observation. The phenomenological research strategy was considered the best strategy to facilitate the study of the research problem to answer the research question, achieve the study's objectives and guide the methods used to collect data towards understanding the phenomenon. This includes using an ethnographic process in the data collection.

The research is focused on comprehending the social context of the research via the study of participants through extensive engagement, the developing of relationships and the patterns of meaning presented. By conducting this exploratory research, the intent is to assess the phenomenon, seek insights and understand the perception of the research participants towards achieving the desired outcome from the research findings.

Design anthropology (DA) was used as the research methodology to achieve a more transformative, bottom-up and innovative approach that will challenge the existing ideas of acquiring employable skills.

1.6.3 Research methodology

Research methodology is how the researcher will access and report what will be learnt from the reality of the research participants (Guba & Lincoln, 1994; Welman, Kruger & Mitchell, 2005). The research was conducted using processes that underpin design anthropology. Design anthropology is a collaborative methodology that combines research practices, methods and techniques from design and anthropology, which is aimed towards innovation and transformation (Gunn & Donovan, 2012; Otto & Smith, 2013; Prendiville, 2015; Ventura & Bichard, 2016, Drazin, 2021). It serves as a mediator between the designer and the user for social design (Ventura & Bichard, 2016).

The DA methodology process as shown in chapter three (Figure 13) was used in the study. This process consists of nine stages for conducting DA research. These stages should not be viewed as linear, but as iterative, evolving and concurrent processes that emerge throughout the research. In other words, the phases do not have to follow a particular order and will be iterative and could occur in parallel with each step of the process understood as a means towards compiling the end product.

Afrika Tikkun was identified as the gatekeeper (the mediator who provided access to this study's participants) for the youths at Mfuleni. Afrika Tikkun, a not-for-profit organisation (NPO), has as its focus unemployed youths-at-risk; to train them for ten months in preparation for the work environment (https://afrikatikkun.org/). The NPO served as the unit of analysis of this study while the unit of observation is unskilled and low-skilled unemployed youths. The youths identified were between the ages of 18-25 years.

Further to using the process above, the researcher used the biomatrix system theory with the participants, to explore the co-causing factors of unemployment and poverty (Dostal, Cloete & Járos, 2005). As unemployment and skill shortage are complex challenges, a tool to help break down this problem was needed; I chose the biomatrix system theory. The biomatrix theory posits that to solve a problem, the problem has to be dissolved first (broken down) into other factors that the problem interacts with. Problem dissolving is breaking down (reductionism) a problem into different pieces by doing systemic brainstorming to carefully understand how a problem interacts with other factors. See figure 17 and table 6 in chapter three for more details.

Data analysis was done concurrently during the process of data collection using various tools such as the Biomatrix Web and affinity diagrams during the workshops with the youths. These tools were used to analyse, organise and group the ideas from

the DA workshop activities into their meaningful, natural themes and relationships (Tague, 2005). After collecting the recorded data, further analysis was conducted using Atlas.ti. The analysis involved identifying similarities and connections between coded phrases and words and combining closely related ideas into themes.

1.7 Delineation

The scope of this study was restricted to Mfuleni, a marginalised urban community in Cape Town, Western Cape, South Africa. The researcher's physical proximity to the community was necessary to ensure the proper implementation of DA throughout the research. It was bounded within the context of the unemployed and unskilled or low-skilled youths living in Mfuleni, one of the marginalised urban communities in Cape Town, Western Cape, South Africa.

Furthermore, the research was done using a qualitative research design and an interpretivist approach using a small group of (ten) young people. However, while this may be the case, the number of participants fulfils the criteria for in-depth focus group activities with community members. This allowed for an iterative process with the same participants. See chapter three, section 3.4, for more details.

1.8 Ethical considerations

Permission to conduct this research was granted based on the research proposal submitted to the Research Committee of the Faculty of Informatics and Design (FID) at Cape Peninsula University of Technology (CPUT).

The ethical considerations comply with the ethical principles of FID and with general principles for scientific research such as obtaining appropriate individual consent and ensuring confidentiality in the use and storage of data.

Participation in this research was voluntary. Participants were informed that they had the right to refuse to answer any question that posed a threat to them and they have the right to remain anonymous. Participants were informed of their right to refuse to provide any sensitive data that may be requested. If any participant chooses to withdraw, all data gathered until the withdrawal time would be destroyed.

To protect the confidentiality of the participants, the researcher assured them that any information they shared would remain confidential. Personas and pseudonyms were used to protect their identities. The participants were informed of the aims and objectives of the study, and what would be required of them to make the project a

success. Additionally, they were made aware of their rights to participate and that they could withdraw from the study without any negative consequences.

1.9 Contribution of the research

The research adds to the body of knowledge of gameful design/gamification, design anthropology (DA) as a methodology as well as community informatics; especially within the context of youth unemployment in marginalised urban communities in South Africa. This research extends the work in which gameful design elements and combinations could be used to engage and motivate users (extending the work of Schöbel et al. (2017)) within their context and lived experiences. This thesis theoretically and practically contributes to the gameful design field in skills development for youths in marginalised communities.

Theoretically, the research contributes to a better understanding of the social context of low and unskilled unemployed youths in South Africa and provides an understanding of the complexities surrounding the youth from their lived experiences. In addition, the researcher has conceptually provided an understanding of the process of how to use gameful-designed systems to engage and motivate youths to learn employable skills with the potential of reducing unemployment and poverty. This is achieved by considering the gameful design elements identified previously.

Practically, it also provides a localised framework (and user flow) on how to incorporate game elements within the context of unemployed youths in South Africa. The finding from the study can lead to the conceptualised design of a gameful designed system for skills learning that designers and stakeholders can duplicate for skilling youth in South Africa. The results provide insights for gameful designers, development centres and policymakers involved with youth skills development and how they can incorporate the identified elements in a system.

Methodologically, the researcher presented the process of how to carry out research within DA and community informatics, with tools that engage the lived experiences of participants and for understanding complex and ‘wicked problems’.

1.10 Outline of the thesis

This thesis is divided into six chapters, which are outlined as follows:

Chapter 1 introduces and gives a brief background to the research problem. The challenge of youth unemployment in South Africa, especially regarding those youth living in marginalised communities as well as why skilling these youth is of importance

for the South African economy. The background notes why gameful design is needed to motivate and engage the youth to learn skills and why their context should be considered for designing a system for 'effective use'. This leads to the research problem statement, the aim and objectives of the study, and the research question and sub-questions. The research design and methodology used in the study are briefly explained. Furthermore, the ethical consideration and research contribution is highlighted.

Chapter 2 presents the literature review of the study. It focuses on the challenges faced by youth in marginalised urban communities in the digital era, with a particular emphasis on the digital divide and the perspectives of community informatics (CI) and digital-for-development (D4D). The review highlights the importance of considering the CI and D4D perspective for effective community-based innovation. The chapter also discusses the youth unemployment crisis and skills shortage in relation to the South African 2030 national goal and the Fourth Industrial Revolution (4IR). Additionally, the policies, plans, and programs implemented by government agencies and other stakeholders to address these challenges are reviewed. The theoretical perspective of the study follows and argues for the adopted theory used. This theory provides the framework for the considerations of the study and how best to study the phenomenon. Thus, the need for a methodological process such as design anthropology which is used in this study is justified.

To engage and motivate youth, gameful design is introduced. Here the definition from various authors is first presented and then the definition within this study. The researcher posits that a comprehensive definition of gameful design should encompass four components. Various gameful design elements, user types, and frameworks are reviewed leading to the HEXAD user-type framework. Furthermore, how gameful design has been put to use and the gap in understanding how to design for the youth group considered in this study, is examined.

Chapter 3 presents the research design and methodology of this study. The chapter provides detail on the research paradigm and the DA methodological process. Firstly, the researcher discusses the epistemology and ontology basis for the study and the research approach. Furthermore, the research methodology is elaborated on, reflecting on the research conducted with the youths (alumni) at Afrika Tikkun at Mfuleni and the systematic process followed to collect, analyse and interpret the data collected. The ethical considerations are also presented in this chapter.

Chapter 4 describes the process of analysing the data collected and the findings. The researcher outlines and describes factors that surround and affects the study youth group in South Africa. These insights are from their lived experiences and describe how complex solving the skilling and unemployment issue is. The twenty-five factors found are grouped into six themes: knowledge and use of technology, funding and capital, resources for upskilling, opportunities, training and education, as well as physiological and psychological issues. These were discussed to note the challenges the youth face and highlight the solutions and features the gameful system should have. Furthermore, the findings of the gameful elements that engage and motivate the youth to learn skills are further discussed. These elements and factors identified led to workshops on how to incorporate these findings to create a gameful designed system.

Chapter 5 presents the discussion of the study's findings by addressing the sub-questions, which collectively answer the main research question. The chapter begins by exploring the complexities and implications of the youth challenge in South Africa, particularly in relation to the future of work (2030 goal and 4IR). Several considerations that stakeholders should bear in mind while working towards a solution for this challenge were described. These considerations are linked to the gameful design elements, and I discuss how twenty-three gameful design elements and two physical elements can be incorporated into a gameful system. To do this, I use the MDA framework to identify the components that best fit each gameful element. Additionally, the chapter examines the user types identified through the HEXAD framework. The study also presents and discusses a user flow framework to facilitate the incorporation of these elements into the youth experience.

A user flow framework is depicted and discussed to understand how to incorporate these elements into the youth experience.

Chapter 6 contains the researcher's concluding thoughts, recommendations and proposed ideas for future research.

In summary, unemployed youths that are low or unskilled, particularly those in marginalised urban communities, continue to face challenges in finding employment. The research aimed to address this by exploring ways to engage and motivate these youths through gameful design, which takes into account their social context and integrates their experiences to meet their needs. To achieve this, the study used design anthropology as a methodology, which is consistent with the principles of

community informatics that require a deep understanding of the community for designing and developing technologies that fit their needs.

CHAPTER TWO
LITERATURE REVIEW

2.1 Overview

This chapter presents the theoretical justifications that the research aimed to attain, as highlighted in the preceding chapter. This review begins by examining the digital era and the recent industrial revolution. The current condition of unemployment among marginalised youth in urban areas of South Africa (SA), taking into account the context of the rapidly evolving digital era. This section outlines the wider challenges and prospects that accompany the digital age. Furthermore, the discourse advocates for an approach that emphasises the significance of digital-for-development (D4D) in comprehending the particular challenges of this era. The review argues for community-based research that focuses on achieving transformation, inclusion and sustainable use of technology rather than mere access to technology. The discussion moves on to highlight the background of the unemployment crisis in South Africa, especially for youths living in urban marginalised communities. This analysis also puts into perspective the skills mismatch the South African economy faces and how it could hinder achieving the National Development Plan for 2030 as well as youth preparedness for the economy in the digital era context. The chapter also discusses policies, plans and programmes currently in place to address the youth challenge of skills acquisition and their relation to unemployment. The review notes whether the current solutions to these problems are sufficient.

To understand this multifaceted phenomenon and determine how to equip marginalised youths with the necessary skills, the review deliberated on the theoretical framework that would facilitate exploration and comprehension of the societal challenges, as experienced by these young people in their communities, and that would enable the acquisition of digital skills. This led to the adoption of design anthropology as the most suitable methodology for the study. The chapter concludes by discussing the application of gameful design for engagement and motivation in learning, particularly for youths. Gameful design elements and frameworks in the extant literature were further outlined. Furthermore, this review motivates for exploring gameful design elements for acquiring employable skills, from the viewpoint of potential users, specifically urban youth in marginalised communities.

2.2 The digital era: a pathway to 4IR and chaos

The term ‘industrial revolution’ has been associated with the significant transitions experienced in industries, but with the introduction of the Internet and the World Wide

Web, and the use of digital devices, the unfolding digital era marked a transition from analogue and mechanical systems towards more digitised systems. At certain phases over time, different inventions and technologies have emerged and merged in complex ways, bringing about transformations in industries and societies. These phases have so far gone through four highlighted iterations of industrial revolutions – the first, second, third, and now the fourth.

The first industrial revolution was steered by the introduction of railways and steam engines, the development and use of fossil fuels, and mechanised production. The second phase of the industrial revolution was characterised by advancements in electricity production, electrical appliances, and communication technologies such as radio, television, and telegraph (Ajayi, Bagula & Maluleke, 2022). The digital era began during the third industrial revolution (3IR) or the 'digital revolution', around the late 1950s to 1970s, through the emergence of digital technologies and computers (Coldwell, 2019).

In recent years, the rapid development of technology and digital landscapes has led to the discussion of the Fourth Industrial Revolution (4IR). It is an era that is characterised by the extensive adoption of rapidly developing digital technologies and has revolutionised various aspects of society including how we communicate, learn, work, and lifestyle (Coldwell, 2019; Philbeck & Davis, 2019; Stavropoulos, Motti-Stefanidi & Griffiths, 2021; Ajayi, Bagula & Maluleke, 2022). The 4IR also referred to as the 'second coming' of the 'digital era' (Coldwell, 2019) or sometimes Industry 4.0 (Kagermann, Lukas & Wahlster, 2011; Ajayi, Bagula & Maluleke, 2022) is a paradigm shift that builds on the digital revolution of the third industrial revolution.

The concept of the fourth version of industry was introduced in 2011 by Kagermann, Lukas, and Wahlster who presented the 'Industry 4.0' initiative for Germany. Judging from their experiences in science, politics and business, they indicated how the industry in the next decade would undertake a paradigm shift based on digital technologies and connectivity to the Internet to create new business models. Notwithstanding, this notion of '4IR' became popular in 2016 when Klaus Schwab, the World Economic Forum (WEF) founder, introduced it (Schwab, 2018). The general school of thought is that the capability of digital technologies, combined with previous industrial revolutions, has enabled a new economic pathway and created a new phase in human development (WEF, 2023).

The increased speed of the Internet and the Web, have thus far contributed to elements of digital transformation affecting various industries, and individuals' livelihoods. With up to 62.5% (4.95 billion) of the world's population (up to 8 billion) now connected to the Internet, and with the speed of the Internet continuously improving (Hootsuite, 2022), both the notion and the achievement of "global village" (globalisation) is not purely fiction. This era of digital convergence is characterised by innovation and technology, including artificial intelligence (and machine learning), big data and analytics, Internet of things (IoT), 3D printing, cloud computing, blockchain technology, advanced robotics, self-driving cars, as well as Nano-technology (Ajayi, Bagula & Maluleke, 2022). Cumulatively these advances are some of the essential building blocks for the 4IR but with dependencies on technologies that shaped the third industrial revolution. These innovations and improved technologies have stimulated efficiency in our means of communication, growth in the global economy, production of goods and services as well as in the teaching and learning space.

Despite some authors placing the focus and defining 4IR on technological advancements and emerging technologies (Coldwell, 2019; Ajayi, Bagula & Maluleke, 2022), 4IR is not simply a series of incremental advancements in technologies (Philbeck & Davis, 2019; Schwab, 2018). It is also a shift that disrupts how economies, organisations and people create, exchange and distribute value (Schwab, 2018). This disruption is merging the digital world with the physical, social, cognitive, and biological worlds (WEF, 2023). The focus on the digital world and the technologies that drive the revolution can sometimes negate the focus on other worlds including the human factor.

Nowadays, it is not surprising to see the embedding of technologies in the physical and biological worlds including the emotional and cognitive areas of life. It is important to understand how emerging technologies have formed part of every area of life beyond transmitting, processing, and storing data (Philbeck & Davis, 2019). For instance, the advancement of robotics and machine learning in the physical world have improved manufacturing and logistics in industries but at the same time reduced the need to employ people, thereby creating a social problem that affects the employment of people.

The disruption 4IR brings creates opportunities, but at the same time, this disruption is entropic and chaotic, consequently creating challenges (Schwab, 2018; Coldwell, 2019; WEF, 2023). Thus, this compels us to reengage our thought process on how to harness the opportunities of 4IR while finding ways to mitigate the challenges it brings.

Finding the right balance that is sustainable, inclusive, and future-proof can positively impact individuals, their families, communities, organisations, and economies.

As with previous industrial revolutions, the emergence of the Fourth Industrial Revolution implies that some communities and countries will experience more challenges or struggle to adapt to this change than others (Schwab, 2018). The following sub-sections will focus on these challenges and how they impact developing countries such as South Africa.

2.2.1 The perils of the digital age and Digital for Development (D4D)

As indicated above, the digital age is presenting numerous unfolding challenges that need to be addressed. Therefore, it is imperative to understand some of these challenges and how they impact individuals, communities, organisations and economies, especially in developing countries. Understanding these challenges, by looking beyond the technologies, could help find ways to sustain the promises of digitisation while having a positive impact on people and communities (WEF, 2023). Digitisation challenges can be viewed from social (Stavropoulos, Motti-Stefanidi & Griffiths, 2021), economic (Schwab, 2018; Philbeck & Davis, 2019; WEF, 2023), organisational (Coldwell, 2019), and political (Philbeck & Davis, 2019) perspectives. These challenges are complex and require thoughtful consideration in addressing them.

Although the technologies that make digitisation possible have been welcomed by many, there is also resistance due to the negative effects these challenges pose socially, economically, organisationally, and politically. These challenges are intertwined regardless of how they are categorised. For instance, the economic challenge (of the cost) of adopting a new business model through automation also means the loss of jobs of people which is a social problem. Likewise, politically, there are still unclear laws and policies that will guide the process of the threat of digitisation, which may lead to entropic workplace behaviour and outcomes (Coldwell, 2019).

The emergence of the digital era (which I would term a chaotic and entropic revolution) creates new challenges that include privacy and security concerns, loss of jobs and unemployment, an unlevelled playing field for businesses, and a lack of skills for digital opportunities. The discussion of 4IR in developing countries often focuses on social and economic problems (Schwab, 2018; Stavropoulos, Motti-Stefanidi & Griffiths, 2021), thus this review will follow suit. The discussion will be from the social and economic perspective while keeping in mind that this aspect is intertwined with the

political and organisational aspects. For instance, in South Africa, Magwentshu and colleagues (2019) at McKinsey reported that between now and 2030 the 4IR drive could lead to a displacement of up to 3.3 million existing jobs. The most affected sectors will be manufacturing and retail; leading to a greater level of automation with artificial intelligence (AI) aspects and the displacement of manual labour and individuals with low skill levels. These jobs when automated can be performed with more precision, efficiency and at a faster and cheaper rate (VPUU, 2019).

The challenges posed by the digital era are observable in all countries but are more pronounced in developing countries (Schwab, 2018). With many developing countries still adjusting to meet up with the challenges of the previous industrial iterations (2IR and 3IR), this means that the digital advancement of economies will only perpetuate the already existing digital and developmental divides being experienced. This includes the challenge of the digital divide experienced by poorer or marginalised communities; which in turn causes a higher level of inequality and unemployment for those not equipped with the skills for this era (Bornman, 2016; VPUU, 2019). The digital divide – a term which emerged in the 1990s – can be summarised as the inequalities associated with accessing and utilising information and communication technologies (ICTs) (Castells, 2001; Wilson, 2006; Bornman, 2016), with Wilson (2006) including the disparities in their distribution.

While some authors (Lediga & Fombad, 2018; Krönke, 2020; Cariolle, 2021) and organisations such as the World Bank still use the term digital divide, some authors have criticised the term for being a “marketing campaign for Internet service providers (ISPs)” to expand Internet connectivity (Gurstein, 2003:1) and say the term is “contested and outdated” (Carlson & Isaacs, 2018). Carlson and Isaac instead proposed a new term, namely, ‘technological capital’, as a replacement and recommended that ICT be assessed from the perspective of an individual’s accrued history with ICT. This assessment is done by considering four factors, namely, the individual’s awareness of ICT, their knowledge of ICT, their access to ICT, and the individual’s technological capacity. Gurstein (2003) in his view, argued that the focus should not just be on access to ICT but also on the “effective use” of ICT which is drawn from community informatics (CI) – making ICT a necessary tool for everyone in the digital economy. Whatever the term being used, these views can be construed to argue that an effective and efficient way to deal with the perils that come with the digital age would be to place more emphasis on empowering communities that are struggling to trigger the benefits of digitisation.

In proposing a more multifaceted view of the digital divide and the inequalities associated with it, Van Dijk and Hacker (2003) argued that four barriers could create digital inequalities. Firstly, “mental access”, which is the lack of rudimentary digital experience caused by the unappealing impression of new technologies, lack of interest in digital technologies, and/or having digital anxiety. Secondly, “skill access”; is the lack of access to digital skills. Thirdly, “material access”; is the lack of access to digital technologies and infrastructure. Lastly, “ICT usage”; is the lack of use or the opportunity to use digital technology. However, most discourses centre on the third barrier –the lack of access to digital technologies and infrastructures (Bornman, 2016). As Bornman (2016) rightly argues, the skill access barrier and the mental access barrier are often neglected while the digital divide of access and use of ICT is reducing.

Although there have been efforts (theoretically and practically) to curb the challenges associated with terms such as digital divide, and information and communication technology for development (ICT4D 0.0 to its current form of 3.0) (Heeks, 2008; Bon & Akkermans, 2014; Heeks, 2020a), the hope of bridging this gap to be more inclusive can be eluding in nature. Clement and Shade posit that for any community to be empowered through digital technologies, key decision-makers and policymakers have to address three questions 1. Access to what digital technology products and services, 2. Access for what purpose and 3. Access for whom? (Clement & Shade, 2000). These questions shift the perspective from simply having access to digital technologies to how these technologies can be used to serve their purpose for those who are empowered to use them. In other words, what good is access to digital technologies if individuals and communities are not empowered to use these technologies for their development?

However, there is a paradigm shift in how digitalisation is changing the focus of development and geographical terminology from “international development” to “global development” (Horner & Hulme, 2019). This paradigm shift emphasises an opportunity to change the terminology “ICT” to “digital”, which Heeks (2020a) suggests this paradigm should be referred to as “digital-for-development”. This debate for digital-for-development (D4D) centres on the understanding that development is currently based on the Sustainable Development Goals (SDGs) with three key themes – transformation, sustainability, and inclusion, while previous ICT4D versions of 1.0 and 2.0 were mostly shaped by the Millennium Development Goals (MDGs) which came to an end in 2015 (Heeks, 2020a). The MDGs were primarily focused on ‘developing’ countries while the SDGs focuses on all countries in the global North and global South,

thus creating new geographies of 21st-century development (Horner & Hulme, 2019). Without a doubt, the binary of North and South countries is dissolving in favour of divergence within nations but at the same time enabling the convergence of countries through the diffusion of knowledge and the emerging global value chains enabled by digital technologies (Horner & Hulme, 2019; Heeks, 2020a).

The convergence of countries through the diffusion of knowledge means that developing countries are forced to keep up with the emerging global value chain. The complexity of this entropic and chaotic nature of digitisation and the convergence of countries implies that D4D focuses on a broader spectrum of development, although its patterns and logics are still emerging (Heeks, 2020b). Thus, in this thesis, I will not try to unpack these patterns and logics but look at it from the perspective of how digital inclusion has led to inequalities in less advantaged groups and how best to deal with adverse digital incorporation within these groups' communities (Heeks, 2022). The aim would be to encourage and facilitate these communities to use digital innovations and technologies to their advantage.

The underlying need for digital inclusion, community transformation and sustainability goes beyond access to ICT or the digital divide (Gurstein, 2003; Heeks, 2022). As D4D consider communities from a global development standpoint, our focus shifts more to a macro-level rather than to a micro-level (Heeks, 2020b). In other words, it is not just about dealing with the challenge of individuals having access to, use and be skilled in digital technologies but also the consideration of how the national-level economics affects these individuals. The digital economy has created a complex situation where many jobs are being created but on the other hand, the production gains from automation have created unemployment through the reduction of labour (Heeks, 2020b; Stavropoulos, Motti-Stefanidi & Griffiths, 2021). This is the situation many youths face in marginalised communities in South Africa. These challenges are historical and similar to other developing countries, which are still faced with the challenges of post-colonisation, post-apartheid and now capitalism.

In the following sections, we will examine what it means to be marginalised in the South African context with a focus on youths living in marginalised communities in urban cities.

2.2.2 The marginalised SA urban youth context in the digital era

The Being marginalised is a complex phenomenon that no single definition can adequately describe its multi-dimensional characteristics. Marginalisation as a term

has to be contextualised and examined from experience. As Mowat (2015) argues to understand the concept of marginalisation, it is central to ask 'what it means to be marginalised' and secondly 'marginalised from what?' These questions provide the legitimacy of the question of who is marginalised and why. Marginalisation is often discussed with issues relating to social exclusion to bring about inclusivity to whatever issue is being discussed. This could be in terms of education and learning barriers (Messiou, 2012; Mowat, 2015), exclusion in human capital (Obeng-Odoom, 2019), equal opportunities and social justice (Etim & Iwu, 2019) or other forms of marginalisation.

Marginalisation takes multiple forms that may not always be obvious to the observer and sometimes to the individual/group (Messiou, 2012). In addition, it is not just a state of being socially excluded but also the feeling of the individual in that state (Messiou, 2012; Mowat, 2015). Messiou's assertions make a distinction between conceptualising marginalisation by experience (interpreted by the individual/group) and by recognition (by the individual/group and the observer). Let's look at this with a more simplistic example and context. If a person from a poor community changes their perception of not seeing themselves as being marginalised, should they still be viewed as being marginalised because they are poor or from a poor community? Or does being poor equate to being marginalised? Does that also mean that someone who has financial comfort cannot be marginalised? Thus, this raises the question of whose perspective can marginalisation be looked at from, from the individual or external entities.

This dilemma can be mediated by the "extent to which there is congruence between" what is valued by the individual and what is valued by the society (Mowat, 2015:467). In other words, marginalisation can be established when it is viewed as the same from the individual's experience and recognised by society, viewed from the individual experience only, and/or only recognised by society. It is thus preferable to define marginalisation within a certain context but with an ideal set of expected values, aspirations and norms (Bottrell, 2007). Individuals or groups of persons who do not meet these ideals can be deemed marginalised. Notwithstanding, there is also the ethical or moral ground of not denying historical events such as what happened in South Africa. The historical context in South Africa (SA) is seen engraved in various aspects of life including education, health, and job opportunities among others. In this regard, I will briefly describe the context of the marginalised urban youths in this digital age.

First of all, it is important to note that South Africa's definition of youth differs from the United Nations (UN) definition. According to the UN, youth refers to individuals aged 15-24, whereas in South Africa, youth encompasses those aged 14-35 (Gwija, Eresia-Eke & Iwu, 2014). The National Youth Commission (NYC) ACT of 1996 in defence of having the 'youth' age group extended states that:

> *To create a united, non-racial, non-sexist and prosperous society, in which the youth of South Africa shall promote national reconciliation and unity, build a new patriotism and foster peace, justice and a human rights culture. …South Africa recognises the role that youth played (in the struggle against apartheid) and will still play in society, and since the youth in South Africa constitutes an energetic, creative and the largest sector of our population, and given the challenges this sector faced and continues to face. …it is necessary to redress the imbalances of the past and to create a national youth policy aimed at empowering the youth and allowing them to realise their full potential through optimal access to opportunities* (NYC, 1996:1).

To 'redress the imbalances' of the past, the South African State devised the term 'youth development' (DPME, 2014) and drafted the national youth policy 2020-2030. In line with the definition of youth in SA, this thesis would refer to youth or young people as those aged 14-35 living in SA.

As with any other economy worldwide, the South African economy is transitioning towards a more technologically-oriented industry, leading to a higher demand for 21st-century skills, particularly digital skills (high skills), as opposed to labour-intensive skills (low skills) (Magwentshu et al., 2019; OECD, 2019). While this is not inherently negative, the inequality experienced by a significant portion of the population in the country means that many individuals lack the necessary digital skills for new employment opportunities, adequate internet access, proper education (at least a high school certificate), and technological advancements and innovations (VPUU, 2019). In SA where an individual resides, his/her level of education, and whether he/she has any previous work experience have a considerable impact on the possibility of the youth gaining employment (Yu, 2013). Although some low-socioeconomic communities are in rural areas, there are many of these marginalised communities in urban cities (Leibbrandt et al., 2010; May, 2010).

According to the World Bank (2022), inequality in SA remains among the most severe and persistent in the world. This inequality is historical and comes from the previous

apartheid regime where groups of people especially those living in urban areas were forcefully removed from their homes and placed in secluded areas/communities (called Townships or Locations) (Graham & Mlatsheni, 2015; Ismail & Kollamparambil, 2015; Mayombe & Lombard, 2016). These Townships/Locations were formed as a consequence of apartheid's spatial planning, which entailed creating hostel-style accommodations on the outskirts of urban cities for specific racial groups intended to provide cheap labour (Leibbrandt et al., 2010). Accordingly, trends to date show that those with low skills and less educated are mostly from these marginalised communities (Leibbrandt et al., 2010; Yu, 2013; De Lannoy, Leibbrandt & Frame, 2015; Graham & Mlatsheni, 2015; Ismail & Kollamparambil, 2015; Mayombe & Lombard, 2016), thus increasing their unemployment rate post-apartheid (Leibbrandt et al., 2010; May, 2010; Anderson, 2012; Mayombe & Lombard, 2016).

The high skills shortage partly caused by the South African economy's shift towards a technology-led and high-productivity growth path due to the digital revolution between the late 1990s and the early 2000s "was intended to stimulate investment in skills development and higher wages…" occurred at the "same time as an increase in the still largely unskilled labour force and a shift away from labour-intensive agriculture" (Graham & Mlatsheni, 2015:51). This result was a decline in the need to hire low skilled labour and also resulted in fewer youths living in these marginalised communities gaining employment opportunities (Graham & Mlatsheni, 2015; Graham & De Lannoy, 2016). To date, this has remained a challenge both theoretically and practically of how best to deal with the skills issue to optimise job opportunities.

The Department of Women, Youth and Persons with Disability (DWYPD) acknowledges that the lack of access to quality (and higher levels of) education and skills development opportunities has contributed significantly to youth unemployment and perpetuated inequality and poverty in marginalised communities (NYP, 2020). Many of these youth do not have the financial means to get educated or train for high-skilled jobs, consequently, this often results in them becoming trapped in poverty and unable to escape its grasp (May, 2010). Yu (2013) also emphasises that poverty is a major reason why young people struggle to keep up with their studies. Unfortunately, the lack of financial means also leads many of the youth to discontinue schooling early and hinders them from completing their secondary school education or even any form of post-secondary education, resulting in a high drop-out rate from grade 9 (Graham & De Lannoy, 2016; NYP, 2020). This leaves them disadvantaged and unemployable with few (or no) professional or technical skills (NYP, 2020). According to the National

Youth Policy (NYP), the young people living in these communities may still face challenges in securing jobs in low-skilled sectors as they lack the social capital to connect them to job opportunities. As a result, around 60% of the country's youth who do not have work experience may remain excluded from the economy (NYP, 2020).

With this, there is a huge disparity observed in the demand and supply of skills in the South African labour market exacerbated by these complex problems, which include numeracy and literacy skills at primary schools being below the international standard and the low pass rate of mathematics and science in grade 12 (De Lannoy et al., 2018; NYP, 2020). These challenges also impede growth in higher education, particularly in Science, Technology, Engineering and Innovation, and the potential skills development required for the digital era (Magwentshu et al., 2019; Maule, 2019).

Consequentially, to put this in numbers, while the rate of unemployment in South Africa was already challenging to deal with before the COVID-19 pandemic, the pandemic exacerbated this statistic up to 34.9% in the third quarter of 2021. According to Statistics South Africa (Stats SA), it is the highest unemployment rate recorded so far (Stats SA, 2021). Statistics South Africa (the South African National Statistics Service) states this figure is up to 46.6% if the expanded definition of the unemployed is considered. This extended definition includes those who are discouraged work-seekers – people without employment and available for work during a referenced period but did not take active steps to find work or start a business during the last four weeks, “provided that the main reason given for not seeking work was any of the following: no jobs available in the area; unable to find work requiring his/her skills; lost hope of finding any kind of work” (Stats SA, 2018:16). Accordingly, in this study I will also use the term unemployed to include discouraged work-seekers.

A lot of these unemployed people are young people without the right skills and educational level to find employment (Graham & De Lannoy, 2016; Magwentshu et al., 2019; NYP, 2020; Stats SA, 2021). It is important to note that young people aged 15 – 34 years make up 46.3% of the unemployed population in the country (Stats SA, 2021). In other words, almost one out of two youths in SA is unemployed. Many of the unemployed young people who live in these marginalised communities find it difficult to gain employment since they are primarily unskilled or low-skilled (Leibbrandt et al., 2010; Graham & Mlatsheni, 2015; De Lannoy, Leibbrandt & Frame, 2015).

In addition to the challenges outlined above, these communities have seen a consistent rise in population due to migration from rural areas to urban areas, thus,

increasing the number of unemployed people in urban cities (Leibbrandt et al., 2010; Mayombe & Lombard, 2016). Most of those who migrate to these cities in search of opportunities are young people (De Lannoy et al., 2018). This continuous increase in unemployment in urban cities is also fuelled by the fact as stated that the available opportunities require high-skilled individuals, and again, most of those who migrated are not able to fill the labour demand (Lam, Leibbrandt & Mlatsheni, 2008; Burns, Edwards & Pauw, 2010; Yu, 2013; Graham & Mlatsheni, 2015; NYP, 2020). Living in this less economically developed 'township' also makes it difficult for youths to find jobs, as these areas are far from the places where the jobs are located (Mlatsheni & Ranchhod, 2017; De Lannoy et al., 2018). The transportation network to the main part of the city in search of opportunities is often not reliable and/or affordable (Mlatsheni & Rospabe, 2002; De Lannoy et al., 2018). This often leads to discouragement and low motivation among the youth.

The marginalised youth unemployment numbers and lack of high skills according to the National Youth Policy (NYP) for 2020-2030 have "reached crisis proportions in South Africa" and are a major challenge facing the country (NYP, 2020). This challenge is still identified as one of the most persistent, social-economic challenges faced by the South African economy (Yu, 2013; Gwija, Eresia-Eke & Iwu, 2014; Graham & De Lannoy, 2016; Stats SA, 2021).

While the current state of these youths may look gloomy, this digital industrial paradigm changes and creates many new opportunities that youths in South Africa especially those in marginalised communities are yet to leverage partly due to the skilling, effective use, and access to digital technologies. Nevertheless, while digitisation, automation, and machine learning will lead to the displacement of certain jobs, they also could potentially create new jobs up to 4.5 million of them; leading to a net gain of an additional 1.2 million jobs (see Figure 1) (Magwentshu et al., 2019). While statistics such as this are based on probabilities and could turn out not to be 100 per cent correct, the projection is positive. This implies that for the youth to fill these jobs they must be prepared with higher skill levels to be able to access these new job opportunities which require highly skilled labour. Young people in South Africa must be prepared to adapt to this fast-paced industrial revolution with urgent digital skills training (Magwentshu et al., 2019; VPUU, 2019).

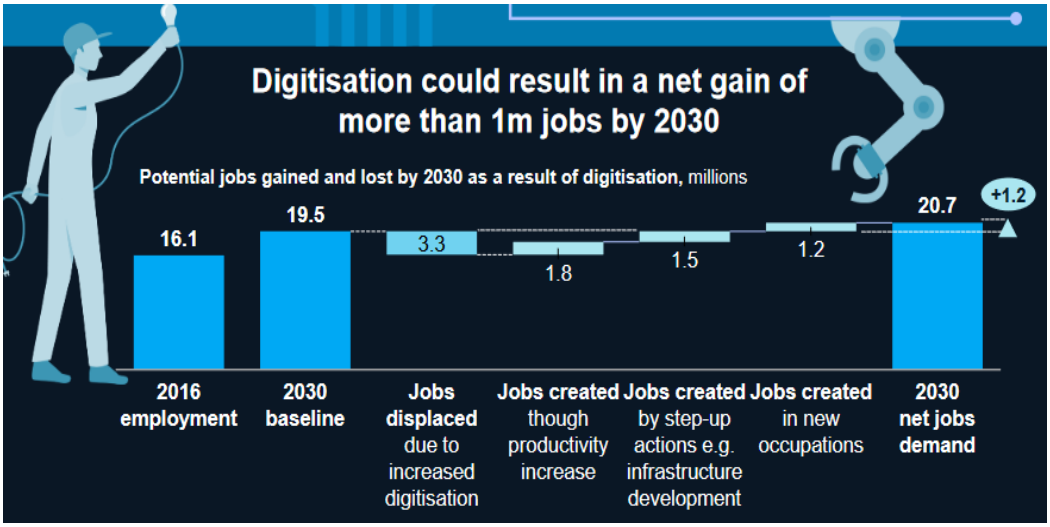


Figure 1: Possible net gain of up to 1.2m jobs by 2030 (Magwentshu et al. 2019:1)

Skills development is considered a plausible means for the youth to break free from poverty. This intervention Graham and Mlatsheni (2015) argue will enhance the youth employability – skills and characteristics that make young individuals more marketable in the industry. Additionally, Graham and Mlatsheni (2015) assert that the focus of research should be on unskilled youths with less than a matric (high school) qualification, as they amount to a higher unemployment rate when compared to the absorption rate of employment amongst post-secondary qualifications. The suggestion resonates with the National Planning Commission's (2012) recommendations to find ways to improve skills acquisition and development, especially for young adults in poor communities.

That said, the recognition of digital technologies to drive change in communities as the one discussed above means that the solution would not just be to dump technologies in these communities and 'force' them to adopt these technologies. It is important to consider developing digital skills among the youth and how they can use these skills to contribute to the global development of the digital era. A key step to doing this would be to consider an approach that drives community innovation – an innovation that occurs within and is concerned about the context of a community (Gurstein, 2013; Williams & Durrance, 2018). This innovation drives the capacity of local communities to respond to local challenges with adverse digital incorporation within these groups' communities (Heeks, 2022) with the aim of economic advancement (Gurstein, 2003). While access to digital technologies and ICT infrastructures is needed, providing access could be useless to economic development and wealth creation for communities if there is no link between access and economic development in

communities (Williams & Durrance, 2018). Equipping such marginalised communities allows for these communities to be able to produce and distribute, and not only to consume (Gurstein, 2003).

To achieve this, we can take a look at the Guistein (2003) adaptation of Clement and Shade's (2000) "Access Rainbow" as seven conditions to consider for equipping marginalised communities. These include:

1. The available infrastructural facilities accessible in the area have to be appropriate for the application being designed or the application is designed and developed in a way that allows for the use of the current accessible technical infrastructure in a community.
2. The input and output devices required for the designed application are usable and available by the target community.
3. The tools, software and peripherals needed are locally designed or are locally available.
4. The content is presented and described in the form, language, and appropriate literacy level of the target community.
5. The service provisions that are made available must be appropriate to the target population and their circumstances.
6. Provision for capacity development that is locally appropriate is included in the designed application for the application's successful implementation.
7. Finance and governance to allow for appropriate financing and legal/regulatory frameworks for the designed application.

This paradigm shifts the focus on community contexts toward the skilling for effective use, design, and possible consequences of digital technologies for community development (Gurstein, 2003, 2007; Huang, 2018; Williams & Durrance, 2018). Youth and community development practitioners have to also acknowledge that inequalities in less advantaged groups are multivocal and multifaceted (Carroll, Shih & Kropczynski, 2015; Parra et al., 2015; Heeks, 2022) with multiple and intersecting antecedents (Gurstein, 2007). In this regard, some key attributes D4D should have are the sustainable development of communities regarding digital technology usage and opportunities, social context and inclusiveness, and the effective use of digital technologies (Gurstein, 2003; Huang, 2018).

The promotion of community development should link community social and economic development with opportunities that are emerging (Pigg, 2005; Huang, 2018). For

instance, in the case of youths in these urban communities, these youths' skills have to be developed to be competitive for opportunities in the digital era and their development has to be enabled through tasks that are of shared values and goals within their context (Gurstein, 2013). In this context, every process including planning and design has to be cogitated with the community through participatory and co-designed methods (Saad-Sulonen & Horelli, 2010; Gregory, 2018). This approach should lead to what I would term a democratised community-based technological innovation (DCBTI) – that is an innovation "done by, with, and in the community and not simply something that is done 'to' or 'for' the community" (Gurstein, 2013: paragraph 11). That is to say, the community must have a sense of 'ownership' towards a product, service, innovation, or innovation strategy provided by being actively involved in the process.

The process should involve identifying these communities' goals where the community members are at the centre of the research. Thus, philosophies or methodologies such as the use of participatory design and design anthropology are used to bring about a 'style of knowing' of what to design for communities (Otto & Smith, 2013; Wasson, 2016). For proper community innovation, community members have to be placed as active participants in the design and development process (Gregory, 2018; Huang, 2018).

Before continuing the discussion on the theoretical stance of this thesis, it is necessary to examine efforts put in place as interventions to deal with the issue of youth unemployment and skilling them for the digital era.

2.2.3 Interventions for the 'chaos' revolution for youths in South Africa

In South Africa, efforts have been made to tackle the challenges caused by the current chaotic and entropic industrial revolution. With the ongoing challenges faced by the youth in the country post-apartheid, it is not immediately clear whether these initiatives offer a complete solution to the problems at hand. Nonetheless, policies, plans, and programmes have been created and designed specifically for the youth to tackle this social impasse. Although there is a consensus among the various organisations and agencies to address these challenges, the policies, plans, and programmes are not always implemented in the best way. Additionally, there are different methodologies used to deal with these challenges, which may lead to implementation issues that cause more challenges than solutions (De Lannoy et al., 2018).

To provide context, these challenges faced by the youth are significant and have garnered considerable attention from various sectors, including the government, private and public organisations, educational institutions, research groups, and individuals. Aside from policies like the National Youth Policy 2020-2030, the government has implemented several programmes aimed at promoting 'Economic Participation and Transformation' among young people. Some of these programmes listed are the Expanded Public Works Programme (EPWP); Youth Employment Service (YES); Community Works Programme (CWP); Employment Tax Incentive (ETI); National Rural Youth Service Corps (NARYSEC) (NYP, 2020). Others are National Youth Development Agency (NYDA) funded youth cooperatives and youth entrepreneurs, Jobs Fund, skills training (e.g., learnerships funded by SETAs), and National Youth Service Programme. These align with the South African 2030 National Development Plan (NDP) – to address unemployment among South African youth through skilling, education and development (NYP, 2020). I will provide a brief review of some of these interventions below.

The Department of Women, Youth and Persons with Disability drafted the National Youth Policy (NYP) 2020-2030 in line with the South African 2030 National Development Plan (NDP). This policy identifies seven ongoing challenges that young people face, including high rates of dropping out of school and difficulty transitioning to work, low levels of skills and skills mismatch, high rates of youth unemployment and low levels of entrepreneurial spirit, poor physical and mental health outcomes exacerbated by the COVID-19 pandemic, untapped potential in cultural and creative industries, eroding social connections and active citizenship, and inadequately resourced youth development and poorly coordinated services (NYP, 2020:2). Thus, the policy emphasises five priority areas to accelerate the development of South African youths. These areas are: Providing quality education, skills training and giving the youth second chances; Ensuring economic transformation, entrepreneurship and job creation; Increased physical and mental health promotion including COVID-19; Social cohesion and nation-building; and Effective and responsive youth development machinery.

Additionally, to improve the quality of education and develop skills, the NYP proposes monitoring compulsory quality Early Childhood Development (ECD) and early learning programmes for everyone, including braille and sign language. The policy also stresses the need to intensify skills that would prepare youth for 4IR. To prepare the youth, the curriculum would need a review to reflect a framework that would train for

skills such as problem-solving, entrepreneurship, digital skills (such as machine learning/artificial intelligence, robotics, nanotech, and biotechnology), and critical thinking. To do this would mean that there would be a drastic teacher development drive and make the teaching profession attractive to young people (NYP, 2020).

The NYP also suggested ways that would encourage youth entrepreneurship and job creation by removing barriers and creating opportunities. These ideas include supporting and developing youth-owned businesses, creating inclusive markets in townships and rural economies, increasing marginalised youth participation in the Expanded Public Works Programme and the Community Works Programme while earning income, and introducing basic incentives to unemployed youths. Furthermore, these proposals include implementing the 'Presidential Youth Employment Intervention' (PYEI) which consists of five priority actions over the next five years.

In the State of the Nation Address (SONA) 2020, the South African President acknowledging the youth challenge, introduced the Presidential Youth Employment Intervention stating:

> *The fact that the unemployment rate among young South Africans is more than 50% is a national crisis that demands urgent, innovative and coordinated solutions… It is therefore essential that we proceed without delay to implement a comprehensive plan-driven and coordinated by the Presidency – to create no fewer than two million new jobs for young people within the next decade. –* President Ramaphosa (Dicks, 2020)

The PYEI outlined five key areas of priority (see Figure 2) "1) Building a national Pathway Management Network; 2) Implementing agile, demand-led workforce development programmes; 3) Supporting the township and rural economy; 4) Providing opportunities for workplace experience; 5) Revitalising the National Youth Service" (Dicks, 2020:101).

Figure 2: Five priority actions for youth over five years (Dicks, 2020:101)

Dicks say the national Pathway Management Network should have these key features: Allow youth to view and access the available learning and work opportunities, receive work readiness training and a range of support services to navigate employment, funding, and other economic opportunities, and complete online assessments and support (online and in-person).

So far the PYEI two programmes – National Youth Service (NYS) programme, and National Pathway Management Network (NPMN) Innovation Fund – are currently in phase 3 at the time of writing (read more about the PYEI programme here: https://www.gov.za/speeches/pyei-23-jun-2022-0000).

There have also been extensive research conducted on the issue of youth unemployment, along with the various initiatives, plans, and policies aimed at addressing the problem. Despite these efforts, the challenge continues to worsen, as noted by Graham and Mlatsheni (2015) and Graham and De Lannoy (2016). De Lannoy et al. (2018) point out that one of the obstacles to this progress is the lack of collaboration among stakeholders, who often work independently in their silos. In other words, a harmonious solution is needed to integrate all youth plans and policies from various youth departments and organizations (public and private) to address the youth unemployment and skills challenge (De Lannoy et al., 2018; Dicks, 2020; NYP, 2020). The COVID-19 pandemic and the fast-paced digital era have further emphasised the need for these sustainable global development solutions to be online. As Bozalek et al. (2013) assert that utilising technology to address these issues is crucial in reducing unemployment. Such a solution should provide skill-building opportunities and financial assistance to young individuals from low and middle-income households, as well as those with lower academic capabilities (NYP, 2020). Yu (2013) further suggests that in addition to technical and professional skills, the absence of "soft" skills like emotional

intelligence, effective communication, and personal presentation can impede youth from attaining employment and should be considered.

Thanks to the Internet, in recent years there have been several universities, tech start-ups, governmental agencies, and even individuals designing and developing digital platforms for learning skills or upskilling. These digital platforms range from those developed by tech firms, such as Unity Learn, and Microsoft Academy, Udemy, Datacamp to universities' online learning platforms, and even universities' collaborations (Coursera and EDX) with tech firms. Most of these are generic and not designed for a specific group such as the youths in marginalised communities. Whilst these platforms are available, they are not immune from certain challenges. Even as generic skills learning platforms, there is still a very low completion rate of between 4 to 6 per cent (Lederman, 2019; Nishiyama, 2021). These completion rate numbers are decreasing rather than increasing, thereby making some of these platforms such as Coursera and EDX shift their focus more on "traditional roles of helping colleges take their academic programs online" (Lederman, 2019).

These digital platforms present opportunities for many to learn and upskill, especially for those in well-developed areas, but ignore the challenges youths in marginalised communities face due to economic, social, cultural, environmental or even technical factors surrounding them (Lederman, 2019). Therefore, if any impact is to be made on these communities, these challenges must be understood from a different perspective – the community perspective. A perspective where the requirements are understood from the lived experience of the youths living in these communities, taking into consideration factors surrounding them.

The National Youth Policy for 2020-2030 advocates for a multi-faceted approach to increase skills and create practicable pathways. The multi-faceted approach should aim to improve completion rates in skills training and directly tackle the youth's lack of skills and work experience, towards a more sustainable solution. Furthermore, Graham and De Lannoy (2016) also stressed that solving this multifaceted problem would need a multidisciplinary research approach and a focus on short to medium-term solutions, not just long-term ones. They suggested the following interventions to stakeholders, including employers should shift their appointment criteria to make it easier especially for entry-level job seekers, addressing job-seeking barriers caused by the past apartheid spatial planning, and providing assistance to young people in terms of social networks, information and support and opportunities.

To make good these interventions, De Lannoy et al. (2018) argue that it has to happen at a macro and micro level, according to their Theory of Change (TOC) framework. The TOC should be considered in four parts: a supply side, demand side and intermediary component, as well as a policy element. The TOCs they say are written for all groups championing the goal of youth empowerment (since the responsibility for youth empowerment is not solely a group's responsibility). They summarised the TOCs as follows:

1. Supply side of the TOC – seeks to address the shortfall of supply of mid to high skills. To do this, the youth have to be ready and equipped with the skills necessary for a diversified labour market. These skills should include literacy and numeracy skills, technical, and soft/workplace skills.
2. Demand side of the TOC – seeks to address the concerns of employers' difficulty employing young people because of the quality of education, reducing their prospect of gaining work experience. Other reasons are the racial background and social connectedness of these young people. To do this, employers should be willing and equipped to accept and provide youth with work experiences (short or long-term) regardless of their background. They also add that employers should be incentivised to employ youths.
3. Intermediary TOC – seeks to address other fundamental barriers that hinder youth from finding employment. These include crucial 'hinging moments' of the youths such as the cost of looking for work, "the lack of productive social networks, the lack of financial capital and the spatial mismatch make it particularly difficult for young people to find their way into jobs, or for employers to find the young people they potentially would be willing to employ." To address this issue, the youths have to be connected to a 'bridging system' at various 'crucial hinging points' that inform and support them.
4. Policy TOC – seeks to address the uncoordinated policies, contradictory outcomes of policies, policies without implementation plans, and/or policies without the capacity of government to implement them proficiently. To address this, they say the surplus and duplication of youth agencies and desks be streamlined with the reallocation of resources to prevent duplication.

Understanding how to design, build and implement an integrated system that can address the four parts of the TOC is critical to the interventions for youth skilling and employment. There is a need to have an all-inclusive integrated platform as an ecosystem that considers these solutions in one place – one system, one platform,

where youths can find and do everything in one place. This will reduce the confusion, misdirection and overwhelming feeling of the youths on where they should start or source information for jobs and funding, and most importantly, where they can get training.

To summarise, D4D aims to strengthen marginalised communities through the lens of sustainable global development to address the digital era challenges and create opportunities, and the question is: how can we use a transdisciplinary/multidisciplinary approach to train and equip disadvantaged youths for digital technologies and the opportunities they present in the digital economy? (Gurstein, 2000; Williams & Durrance, 2018; Magwentshu et al., 2019; Heeks, 2022). Secondly, if engaging youth in skill training on digital platforms is difficult (Glover, 2013; Lederman, 2019), then what steps do we take to increase their engagement on these platforms?

To increase engagement and completion rates of skills development using technologies, the art of using gameful design was introduced. Gameful design is currently being researched and applied on some learning digital platforms, especially on platforms targeting the more traditional academic programs, again, ignoring a large pool of individuals such as the vulnerable youth (Glover, 2013). Gameful design could harm engagement and motivation rather than increase engagement and motivation, and be counter-productive and distracting (Thom, Millen & DiMicco, 2012; Glover, 2013) when not properly designed. Before proceeding to discuss gameful design (section 2.3), in the next sub-section, I discuss the theoretical considerations adopted for this thesis. These theoretical considerations provide the perspective and lens through which the phenomenon being studied is explained.

2.2.4 The theoretical perspective of this study

D4D focuses on community innovation by strengthening communities facing digital challenges and utilising digital technologies to create opportunities. The diffusion of innovations (DOI) theory is commonly used in research aimed towards innovation. While DOI is well-known, it is limited in understanding how to design for innovation and how users adopt and use innovations. Instead, this study is guided by constructivism, a learning theory that emphasizes active knowledge construction through experience (Juvova et al., 2015; Anderson, 2016). The use of constructivism is thus argued to be deemed more appropriate for community innovation in learning skills and for this study's research design and methodology. Before introducing constructivism's history, overview, and its tenets rationale within the study's context, this section will briefly discuss the main tenets and limitations of DOI.

Historically, the diffusion of innovation theory was first discussed by Gabriel Tarde, a French sociologist in 1903, followed by other authors including Ryan and Gross (in 1943), but was made popular by Everett Mitchell Rogers in his book of the same name as the theory in 1962 (Kaminski, 2011). Rogers became interested in the diffusion of innovations theory based on farmers' reluctance to adopt new ideas that could lead to more profits. Therefore, most of Rogers' research focused on understanding how to speed up the rate at which innovation is diffused (Rogers, 2003). For contextual purposes, I am providing a summary of the key principles of the theory, as there exists a substantial body of knowledge on this theory.

According to Rogers, the diffusion process occurs when certain channels are used to communicate innovation (or new ideas) over time, to members of a certain social system. Hence, the four main elements identifiable in every DOI research are "the innovation, communication channels, time, and the social system" (Rogers, 2003:11). This diffusion process is intended for people who adopt a product, technology, practice, idea or behaviour perceived as new (Rogers, 2003; Kaminski, 2011; LaMorte, 2019). This process of adoption is referred to as the 'innovation-decision process'.

The innovation-decision process (Figure 3) refers to the sequential steps decision-making units (or users) take to adopt or reject a new idea or innovation. This process occurs over time and consists of a series of actions according to this theory (Rogers, 2003). It is comprised of five steps:

1. **Knowledge stage.** This is the stage at which an individual or group becomes aware of an innovation and acquires some understanding of how the innovation works and why the innovation is needed.
2. **Persuasion stage.** At this stage, the individual or group forms an attitude (favourably or unfavourably) toward the new idea. This persuasion is centred on the receiver of the innovation based on their feeling.
3. **Decision Stage.** Decisions are made either to adopt or reject the innovation at this stage.
4. **Implementation Stage.** The individual or group at this stage gets to use the innovation.
5. **Confirmation Stage.** This is the last stage and it occurs when the adopter seeks more information to reinforce their decision but could also reverse the adoption if there is conflicting information.

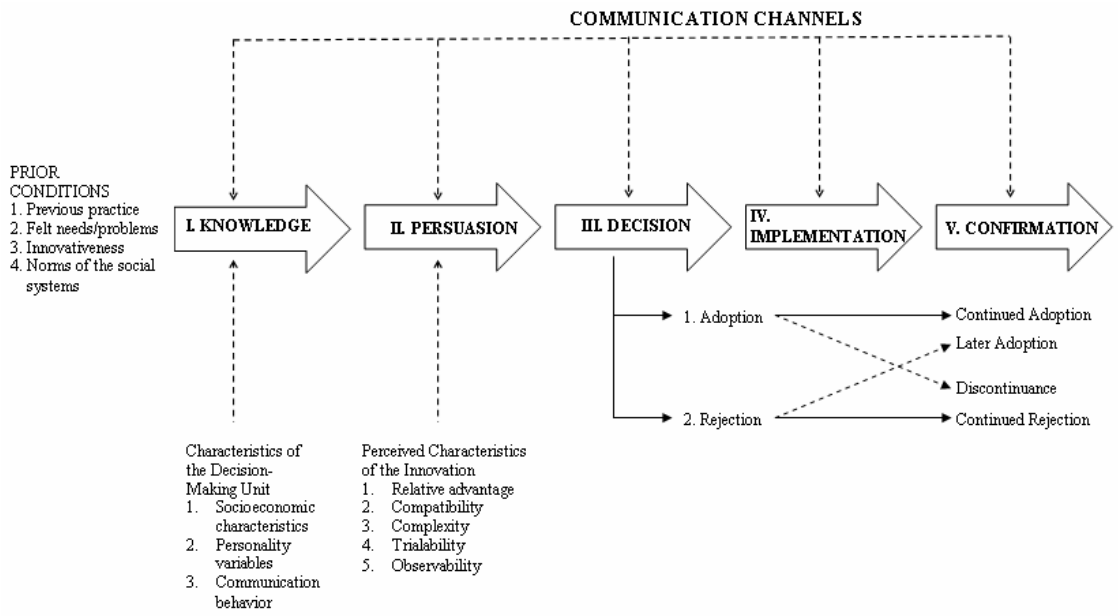


Figure 3: A model of stages in the innovation-decision process (Rogers, 2003:16)

To add, DOI theory suggests that certain individuals are more likely to adopt innovations earlier than others. Rogers categorizes these adopters into five groups based on their level of "innovativeness," ranging from innovators who are willing to try new ideas, to the early adopters; the early majority; the late majority; and lastly, to laggards who are the last to adopt a new idea.

Adopters of the innovation or technology would need to evaluate: 1. The relative advantage compared to previous innovation, 2. Check how compatible the innovation is with their experiences, values and needs, 3. Check how complex the innovation is, 4. Have a trial of the innovation, and 5. Being made observable by others (Rogers, 2003; Sahin, 2006).

From the above, it can be deduced that the DOI theory assumes that innovation has to follow a top-down approach where a product, technology or idea has to be designed or developed for individuals and these individuals will have to ‘adopt’ it. In other words, these innovations and technologies are developed for users to adopt and they need to figure out how to readjust themselves and learn to use these innovations. Users need to be persuaded (either internally or externally) and sometimes forced (in terms of a group – an organisation or a community) to adopt solutions that they deem not compatible with their experience and social context. This could bring about social tensions and resistance to change and could also lead to adopters reinventing the use of the innovation for an unintended purpose (Kaminski, 2011).

While the design ‘for’ and ‘adopt’ approach of DOI is not so much of a problem in some contexts, it does not consider innovation from a bottom-up approach where users design products ‘by’ themselves. This limitation means that the theory does not foster a co-creation or participatory approach to innovation and also does not consider complexities surrounding an individual (LaMorte, 2019). It is fair to say that diffusion theories such as DOI cannot account for all innovation use and adoption variables and their use could miss critical indicators, especially in the context of community research. Thus, each community innovation and informatics problem must be dealt with using theories that best suit its complexity, which includes the lived experiences and factors surrounding the potential users of such innovation.

When it comes to developing skills through technology, the aim is to create efficient tools that can address the challenges faced by young people living in marginalized urban areas. To achieve this, it's important to view the users of these technologies as creators, taking into account their social contexts as discussed in section 2.2.2, rather than just passive adopters of the technology (Gunn & Donovan, 2012). Hence, the adopted theory is constructivism. The rationale for the adopted theoretical framework is that as a learning theory, it considers factors that the previously discussed theory does not consider; such as a person’s context including their previous experience as well as social and environmental factors.

This research study’s theoretical framework is adopted from constructivism. Constructivism is credited to Jean Piaget and further shaped by others such as John Dewey, Lev Vygotsky and Jerome Bruner (Amineh & Asl, 2015; Juvova et al., 2015; Anderson, 2016). The theory posits that the construction of new knowledge and skills by individuals is formed by the interaction of the internalised ideas from the individual’s previous experience and the information in the environment of the individual (Juvova et al., 2015). This results in newly adopted structures by the individual. It should be noted that the theory of constructivism is a ‘philosophy of learning’ and not a pedagogic or teaching method (Anderson, 2016). The use of this theory, like other theories, can be characterised and defined in many ways but as Anderson further states, acquiring new skills happens most effectively when “the task and context are authentic and hold meaning” for the youth (Anderson, 2016:38).

The use of the theory within this study is not to try to explain or focus on what methods there are for teaching or the sub-type thereof, as there are various studies on it, but rather on the philosophical aspect of the theory and to use the components that form the constructivism theory to explain the study’s phenomenon. The tenets ingrained in

the theory, are summarised as: 1) learning is looked upon as a personal journey but influenced by other components such as the social and environmental factors of the person (Anderson, 2016), 2) previous experiences of the learner are considered, 3) motivation for learning has to be considered, 4) the means of facilitation (Hein, 1991; Amineh & Asl, 2015) and 5) one other component is meaningful interaction and collaboration with others as proposed by Vygotsky (Woo & Reeves, 2007; Anderson, 2016). Therefore, these components have to be considered in terms of designing community-based innovation for skills development among marginalised youths. The designed technology has to facilitate active learning (practical) for the construction of new skills (Juvova et al., 2015). See Figure 4.

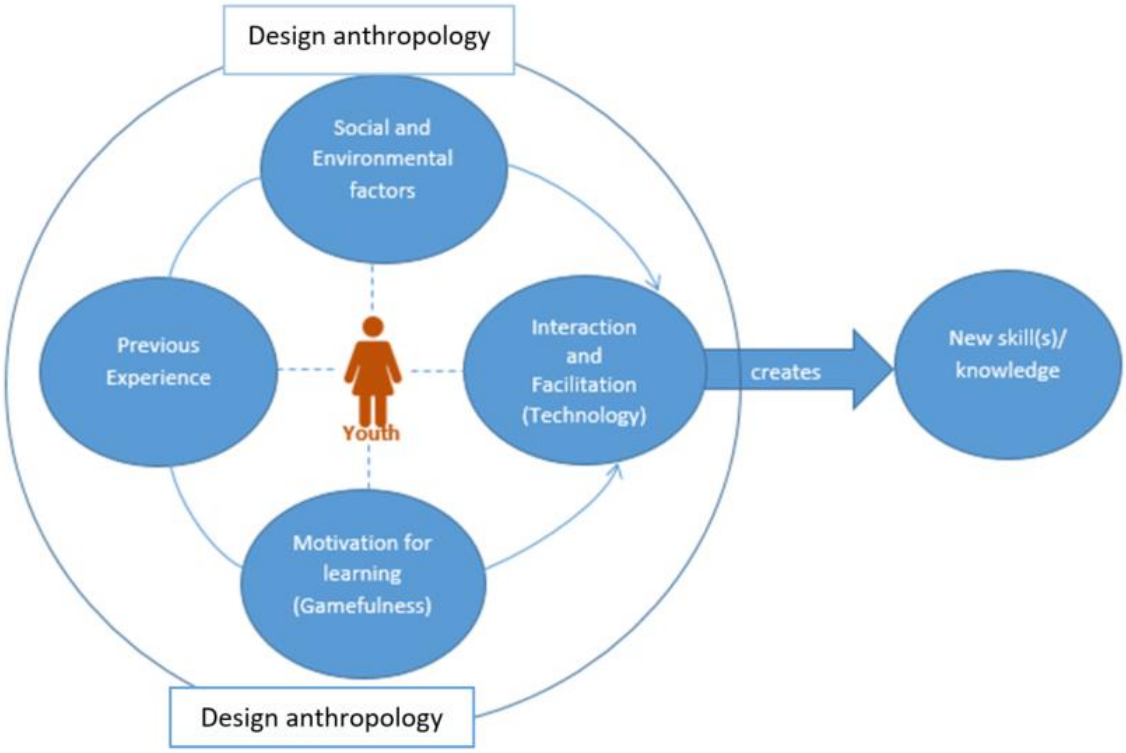


Figure 4: Research conceptual framework (Author's construct)

Drawing from the theory with respect to the unskilled or low-skilled youths within marginalised urban communities, to develop a gameful skills development platform that would lead to new skills, the following has to be considered:

1. What are the factors and complexities surrounding these youths?
2. What are their previous experiences, especially with regard to skills acquisition and opportunities?
3. What technology would be best to facilitate the learning and interaction between the youths in their community?

4. How can gameful design be used to keep them engaged and motivated?

Considering the above, an approach that is exploratory in nature and can help in understanding the above from the perspective of the youths will need to be followed. Secondly, as mentioned, if this technology is to be a 'democratised' community-based technological innovation (DCTI), then it has to be done 'with' and 'by' the youths for them to have a sense of 'ownership' (Gurstein, 2013). Therefore, the best approach has to be one in which the research design and methodology allow for such exploration. This has to be an approach that is trans/multidisciplinary – anthropological and design in nature – as suggested by Graham and De Lannoy (2016). In addition, as this study is grounded in D4D and its field of research is often interdisciplinary, multi-vocal and multifaceted (Carroll, Shih & Kropczynski, 2015; Parra et al., 2015; Heeks, 2020a), it would make sense to follow suit.

This approach helps make sure that community research leads to the successful implementation of projects as it allows researchers to pay sufficient attention to the community and its members where these types of research are conducted (Heeks, 2008; Parra et al., 2015). In addition, it allows for the exploration to understand how their social context affects motivation for skills learning and how these could be mitigated from their perspective. For any community-based research to succeed, Parra and colleagues (2015) emphasise that the research should be conducted with the interest of the community members in mind and to build trust. Equally important, researchers need to understand the complexity within the community to develop meaningful technologies (Day, 2010). For these reasons, design anthropology – a field of study, philosophy, and/or methodology – is gaining relevance as a way to understand and design for change in communities. Thus, this thesis uses design anthropology as the main methodology to guide the research process of the four aspects identified to be considered in this study. In chapter three, I describe in detail the ontology and epistemological stance of this study and how it leads to the desired methodology – Design Anthropology (DA). The next section examines gameful design in detail.

2.3 Engage and motivate me: the art of gameful design

Gameful design and gamification have been studied and applied to various scenarios to create more engagement, participation and motivation for users to complete a set of activities or goal(s). Gameful design and Gamification have gone on to be a buzzword, especially in business (Deterding, Dixon, et al., 2011; Deterding, Sicart, et al., 2011), fitness (Wu, Kankanhalli & Huang, 2015; Wei, 2017) and education space

(Adukaite, Van Zyl, Er & Cantoni, 2017; Glover, 2013). The terms "gamification" and "gameful design" have been discussed and analysed by scholars and industry experts with both positive and negative perspectives (Hassan and Hamari, 2020). In this section, these terms will be defined from different authors' viewpoints and compared to the definitions derived from this review. We will also examine the identification of game elements and frameworks, as well as their application in learning and skill development.

2.3.1 Defining gameful design (and gamification)

Some authors have defined the terms gameful design and gamification to mean separate things; with contrasting views on what the definitions should be. For instance, Tondello (2017) argued that the difference in terms 'lies in the designer's intention' while referring to Deterding, Dixon, Khaled and Nacke's (2011) work, which describes gamification in terms of when designers' focus is on using game elements as a strategy to solve a problem, and gameful design as when designers' focus is on creating a gameful experience. Tondello concludes that the difference does not matter if users accomplish their desired goals on a designed product. Velasquez argued in the comment section of the same Tondello's online article that the ambiguities of the terms stem from "the use of terms such as 'game elements' or 'game thinking', which are semantically broad and rather obscure" (Tondello, 2017). Velasquez adds, "[g]amification places an emphasis on game feedback systems and game interface components, while gameful design places the emphasis in game mechanics and rules (which includes the above)" (ibid).

Bell (2018:42) agrees that the terms are distinct but subtle. Bell equates "gamification to making a game of an activity", whereas gameful design "looks at the various aspects and intrinsic motivators that are embedded in successful games (and in other non-game events) and asks whether those elements can be replicated". As such, the term 'gamification', derived from the digital media industry, has been heavily contested and has created significant discontentment among game studies and industry experts (Deterding, Dixon, et al., 2011; Tondello, 2017). The oversimplification, multiple interpretations (as seen above) and the various ways of implementation led to some coining their own terms (Deterding et al., 2011).

To clearly understand these terms (gameful design and gamification) and their use, one must examine the often-quoted work of Deterding et al. (2011) in this regard. Deterding et al. (2011:2) defined gamification as the "use of game design elements in non-game contexts". To arrive at this definition, they first differentiated between

‘gamefulness’ and ‘playfulness’ using Caillois’ interpretation of the concepts of Paidia and Ludus (Caillois, 2001). While Paidia on one end signifies uncontrolled, uncertain, free, and gaiety activities; Ludus, on the other end, signifies subordination to rules, calculation, skill, and patience. Ludus thus denotes the qualities of gamefulness – goal-oriented with rules.

Deterding et al. (2011) assert that designing a product for gamefulness using game elements is the goal of gameful design and gamification is the design strategy of using game design elements. In order words, these two terms are not different based on “designers’ intention” but rather based on “intensional properties” – the design strategy (gamification) and the design goal (gameful design). Gameful design is often implemented using the strategy of gamification (Deterding, 2015).

Any of these terms could be used but depends on what is being referred to – the design strategy (‘gamification) or the design goal (gameful design). However, Deterding et al. (2011) suggest that for academic discourse, gameful design is the preferred term. They argue, “Given the industry origins, charged connotations and debates about the practice and design of ‘gamification’, ‘gameful design’ currently provides a new term with less baggage” (Deterding et al., 2011:5-6).

Huotari and Hamari (2012:19) suggested gamification should be viewed as “a process of enhancing a service with affordances for gameful experiences to support the user’s overall value creation.” Huotari and Hamari's (2012) definition proposed that gamification should enhance the users’ experience rather than just be a systemic method of understanding. Gamification should be goal-oriented (Huotari & Hamari, 2012; Botha, Herselman & Ford., 2014), and be more engaging and enjoyable (Deterding, Dixon, et al., 2011). In addition, Thomas, Hamari, Baral & Sukumar (2021) state that for gamification to be deemed successful, it would depend on the quality of the gameful experience.

The use of terms such as gamefulness, gameful experience, and gameful design is common in discussions related to gamification, as previously mentioned. However, Landers, Tondello, Kappen, Collmus, Mekler, and Nacke (2018) proposed that the term gamefulness be abandoned as it refers to three distinct concepts. Instead, they suggest using the terms gameful experience, gameful system, and gameful design to clarify these concepts. These terms are defined by the authors as follows:

> *Gameful experience: A psychological state resulting from the interaction of three psychological characteristics: perceiving presented goals to be non- trivial and achievable, being motivated to pursue those goals under arbitrary, externally imposed constraints, and the belief that their actions within these constraints are volitional. Gameful system: Any system that creates for its users a gameful experience. Gameful design: A design process that affords gameful experience within a designed system; alternatively, a design process that creates a gameful system by implementing gameful system characteristics effectively* (Landers et al., 2018:15).

I align with Deterding et al.'s (2011) perspective and utilise the term gameful design in this research. I define gameful design as the use of parts of game design elements to achieve a psychological state that is goal-oriented (gameful experience) to increase users' engagement, motivation and participation in a non-game context. This comprehensive definition encompasses all the components of gameful design.

1. The use of parts of game elements
2. A psychological state that is goal-oriented (gameful experience)
3. To increase user engagement, motivation, and participation (user behaviour created by the psychological state)
4. In a non-game context.

These four components must be in harmony to truly define and achieve a gameful designed system.

In summary, the use of either term (gameful design or gamification) is dependent on what the author is referring to (the goal or the strategy respectively) as the use of these terms does not affect the user if the product helps the user accomplish their desired goals. It is also important to note the 'parts of game elements' and 'in a non-game context,' as sometimes games such as serious games are confused with gameful design (Figure 5). Serious games are whole game elements but in a non-entertainment context mostly for educational and learning purposes (Deterding, Dixon, et al., 2011).

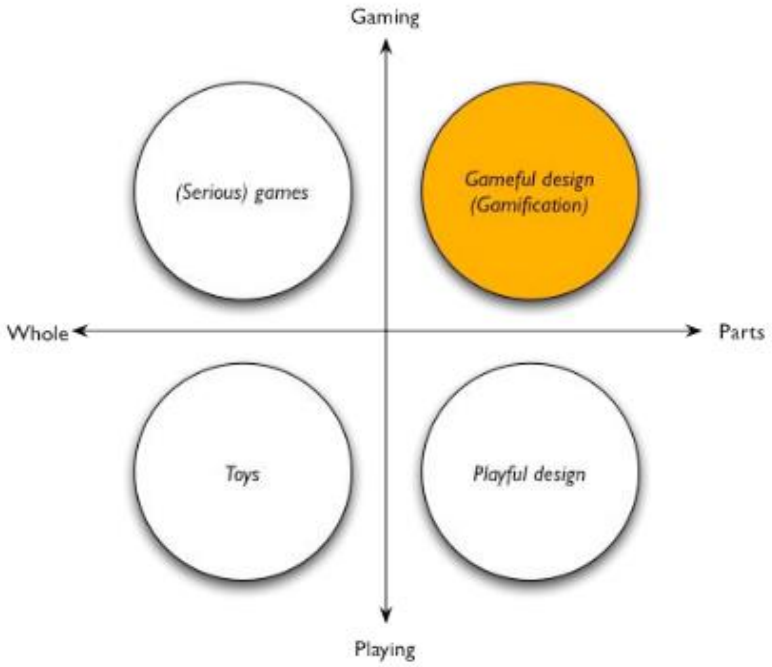


Figure 5: "Gamification" between game and play, whole and parts (Deterding et al., 2011:5)

As stated previously, gameful design uses game design elements. Understanding these elements can help understand what elements are best combined for a given context.

2.3.2 Gameful design elements, user types and frameworks

In order to comprehend gameful design, it is essential to have a grasp of the game elements that are utilized (Hunicke, Leblanc & Zubek, 2004; Schöbel, Ernst, Söllner & Leimeister, 2017). Game design is based on systems thinking and user experience psychology (Zichermann & Cunningham, 2011). Within the game design industry, various player typologies are well-known, including Bartle's (1996) four player types model, which was later expanded to eight (Bartle, 2005), the BrainHex Model (Bateman, 2009; Bateman, Lowenhaupt & Nacke, 2011), Kim's (2014) social action matrix, and Yee's (2015) gamer motivation model.

Bartle (1996) described four approaches to playing multi-user dungeons (MUDs). Bartle stated that these player types arise from two dimensions of playing style – the players vs world and acting vs interacting. The popularly known model has played a key role in raising awareness that different people enjoy games differently (Kim, 2014) and has four-player types being achievers, explorers, socialisers, and killers (Figure 6).

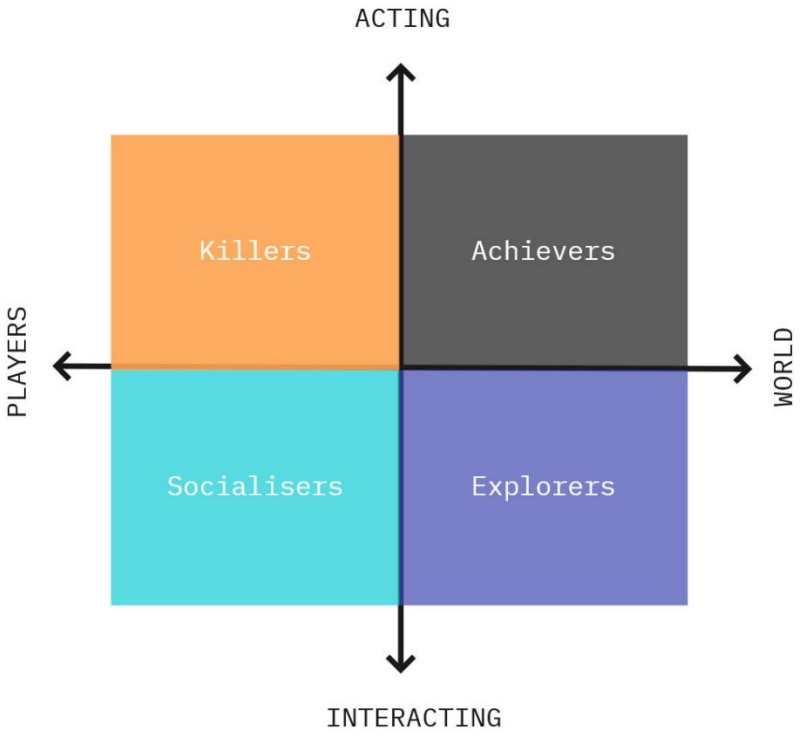


Figure 6: Bartle's four player types (Bartle, 1996:6)

- **Achievers:** the achievers are players whose interest is "acting on the world (game environment)" to master the game. Their concern is to win by immersing themselves in the game environment.
- **Explorers:** interested in "interacting with the world", these players prefer to have the element of surprise and discovery within the game.
- **Socialisers:** these are players whose interest is "interacting with other players" and spending time chatting.
- **Killers:** they are interested in "acting on other players" by doing things to other players and demonstrating superiority.

Recognising the limitations of the previous model, Bartle (2005) introduced a third dimension, namely, implicit/explicit, which expanded the player typology to 8 types instead of the previous 4. As a result, each of the previous 4 player types now exists within two characteristics (Figure 7).

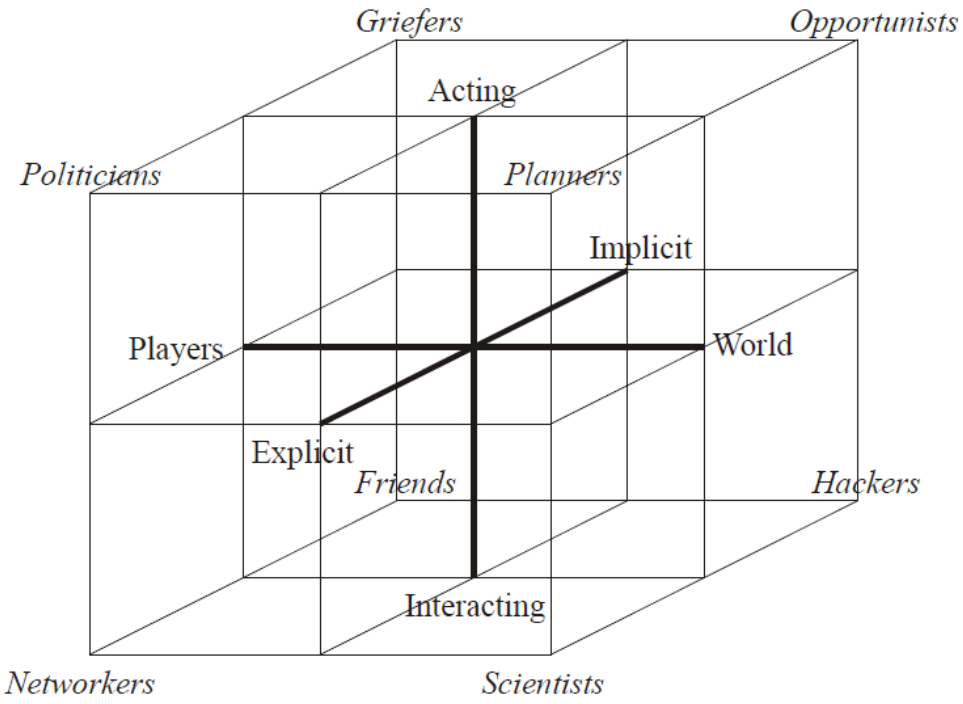


Figure 7: Bartle's updated player types with a third dimension (Bartle, 2005:2)

These player types are: Opportunists, referred to as "implicit Achievers," – find opportunities and seize opportunities as they arise, Planners, known as "explicit Achievers," set goals and strive to achieve them, Scientists, dubbed "explicit Explorers," experiment and create theories, Hackers, categorized as "implicit Explorers," experiment to uncover meaning, Networkers, identified as "explicit Socialisers," seek out individuals to interact with, Friends, referred to as "implicit Socialisers," only interact with those they know well, Griefers, known as "implicit Killers," primarily engage in attacking, and Politicians, categorized as "explicit Killers," act with foresight and consideration.

The players' types were never empirically validated (Yee, 2006; Tondello, Mora & Nacke, 2017). The model gained popularity due to its simplicity and was not intended for use outside the multi-user dungeons (MUDs) / Massively multiplayer online (MMO) domain (Bateman, Lowenhaupt & Nacke, 2011; Marczewski, 2015; Tondello, Mora & Nacke, 2017).

BrainHex a successor of demographic game design 1 & 2 (DGD1 and DGD2) is a player satisfaction model that uses the human nervous system (Bateman, 2009). The player typology from this model are Conqueror, Seeker, Mastermind, Achiever, Socialiser, Survivor, and Daredevil.

Although Kim acknowledges Bartle's four player types, she argues that they are not suitable for social, educational, and casual games. She hence identified four patterns - Compete, Express, Explore, and Collaborate (Kim, 2014). These patterns are mapped out as social actions or verbs, as Kim states, “because as product builders, we can enable these actions by offering specific features and systems.” These verbs are then mapped out as player types, as illustrated in Figure 8.

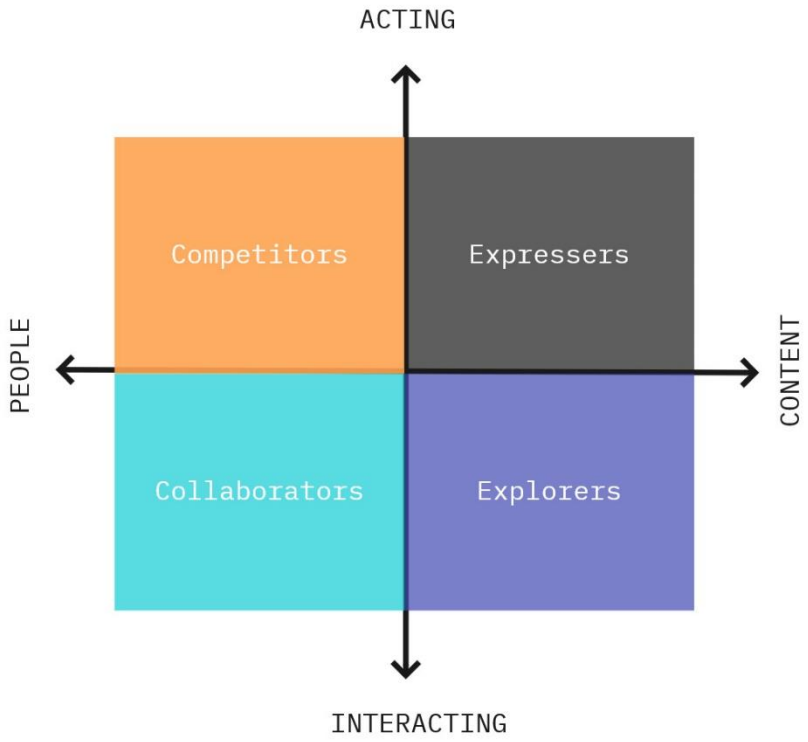


Figure 8: Kim’s social action matrix player types (adapted from Kim (2014))

Yee (2015) collected data from over 140,000 gamers and conducted a factor analysis. This analysis resulted in the development of the ‘gamer motivation model’. This model comprises 12 gamer profiles grouped in 6 clusters (Figure 9). These clusters and their respective profiles are action (destruction and excitement), social (competition and community), mastery (challenge and strategy), achievement (competition and power), immersion (fantasy and story) and creativity (design and discovery).

Figure 9: Overview of Yee's gamers motivation model (Yee, 2015:2)

The models for player types mentioned earlier were primarily developed for games. However, while they are well-known within the game industry, there is a lack of gameful design user types frameworks or models that can be applied to a gameful system. To address this, Marczewski (2015) developed the HEXAD framework. The HEXAD framework and the MDA framework have so far been used in understanding user types and elements in gameful design respectively. Although the HEXAD framework is derived for gameful user types, the MDA framework could be applied in game design and gameful design scenarios. To provide more information on these frameworks, I will briefly explain them below.

To create user types for gameful systems similar to Bartle's game player types, Marczewski created the gamification user types framework called HEXAD. This framework relies on player types and motivation drivers from the literature. Marczewski first summarised these motivation drivers as RAMP (Relatedness, Autonomy, Mastery, and Purpose) (Marczewski, 2013). RAMP is derived from two known motivation studies – the Self Determination Theory (SDT) of Ryan and Deci (2000), and the intrinsic motivation Drive (Pink, 2009). The SDT identifies three aspects as intrinsic motivators – autonomy, competence and relatedness. Similarly, Pink's Drive identifies three aspects as intrinsic motivators - Autonomy, Mastery and Purpose.

The derived HEXAD framework categorises gameful design into six user types, each motivated by the type they represent. In summary, the six user types (Figure 10) are Socialisers (motivated by Relatedness), Philanthropists (motivated by Purpose and Meaning), Free Spirits (motivated by Autonomy), Achievers (motivated by Mastery),

Disruptors (motivated by Change), and Players (motivated by Rewards) (Marczewski, 2015).

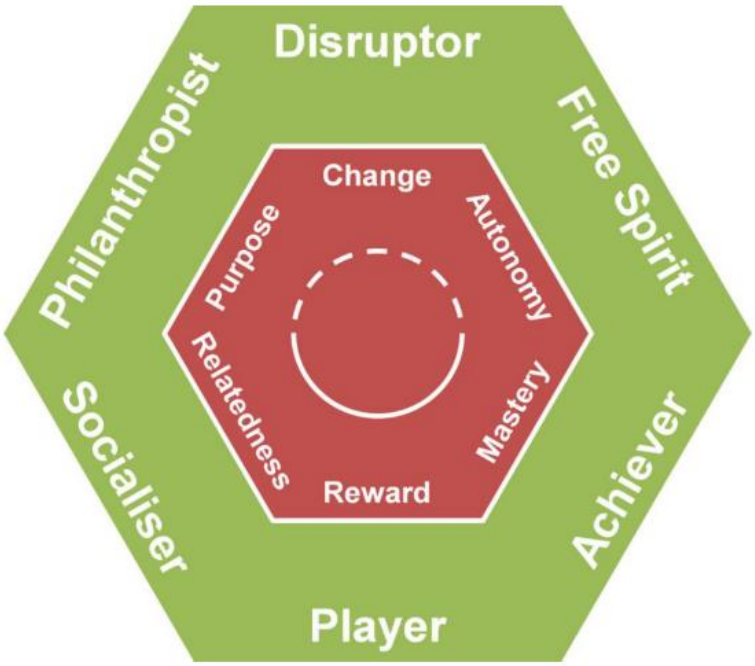


Figure 10: The HEXAD framework (Marczewski, 2015:68)

The HEXAD user types can be further categorised into four intrinsically motivated user types, four extrinsically motivated user types, and four disruptive user types.

- Intrinsic user types: These are the Socialisers, Philanthropists, Free Spirits and Achievers.
- Extrinsic user types: These are the Players user types. The Players user types thus have four user sub-types namely – Self-seeker, Consumer, Networker and Exploiter.
- Disruptive user types: These are the Disruptors user types. The Disruptors user types thus have four user sub-types namely: Griefer, Destroyer, Influencer, and Improver.

Tondello, Wehbe, Diamond, Busch, Marczewski and Nacke (2016) created and tested a 24-item survey response scale to score users' preferences towards the HEXAD user types. Using correlation analysis, they confirmed the validity of the framework to measure user preference against game design elements. The framework was further used and analysed to understand what game design elements were preferable for demographic clusters (Tondello, Mora & Nacke, 2017). This resulted in eight groups

of gameful design elements – Socialisation, Assistance, Immersion, Risk/Reward, Customisation, Progression, Altruism, and Incentive (Table 2).

Table 2: Gameful Design elements adapted from Tondello et al. (2017)

Group name	Gameful design elements
Socialisation	Social comparison Leaderboards Social competition Social networks
Assistance	Glowing choice Beginner's luck Signposting Anchor juxtaposition
Immersion	Mystery box Easter eggs Theme Narrative/Story
Risk/Reward	Access Lotteries Boss battles Challenges
Customisation	Avatars Customization Points Virtual economy
Progression	Levels/Progression Meaning/Purpose Progress feedback Learning
Altruism	Knowledge sharing Gifting Innovation platforms Development tools
Incentive	Badges/Achievements Certificates Collections Rewards/Prizes

Orji, Tondello and Nacke (2018) show that the HEXAD user types influence individual persuasive strategies. Although tested using health applications, ten persuasive strategies (competition, self-monitoring and feedback, customisation, simulation, goal

setting and suggestion, cooperation, personalisation, reward, social comparison and punishment) were investigated with the HEXAD user type model. The findings of the study provide valuable insights for designers who are designing gameful systems, helping them identify effective persuasive strategies to use and those to avoid.

Şenocak, Büyük and Bozkurt (2019) also investigated the use of the HEXAD framework in the open and distance learning (ODL) system. They found that the typical user types for the ODL system are groupings defined as Philanthropists, Achievers and Free Spirits, followed by Socializers and Players. Their findings align with Tondello et al.'s (2016) study. The results of their study are presented visually through a radar chart (Figure 11) which illustrates the distribution of the HEXAD user types.

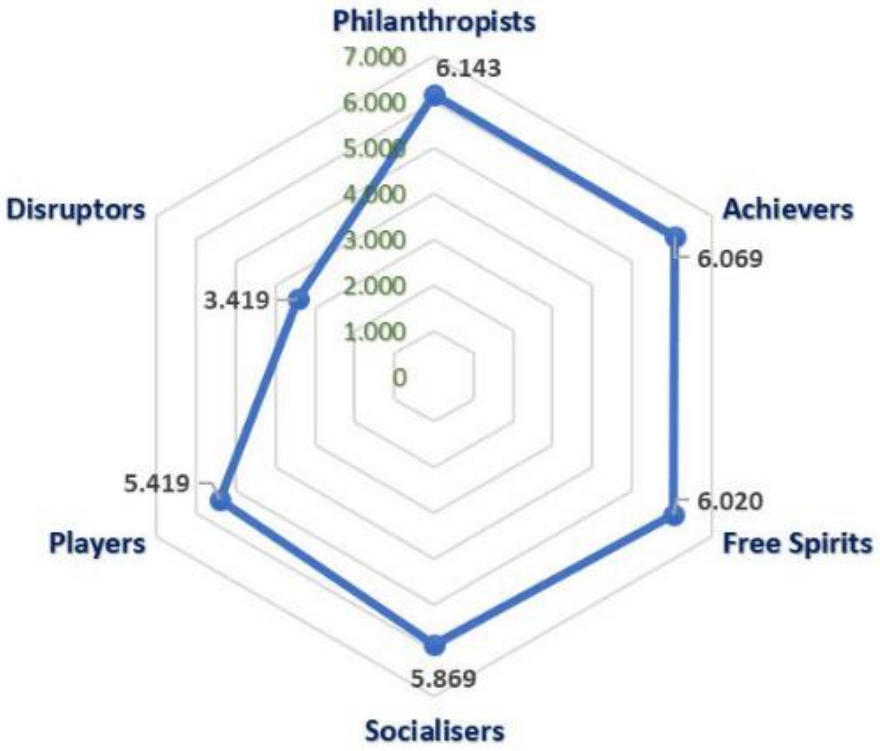


Figure 11: The distribution of the Hexad user types for ODL students. (Şenocak et al., 2019:1014)

The MDA framework, a well-known framework, for game design and gameful design was developed by Hunicke, Leblanc and Zubek (2004). The framework categorises game consumption into three components: 'rules', 'system', and 'fun'. Using these components, they derived design element equivalents for games as 'Mechanics', 'Dynamics', and 'Aesthetics' (MDA). The authors suggest that breaking down game elements into these components helps redefine the concept of gamified systems as systems that shape behaviour through interaction.

The game mechanics are the functioning components afforded to a user by the designer (Hunicke, Leblanc, & Zubek, 2004; Sicart, 2008; Zichermann & Cunningham, 2011). They permit the designer to control the 'levers' of the game to guide users' actions (Zichermann & Cunningham, 2011; Schöbel et al., 2017). They are the rules and goals the system's designer sets for the user. Game elements linked to mechanics include leaderboards, challenges/quests, levels, badges, points, onboarding, missions, feedback and social engagement loops (Zichermann & Cunningham, 2011).

The user's interactions with the game mechanics are the game dynamics (Zichermann & Cunningham, 2011), creating the aesthetic experiences (Hunicke, Leblanc & Zubek, 2004). In other words, they are the user interactions such as time pressure to complete a goal, opponent play (Hunicke, Leblanc, & Zubek, 2004), information sharing among users, the rate of consumption, and all that can be modified for effects (Zichermann & Cunningham, 2011).

The third aspect of the MDA framework, Game aesthetics, on the other hand, evokes emotional responses from the users (Hunicke, Leblanc, & Zubek, 2004). Hunicke and colleagues (2004:2) stress that when describing the aesthetics of game design, words that have a more directed vocabulary should be used instead of words like "fun" and "gameplay" (Table 3).

Table 3: Vocabulary describing aesthetics of game design (Hunicke et al. 2004:2)

No.	Vocabulary	Vocabulary meaning
1.	Sensation	Game as sense-pleasure
2.	Fantasy	Game as make-believe
3.	Narrative	Game as drama
4.	Challenge	Game as obstacle course
5.	Fellowship	Game as social framework
6.	Discovery	Game as uncharted territory
7.	Expression	Game as self-discovery
8.	Submission	Game as pastime

Therefore, a designer considering incorporating these gameful design elements should consider what element would create the intrinsic motivations and equally important, the extrinsic motivations using these frameworks. Marczewski (2015) argued that the extrinsic and intrinsic motivations must be designed for, but that designers need to use extrinsic motivators during the user's initial (on-boarding) stages; thereby suggesting

that as the user engages more with the system, the users should be converted to intrinsically motivated users (Achiever, Free Spirit, Socialiser, and Philanthropist).

The above discourse sheds light on the gameful design elements and frameworks. However, it is important for designers to understand which elements are relevant to include and to avoid imposing and incorporating elements that would be irrelevant and ineffective in a system. While it is helpful to be aware of a list of elements, it is crucial to consider them and how their combination unfolds from the specific context being examined (Schöbel et al., 2017). As Nacke and Deterding (2017) noted the first wave of gamification research was the “what” and “why?” The current wave of research is focusing on the ‘how?’, “when?” and “how and when not?”. This approach allows for the maturation of gameful design in three research domains: (1) theory-driven empirical studies, (2) design methods and (3) application areas. Ideally, studies should answer these three questions in various sectors of application, particularly in training, learning and education. This current research aims to contribute to this effort.

2.3.3 Précis of the application of gameful design in education and skills acquisition

In concluding this chapter, following the discussions so far, efforts and research have been conducted to use gameful design and game elements but mostly in training and education (Lee & Hammer, 2011; Botha, Herselman & Ford, 2014; Şenocak, Büyük & Bozkurt, 2019). However, we must ask: has the application of gameful design been efficient? Has the context of youths in marginalised communities been considered enough to design gameful solutions to motivate them to learn digital skills? These are the gaps this thesis is addressing. As people increasingly prioritise post-material values such as self-identification, self-expression and self-realisation (Inglehart, 2008), there has been a growing interest in designing for motivation, engagement, and enjoyment in human-computer interaction (HCI) (Deterding, 2015). Hence, organisations and designers are searching for ways to sustain user motivation over time, particularly in educational and skill development contexts where keeping young people engaged, motivated, and enjoying the learning process is crucial.

However, Lee and Hammer (2011) argue that while game-like features in education have been present for some time, they have not been effectively utilised to increase engagement. For instance, awarding marks or points to students for completing assignments and tests correctly, and converting these points to grades are examples of game-like features used in education. Lee and Hammer refer to these marks as "badges" and they note that students who perform well in each academic year "level up" to an advanced class. Nevertheless, they argue that even with these, “students

would not describe classroom-based activities in school as playful experiences" and that "the existence of game-like elements does not always translate directly to engagement" (Lee & Hammer, 2011:2). Similarly, Huotari and Hamari (2012) highlighted the significance of engagement and user experience in gameful design. In essence, to achieve a gameful experience is crucial designing any gameful solution to increase engagement and motivation. Simply incorporating game elements does not ensure gameful design and a gameful experience.

The application of gameful design for learning or skills development is mostly done in formal education and it involves applying game mechanics and dynamics to the teaching and learning process (Botha, Herselman & Ford, 2014). Employing gameful design in digital solutions for formal education is still a growing trend, even in economically developed countries (Dicheva, Dichev, Agre, & Angelova, 2015). For example, Dicheva et al. (2015) reviewed 34 case studies and identified seven game mechanics that could be used in education, including avatars, points, virtual currencies, badges, progress bars, levels, and leaderboards. Points are used to measure user performance, leaderboards rank users based on their points and badges, virtual currencies are used for in-game purchases, and levels indicate a user's expertise.

This is similar in studies conducted in South Africa (see Adukaite, Van Zyl, Er, and Cantoni (2017) and Botha, Herselman, and Ford (2014)). Adukaite, Van Zyl, Er & Cantoni (2017) examined the factors influencing the acceptance of gamified systems by tourism teachers. In a study carried out in rural schools of the Eastern Cape, Botha, Herselman, and Ford (2014) implemented gameful design to promote the use of tablets by teachers in formal teaching and learning. While there are few studies in South Africa such as these, it is an area of study often considered one of the most challenging to apply gameful elements, compared to other domains such as business, fitness, and marketing (Dicheva, 2017).

There is still much to be explored in terms of using gameful design for development (GD4D) and how gameful design elements can be employed to enhance learning in non-formal educational settings, particularly among young people in marginalised urban communities. This gap of knowledge on how gameful design can be used for informal skills development and youth in marginalised communities, highlights the contribution and necessity of this study. The study aimed to explore ways of implementing gameful design to engage, motivate, and enhance the experience of the youths, with the ultimate goal of acquiring employable skills. To achieve this, Schöbel

et al. (2017) emphasise the importance of considering user needs and context when deciding on game elements for a learning system. The approach proposed by Design Anthropology was employed in this study to gain an understanding of the youths' local community context and challenges and identify gameful design elements that could engage and motivate them to learn employable skills. The next chapter provides a detailed discussion of the study's research design and methodology.

CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

3.1 Overview

This chapter presents the research paradigm, consisting of the research design and methodology of the study. Additionally, it provides the details of how the research in this was conducted, including the research methods and processes as well as the tools used. The central aim of this research was to explore the social, economic and technical considerations to develop a gameful designed system that motivates and engages urban youths in low socio-economic communities in South Africa to learn employable as well as entrepreneurial skills. The research focused on gaining a comprehensive understanding of these young people's experiences, perceptions, and social contexts to develop a community-based, transformative, and innovative technology for skill development. To accomplish this, I utilised Design Anthropology (DA), which emphasizes the active involvement and central role of the participants.

Research design is the detailed plan of how the research project would be conducted, including how the data would be collected, and the analysis of the data (Bhattacherjee, 2012). It is the “conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data” (Kothari, 2004:31).

Research methodology is the aspect of research that evaluates and depicts the thinking behind research procedures, methods and tools used to answer the research questions and, thus, achieve the research aim (Welman, Kruger & Mitchell, 2005). Kothari (2004) further notes that in research methodology, a researcher should consider the context of the research and use methods (logically) that best fit the context.

3.2 Research philosophy: ontological and epistemological assumptions

Paradigms are interrelated views based on ontological, epistemological, and methodological assumptions (Guba & Lincoln, 1994; Durrheim, 2006). Using Design Anthropology (DA) for this study informs the research design and the study’s approach. I considered using other design approach options and opted for DA as it helped contextualise the societal, economic and other complexities surrounding the unemployed and unskilled youths within urban communities (Day, 2010). While the research background and the theoretical framework discussed in chapter two briefly motivated the need for employing DA as the research paradigm, this section provides

further clarification by outlining the paradigm according to three fundamental questions that delineate inquiry paradigms, as recommended by Guba and Lincoln (1994):

> *The ontological question - what is the form and nature of reality and, therefore, what is there that can be known about it? The epistemological question - what is the nature of the relationship between the knower or would-be knower and what can be known? The methodological question - how can the inquirer (would-be knower) go about finding out whatever he or she believes can be known?* Guba and Lincoln (1994:108)

To gain a comprehensive understanding of these youths' experiences, perceptions, and social contexts, and design a gameful and innovative technology for skill development, a community-based approach was necessary. While there may be various design approaches that could have been used in this study such as service design, design thinking and design science research, it is critical to understand how culture and context inform the design artefacts, including products, services and systems. Design science research for instance sets defined steps for rigor and a systemic approach to design and develop artefacts for real-world problems and to bridge the gap between industry and academia (Hevner & Brocke, 2023). However, it is necessary to understand the context of marginalised communities and find nuances that such design approaches do not offer before designing and developing.

Design philosophies such as Escobar's (2017) "autonomous design" – a philosophy that considers place-based, collaboration, and human experience in designing solutions have gained traction in this regard. This approach seeks to challenge ontologies and epistemologies that have historically marginalised and oppressed marginalised communities. This means that for designers to understand the social context of communities, they need to consider *placing or rooting themselves* in the community-specific space and pay close attention to the context of those places. Community members do not just participate in the data collection process, they practice the design themselves (Escobar, 2017). This consequently creates the importance of anthropology in design, thus, the rationale for design anthropology as this study's paradigm – to critically explore and clearly understand the social context of the thesis' given situation.

It is important to note that this thesis will not try to engage in the contested discourse of the constant evolving anthropological theories or school of thoughts (for instance, see Howes (2022) critical evaluation of Tim Ingold's work) as it is beyond the scope of

this work, but will try to highlight the importance of design anthropology approach in designing with marginalised communities. Although, there are some key underpinnings of anthropology that this thesis is based on:

1. The social context of individuals in an environment is important to consider.
2. Regarding skilling an individual, while some cultural influence might affect the transmission of skills (such as language), digital skills (which is not core to an individual culture) are regrown in each individual, integrated into the modus operandi of the developing human organism through training and experience in the performance of particular tasks (Ingold, 2000; Gibson, 2015). Ingold uses the term practitioner or producer for the end-users as he argues that the end-users ultimately become skilled practitioners of technology instead of consumers (Ingold, 2000, 2001; Gunn & Donovan, 2012).
3. To realise the above, the research must be place-based in the community of the research participants and be collaborative.

Design anthropology's (DA) goal is to bring about a change in the conventional design process (Anastassakis, 2014) and a ‘distinct style of knowing’ (Otto & Smith, 2013) on what to design for. While some design processes and practices force users to create new habits, DA proposes “a design that meets the diversity of human values, trying not so much to forge new habits than to translate existing values in tangible experiences, thus acting in the sense of empowering social groups” (Anastassakis, 2014:243). In doing so, the DA process allows users to be part of creating technological artefacts that fit their lived experiences (Wasson, 2016).

Wasson (2016) describes DA as the practices of anthropologists collaborating with other disciplines such as designers to develop new ideas for product development. This description by Watson limits DA to be seen only from an anthropological perspective rather than as a new discipline incorporating methods and processes from anthropology and design. However, Gregory (2018) views DA as a social design process that offers a more grounded and deeper approach to design research processes compared to other design approaches such as design thinking and human-centred design. Using other design approaches has limits when applied to social or community innovation (Forlano & Smith, 2018; Gregory, 2018).

DA helps designers and innovators to design artefacts with users as active partners in the design process. This allows for negotiated and defined participation (Robertson & Simonsen, 2012), users having a voice in the outcomes of designed artefacts

(Blomberg & Karasti, 2013; Escobar, 2017; Drazin, 2021) and offering an approach that allows for understanding the participants' background and experience impact of design while creating artefacts (Gregory, 2018).

In contrast to traditional ethnography, undergoing long-term fieldwork, Otto and Smith (2013) assert that design anthropologists do not necessarily have to employ a long-term fieldwork strategy. They argue design anthropologists can perform a series of shorter interventions and field studies and that the end goal of DA moves beyond description and analysis; to generating design proposals and concepts. In order words, focusing more on material – prototyping or visualisations – rather than ethnographic monographs and articles. Ventura and Bichard (2016) support this view by noting that design anthropologists should be aware of the time-sensitive nature of the design while integrating sociocultural elements into the design process.

As a practice and approach derived from 'Design' and 'Anthropology', DA incorporate methods from the two disciplines (Smith, 2011; Otto & Smith, 2013; Wasson, 2016; Forlano & Smith, 2018). Forlano and Smith (2018) argue that to create collaboration among the transdisciplinary practices, design anthropologists should abandon some practices from anthropology and embrace some practices from design such as the culture of critique and vice versa. This approach will lead designers to be interconnected with the practices of participants engaging with the output of design artefacts (Gunn & Donovan, 2012). Hence, in relation to skilling the youths, the DA approach should underpin community research for skills acquisition and development (Gunn & Donovan, 2012). Ingold argues that these processes and practices create appropriation and what he terms 'enskilment' (Ingold, 2000) – affording participants as skilled practitioners rather than mere consumers of a system or product (Ingold, 2001; Gunn & Donovan, 2012). I describe further my ontology and epistemological stance below.

3.2.1 The Ontological and Epistemological Question

The ontological part of research looks at the nature of reality, how the researcher sees the nature of reality, and the researcher's assumptions of the nature of reality (Guba & Lincoln, 1994; Göktürk, 2005; Flick, 2009; Saunders, Lewis, & Thornhill, 2009; Bhattacherjee, 2012). Saunders, Lewis, and Thornhill (2009) highlight ontology as either subjectivism or objectivism. There are three fundamental considerations Creswell (2009) alludes to in determining the research approach choice — the researcher's personal experiences, the problem of the research, and the people for whom the thesis will be written.

The research's ontological assumptions are rooted in subjectivity, as it explored the social phenomena shaped by the actions and perceptions of the participants regarding their existence (Saunders, Lewis, & Thornhill, 2009). The study relied on the experiences, perceptions, and constructed meanings of unskilled, unemployed urban youths to determine the necessary game mechanics, dynamics, and aesthetics needed to motivate them to acquire employable skills. The researcher's background as a user experience designer and developer informed his user-focused and participatory approach to research when designing for human use. Therefore, this research is guided by the same perspective.

Epistemology is how the researcher comes to know the nature of reality (Saunders, Lewis, & Thornhill, 2009). The key fundamental epistemologies known in research are Pragmatism, Direct and Critical Realism, Positivism, and Interpretivism (Myers, 1997; Saunders, Lewis & Thornhill, 2009; Neuman, 2011). This research adopted the epistemological assumptions of interpretivism to understand the nature of the context from the perspective of the social actors. The need to follow the interpretivist philosophy is emphasised by Saunders, Lewis, and Thornhill (2009:111) as they assert that researchers should “explore the subjective meanings motivating the actions of social actors” (herein the urban youths) “in order for the researcher to be able to understand these actions” and interpret them. It is on the premise that social reality is shaped by the social context and experience, as such, should be studied within its context by “reconciling the subjective interpretations for its various participants” (Bhattacherjee, 2012:103).

This paradigm aligns closely with the researcher's epistemological view as it allows for understanding the challenges and complexities the urban youths in marginalised communities face in acquiring employable skills as well as exploring how gameful design elements can be incorporated in digital technologies to create engagement and motivation to learn skills. Obtaining insights from the youths faced with these challenges is based on the interpretivist research paradigm that social reality is not objective or singular. Still, it is formed by the subjective interpretation of the experience and the social context of the studied participants (Bhattacherjee, 2012:103). To get these insights, I immersed myself in the daily lives of urban youths living within a low socioeconomic community in Western Cape, South Africa. It allowed me to experience some of the challenges these youths face and gain insight into some of the values shared amongst them. With these experiences, I was in a better position to take on the point of view of the youths (Monette et al., 2014).

3.2.2 Research approach

With the above philosophical underpinnings considered, I followed an inductive approach, as the nature of the research is of the interpretivist philosophy. By following an inductive approach, researchers develop hypothetical and theoretical concepts and patterns from the analysis done to data collected from participants. The inductive approach is described by Saunders, Lewis and Thornhill (2009:126) as an approach "to get a feel of what is going on, to understand better the nature of the problem". The need for an inductive approach is to reduce preconceived notions that impose meaning on the collected data and allow for the collected data to form the theory (Monette et al., 2014). The adoption of an inductive approach for this study necessitated a qualitative study (Creswell, 2009).

Qualitative research is used to achieve a better knowledge of a phenomenon through observation and interpretation of meanings in context. Kaplan and Maxwell (2005) advise that qualitative studies should investigate the behaviours and perspectives of participants in a social context to understand (not explain) a phenomenon. This research approach provides contextual information and gives rich insight into the meaning and purpose of the phenomenon being studied (Guba & Lincoln, 1994).

During this study, the views of the participants about the phenomenon being studied were collected using generic and broad questions to facilitate communication for a 'constructive meaning' (Creswell, 2009). These constructive meanings are non-numeric and are not meant for quantifying but rather to explore and understand human behaviour (Babbie & Mouton, 2010). The context will be lost if the data collected was quantified and numerically expressed.

Qualitative researchers subsequently carry out research using methods and tools that would aid in gaining insights and meanings from the participants, such as observations, in-depth interviews, and focus groups (or in-depth group interviews) (Babbie & Mouton, 2008; Babbie, 2014; Monette et al., 2014). The use of in-depth group interviews and activities in this study places this research in the qualitative sphere.

Some of the steps followed suggested by Monette et al., (2014) to conduct qualitative field research are problem formation, selecting a field setting, entering the field, developing rapport in the field, becoming invisible, the attitude of the researcher, observing and recording in the field and exiting the field. This is in agreement with the advice of Dilthey and Jameson (1972) who emphasise that in trying to understand context, researchers should move from the outer (human action and productivity

manifestations) to the inner (the exploration of meaning) (Tan, Wilson & Olver, 2009; Babbie & Mouton, 2010). This perspective goes beyond mere empathy towards the participants but involves situating oneself within the historical and social context of the participants, as advocated by Tan, Wilson, and Olver (2009). Placing oneself in the context of the community members helps the researcher to articulate what the participants are expressing.

This should be the primary motivation for community based research such as D4D. Having a shared experience with the participants within their community and using anthropological methods and tools was valuable in the overall process. In conducting the research, it helped shape the way I understood the data when conducting further analysis of the collected data.

The key elements of the overall research process, as identified by: the philosophical underpinnings as noted above, the research question and the research aim, the scope of existing knowledge, the unit of observation or analysis and the amount of time and other resources available guided my research strategy choice (Saunders, Lewis, & Thornhill, 2009; Bhattacherjee, 2012). In this study, low-skilled, unemployed urban youths in low-level socio-economic communities were the unit of observation and organisation such as Afrika Tikkun were purposely chosen as the gate keeper. By adopting anthropological strategies, I derived a more informed understanding of the social context of the participants through extensive engagement; thereby developing relationships and patterns of meaning to achieve the desired outcome from the research findings.

As mentioned earlier, focus group activities (with in-depth group interviews) were the data collection method employed in this study. To support the use of focus groups in user-focused design research, Preece, Rogers, and Sharp (2015) suggest that focus groups can provide multiple viewpoints from the participants' perspectives. These multiple viewpoints highlight areas of divergence and consensus among participants and encourage a better rapport between the researcher and the participants. Data collection using focus groups usually involves in-depth discussions or activities with a select small group of participants in a phenomenon of interest (Monette et al., 2014; Preece, Rogers & Sharp, 2015).

The required number of respondents that a focus group should have varies among authors and I would add as well as the context and the nature of the research problem. For instance, Babbie (2014) suggests 5 to 15 participants, Smithson (2008) advises a

group of 6 to 12 participants, while Monette et al. (2014) recommends up to 10 participants. Whatever the range is given, it is clear that fostering a better in-depth group interview and activities requires a relatively smaller number of participants than one may assume. Accordingly, the participation of nine respondents during this study satisfies the number reasonably for in-depth group interviews and activities (refer to Table 4). In addition, Liamputtong (2011) argues that the critical feature of in-depth group interviews should be interaction, as it assists people to explore and clarify their points of view. This set of people should be of shared social and cultural experiences or shared areas of concern; in this case, lack of high skills and unemployment (ibid).

Table 4: The youth participants from Mfuleni

	Pseudonyms	**Gender**	**Age group**
1	Rea	Female	19-29 years
2	Andy	Male	19-29 years
3	Yola	Female	19-29 years
4	Nonzie	Female	19-29 years
5	Amos	Male	19-29 years
6	Alonzo	Male	19-29 years
7	Tee	Female	19-29 years
8	Luzu	Male	19-29 years
9	Luckitz	Male	19-29 years

Next, the rationale for utilising Design Anthropology as the study's methodology is examined to facilitate greater transformation and innovation in addressing the current challenges of obtaining job-ready digital skills and mitigating unemployment.

3.3 The Methodological Question

Research methodology is how the researcher will access and report what will be learnt from the reality of the research participants (Guba & Lincoln, 1994; Welman, Kruger & Mitchell, 2005). I employed procedures that underpin design anthropology in the process (see Table 5).

Whilst design anthropology emerges from two distinctive means of knowledge and academic disciplines, design and anthropology, it is a hybridised version of the two (Smith, 2011; Prendiville, 2015). Design anthropology is a collaborative methodology that combines research practices, methods and techniques from design and anthropology, which is aimed towards innovation and to some extent transformation (Gunn & Donovan, 2012; Otto & Smith, 2013; Prendiville, 2015; Ventura & Bichard,

2016). A design anthropologist serves as a mediator between the designer and the user in the design process, thus creating a deeper understanding of the socio-cultural experiences of the users (Ventura & Bichard, 2016). Design anthropology as a methodology highlights the shared daily practices of individuals in a particular environment or community, which can lead to innovation and transformation (Prendiville, 2015).

The research methods used in this process are ingrained in design anthropology to ensure that the findings lead to the development of an innovative technology that will lead to appropriation (owning technology as a fit to one's personal life) and 'enskilment' (Ingold, 2000, 2001; Kilbourn, 2006; Gunn & Donovan, 2012). Ingold argues that for technology to be used for skills development, it has to be designed as tools rather than as machines (Ingold, 2001; Kilbourn, 2006). In addition, for technologies to be used for skills development, users should be viewed as skilled practitioners, not just passive consumers (Ingold, 2000; Gunn & Donovan, 2012).

Table 5: Summary of the data collecting process

Research study activities	**Targeted data**
The first visit to Afrika Tikkun at Mfuleni played a key role in fostering a relationship and rapport with the participants in their spatial environment. The experience helped create an understanding of the best way to engage with the participants in their environment.	Initial insightful data. Observation of the research settings and context
Second workshop – the biomatrix tool was used resulting in the complexity matrix	Insight into the co-causing factors of the phenomenon being studied
The participants reflective and self-awareness task carried out over three weeks and the 3Ws questions	Insights into the gameful design elements identified and skills to train for.
Third workshop session of brainstorming with the target audience.	A follow-up workshop of a brainstorming session on insights of the ideal state
Brainstorming workshop sessions for clearly defining the problem and ideating solutions	Insights on how to incorporate the findings into a gameful design system.

A comprehensive account of the data collection and analysis process is presented in the following sub- section.

3.3.1 Conducting research using Design Anthropology in Community Informatics

Although authors have clearly defined or described the idea of what Design Anthropology is, there is no clear-cut methodological process for Design Anthropology (see instances in Smith (2011), Ventura & Bichard (2016), and Drazin (2021)). For this reason, it was a bit of a challenge to follow a known established methodological process for Design Anthropology. I, however, acknowledge that Design Anthropology is still an emerging field, hence the need to develop and propose a methodological process (specifically to be used within this study), especially for conducting research in digital-for-development paradigm. The Design Anthropology methodological process used and presented here took into consideration the concepts from the above-mentioned works and extended it for the methodological process as shown in Figure 13.

At the initial (research proposal) stage of the research, I firstly considered using the design thinking process; currently known for its use in industry and the academic space, as shown in Figure 12. It is design-driven for the development of innovative solutions (Dam & Siang, 2019). However, due to design thinking's limitations for studies such as this and its less emphasis on the in-depth understanding of social context, this thesis thus adopted and followed the proposed DA process as shown in Figure 13. For instance, Stage three as seen in Figure 13 has been renamed from 'empathise' to DA's 'placing oneself in context' with the addition of data analysis at stage four to underscore the need to understand social context in DA. The rationale behind these is explained below.

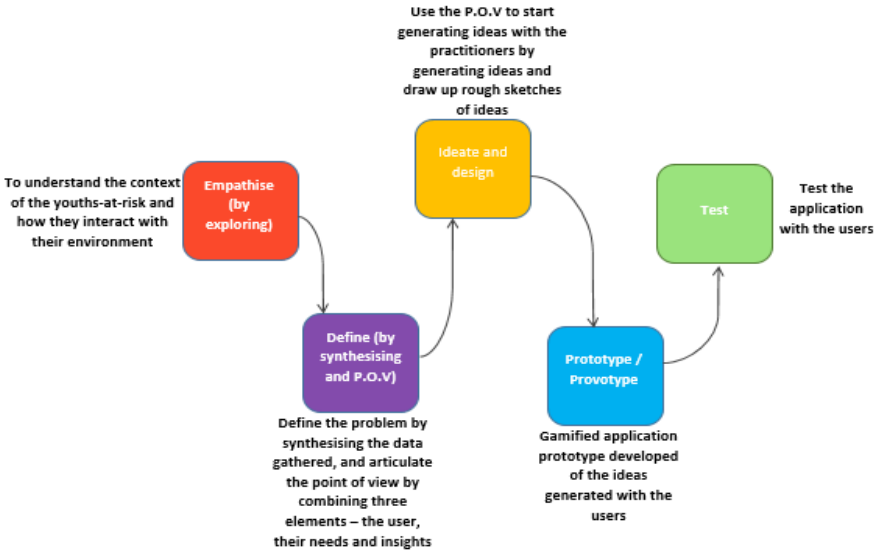


Figure 12: Anticipated initial methodological process for the research (Author's construct)

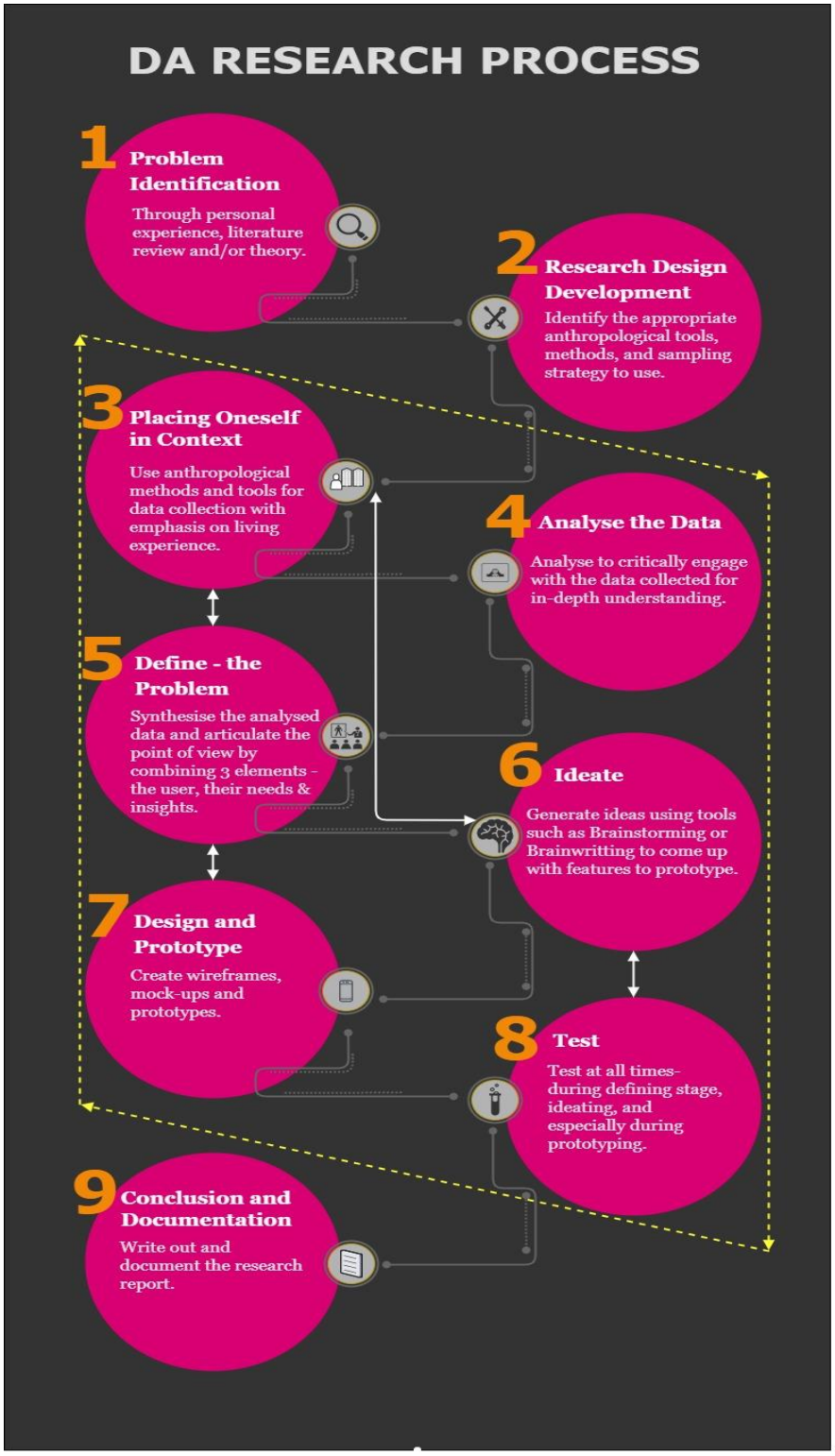


Figure 13: Adopted research process in conducting a DA research (Author's construct)

Conducting research in Community Informatics using Design Anthropology should emphasize three things: Design, Anthropology and the Research process. Each stage of the Design Anthropology process will be explained and then progress into describing how these were applied during this study.

As with other design approaches, stages three to eight are not linear but are iterative (indicated with the yellow arrows around stages 3-8), evolving and concurrent processes (indicated with the white arrows) that emerge throughout the research. Practically within the research process, this means that could either occur out of sequence or in parallel with each step of the process, towards obtaining the final outcomes. Outlined below are each stage of this process – including the roles and responsibilities of team members for collaboration, methods and the tools for each stage.

Stage 1: Problem identification is the first stage in conducting design anthropological research. At this stage, the decision is made on what problem to focus the research on. Identification of a researchable problem could originate from personal experience, theories, or/and review of the literature. While it might seem so many problems exist, it will be erroneous to view any problem as researchable (Monette et al., 2014). Researchers should also consider other factors that might make a research problem impracticable from an ethical, financial or methodological perspective (ibid). The responsibility of identifying what constitutes a researchable problem falls on the lead researcher(s).

The problem that led to this thesis stemmed from my experience in mentoring and training youths to address the challenge of youth unemployment in South Africa. While it may not be a researchable problem on its own, the support of literature for future studies on this area, using gameful design and technology, made it a researchable problem. The gap identified was in understanding how to identify and incorporate gameful design into non-educational skills training digital platforms for youths in marginalised urban areas in South Africa.

Stage 2: Research design development involves developing the appropriate research plan after establishing a clear research problem. The research design is a detailed plan that outlines how the research will be carried out and outlines every step of the research process. This stage involves identifying the appropriate design anthropological tools, methods and sampling strategy to use in the course of the research. The lead researcher(s) should address what information should be gathered and from whom this information is gathered and how the participants will be selected. It is at this stage that the research proposal is written and presented for approval.

This thesis follows the research design as outlined in chapter 1 and in this chapter above.

Stage 3: Placing oneself in the context of the participants through a lived experience. Understanding the participants through the lived experience of the social or cultural context of the participant creates an opportunity for an in-depth understanding of the challenges faced by the participants. This perspective moves from *empathy or discovering* (in other similar design approaches) towards *experiencing it to understand it*. The use of DA focuses and motivates for more anthropological use with the end goal of understanding the lived experiences of respondents by placing oneself in the social context of the respondents. If this is done, an opportunity exists to potentially grasp the meaning of the hitherto unknown thoughts and processes of participants when we as researchers try to experience it ourselves.

This central concept of placing oneself in the lived experience of the respondents; requires in this study a change from empathy or discovery to placing oneself in the social context (stage 3). In-depth interviews, participant observation, ethnography, focus group interviews and activities are some of the recommended data collection techniques for this stage. For group activities, the use of tools that encourages in-depth discussions such as brainstorming, brain-writing, biomatrix, and affinity diagrams should be encouraged. At this stage, anthropology takes higher precedence than design.

Stage 4: Analyse the data. While the researcher(s) forms a deeper understanding from the previous stage, it is imperative to gather more meaning from the data collected from the participants. Using hermeneutics and thematic analysis, this stage which is mostly performed by the lead researcher(s); helps to engage with the data collected and to do so in a critical manner.

Stage 5: Define – the problem. At this stage, the lead researcher(s) should work closely with some of the respondents during the workshop activities. The researcher(s) presents the analysed data to all. Note that these findings may change as the respondents may confirm the findings as valid or not. At this stage, findings are generally validated. To this end, the lead researcher(s) need to be open-minded. Anthropology and design take the same level of priority and precedence. Map out the pains (challenges), gains (goals), and tasks (actions) as discussed during the activities using the empathy-mapping tool. The details from the mapping are used to create personas that best describe the respondents or a storyboard that best tells the story of the user experience.

A point of view (POV) will then be framed and expressed in an actionable and meaningful goal-oriented way such as [User . . . (descriptive)] needs [need . . . (verb)] because [insight. . . (compelling)]. The purpose of the POV is to capture the design vision for the ideation phase. The researcher(s) will then be able to use the 'how might we' (HMW) question that can help spark the ideation phase.

Stage 6: Ideate. This phase is typically conducted simultaneously with the Define stage, during which various features for a product, service, or application are generated through brainstorming. Other examples of idea-generating tools researchers can use are brain-writing (method 6-3-5), six thinking hats, rubber ducking, reverse thinking and questioning assumptions. The whole idea is to get as many ideas generated as possible. The more ideas generated, the better. These ideas are then rated (1-3, 1-5, or star rating) based on their importance and must have been agreed upon by the participants of the workshop activities.

Stage 7: Prototype the ideas. Bring alive the ideas generated by wireframing, mocking-up and prototyping. In addition, one way to provoke discussion amongst participants on a designed artefact is to create provotypes.

Stage 8: Test at all times. Testing should occur concurrently with stages 3 to 7, as discussed above. The intention is that the outcome should be a designed artefact that does not disrupt the life of the end users but innovates or/and transforms them towards achieving their desired goal.

Stage 9: Conclusion and documentation. The ultimate objective of the researcher is to document their findings and procedures in a written format, such as a thesis, article, or book.

3.3.2 DA methodological process applied during this study

The first two stages of identifying the problem and developing a research plan were completed during the proposal writing of this thesis. After the approval of the research proposal, stages 3 to 8 followed suit. Before collecting the data, the first task was to identify and select a community that best fitted and described the context of the identified problem. The next task was to find a gatekeeper within the community that knew several people and controlled research access to the participants. This allowed the researcher to develop a rapport with the participants in the field which facilitated a successful data collection process.

Taking into consideration the research background and research question discussed in chapter one, adequate steps were taken in selecting the group of participants needed for the research. The group though heterogeneous, shared the phenomena of concern, in this case unskilled- or low-skilled, urban unemployed youths, between the ages of 18 to 29 years. Thus, using the Google search engine, a search for youth development (Not for Profit) organisations in the Western Cape was performed. I identified and contacted two organisations via email. A positive response was received from one of the organisations, Afrika Tikkun (https://afrikatikkun.org/) at Mfuleni, a township in the City of Cape Town.

Afrika Tikkun runs a career development programme (CDP) targeted at youths aged 19-29 years. This programme helps mitigate the effects of the challenges these youths face by providing "career guidance, job readiness training, job placement and bursaries for further learning". The information sheet which detailed the purpose of the research was sent via email to the acting CDP Manager for consent and approval. Ten of the youths who had participated in the programme and were volunteering as CDP alumni committee members were selected to participate in the research study. This number fulfils the number of participants needed for an effective, non-crowded, focus group activity.

3.3.2.1 "Is it safe?" – Context and reflection on research settings

Mfuleni is a suburb (township) located in the City of Cape Town Municipality, Western Cape Province, South Africa. It is surrounded by other similar townships in areas known as the Cape Flats. Stats SA puts the estimated population of the township at about 53 000 inhabitants, of which the working-age population (15–64-year-olds) make up 65 percent of the total population. Of the total estimated population, an average of 33.2 percent has either a Matric (29.3%) or a higher education (3.9%) qualification. The sample age group for this study (18–29-year-olds) is approximately 33 percent of the total population. See https://bit.ly/2H2oAwe for further information.

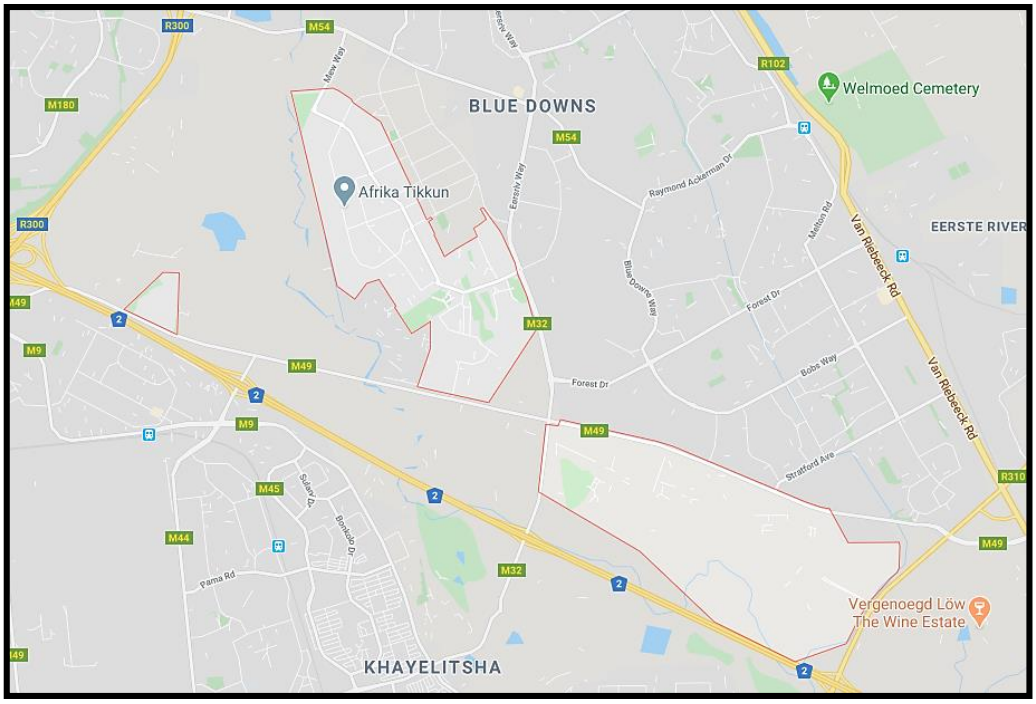


Figure 14: Aerial view and location of Mfuleni (image courtesy of Google Maps)

My first visit to Mfuleni was by an invitation on the 21st of June 2019 as a guest of Afrika Tikkun to give a talk on Careers and the Fourth Industrial Revolution (4IR) to the youths of Mfuleni. Although I was eager to engage with youths on the subject, my preconceived thoughts began to surface, presenting both an opportunity and a challenge. Thoughts focused mainly on security and safety; could I be robbed at a gun/knife point? On the other hand, could a stray bullet from a gang war be shot at me? These preconceived thoughts are not borne out of ignorance, but from narratives from many, including the media. These are thoughts and narratives of how dangerous such places called 'Townships' can be. I pondered a lot about turning down the invitation but finally summoned the courage to accept it.

All the Uber drivers that transported me during all visits to Mfuleni raised the issue of safety and security. 'Is it safe?' they questioned, once they start the trip and hear the name of the township, Mfuleni. I was therefore not the only one concerned about security and safety issues in Townships.

Two drivers cancelled the trip after they accepted and found out they were to pick me up from Mfuleni. Some of the drivers take the risk based on the response from the chat they have with a potential passenger. For instance, a chat I had with a driver was the reason he came to pick me up. When he arrived, he said he only came because of the way I responded to the chat – "you sounded different, that's why I came". Another was driving without the seat belt on and when I queried, he said he did it "because locals

can use it to know those who are not originally from Mfuleni" and it could be a sign of "weakness". It is safe to say that issues of security and safety are of concern apart from the other challenges being faced by community members of Mfuleni such as those being studied in this research; unemployment, poverty, no or low job opportunities, un- or low skilled and a generally low level of education.

Mfuleni, like the rest of the Cape Flats communities, is secluded from other parts of the higher socio-economic areas of the City of Cape Town Municipality. It is about 30 minutes to 40 minutes' drive (without traffic) from the central business district (CBD) (see Figures 14 and 15). Travelling from the CBD to Mfuleni, you move from suburbs with affluent residents or gentrified districts. As you head towards Mfuleni, through the highway, you are greeted by informal settlements of houses made of zinc, wood and often cardboard (called Shacks). These realities are again brought to the fore when arriving in Mfuleni as the GPS cuts off (twice the Uber app took us to a dead-end) and you need to ask for directions from the locals. Indicating that even basic technological services such as GPS have limited application within these communities.

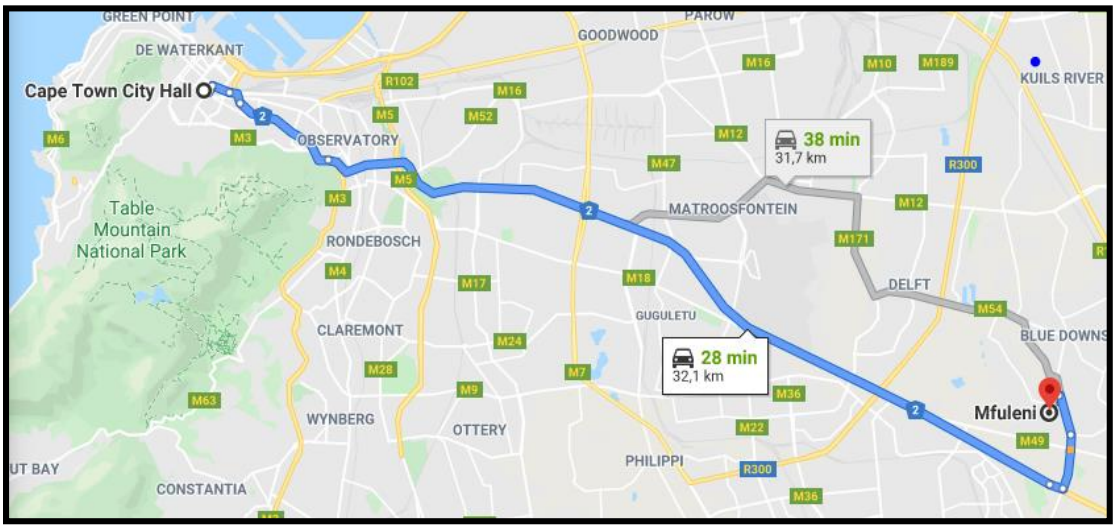


Figure 15: Distance from Cape Town CBD to Mfuleni Township (image courtesy of Google Maps)

One of the first things a visitor will notice when they arrive in Mfuleni is the number of community members involved in the shisa nyama (local name for barbeque) business. It is the primary source of income amongst the community members. Mfuleni has a shopping mall, which houses retailers such as Shoprite; one of the few visible economic entities at Mfuleni. The community also has a Taxi rank and a library. The library at the time of the research study has four working computers. The Afrika Tikkun development, training and resource centre is found in the Mfuleni Township (Figure

16). Its facilities are open to community members, including the computer lab where the youths can request access to them. The Township only has one known internet hotspot close to the library, with a daily cap of 50 MB.

Figure 16: Afrika Tikkun at the centre of the community

Low resource levels (in respect of computers and internet access) may pose a threat to the move towards the industrialised era, termed the fourth industrial revolution (4IR) or Industry 4.0, that focuses on digitised technologies. If there is still a struggle to meet the skills demand for industry 3.0, then there is a high probability of facing challenges to meet the skills demand for 4.0.

Finally, I also attempted to reflect on my position as the researcher in terms of the context of the research setting. While being an 'outsider' trying to bring 'social change' in a community means that I needed to remind myself that this process is often contested (see Akama, Stuedahl & Van Zyl, 2015). The value that design anthropology has is that it allowed me to place power in the hands of the participants while facilitating the process. It ensured that they felt they are contributing to an intervention for the betterment of their own lives. The bottom-up approach (rather than a top-down approach like other design methodologies) encouraged the reduction of 'colonial' and 'patronising' relationships with the participants (Akama, Stuedahl & Van Zyl, 2015). The process allowed me to embrace the participants' experiences and contexts and I also perceived the participants felt they had a platform to air their views on the challenges being studied and being part of creating a solution that would work for them.

With regards to the ethical process, using a well-known gatekeeper within the community and having formed a relationship with the participants before conducting the research with them, made them feel safe. I did not encounter any rigidity concerning them signing the consent forms (most of the participants allowed their real names and images to be used). Although I did ensure they understood what they were signing and preferred they remained anonymous. All through the research process, I ensured I placed myself and the research process (always) in an ethically acceptable manner (Van Zyl & Sabiescu, 2020).

This study reinforces my perspective as a researcher, not to try and force community members to adopt digital technologies but rather to confront existing knowledge to create innovations that are yet to be conceived. While I enjoyed the process of enlightenment, the research process is expensive, especially when it is self-funded.

3.3.2.2 Data collection and data analysis process

At this point, it is important to reiterate that while these stages are described separately for clarity of the steps taken, they sometimes occur concurrently. As an example, in all stages, I placed myself in the context of the research setting. While also collecting data, the data were analysed with the participants using tools such as affinity diagrams and the biomatrix as discussed below.

Below I describe the steps taken and processes followed during this research to understand the context of the participants. In addition, the steps taken to analyse the data collected are discussed. The detailed results and findings are discussed in the next chapter.

Once the approval for conducting the research from my institution and Afrikka Tikkun was granted, a research activity guide and plan (Appendix A) were prepared to guide the process of the group activities. It also helped to ensure the objectives of the activities were achieved. Interacting and working with the participants lasted between three to four months; from the last week of August to the first week of December 2019.

A meeting was scheduled on 30 August 2019 to introduce myself to the selected youths to foster rapport. Although having had the opportunity to meet with them on the 21st of June 2019, this served as an opportunity to meet with the youths one-on-one and get to know them personally. I explained the research aim and the expectations with the role they had to play in the research. Everyone in the room agreed on the set days (Saturdays) and times (12:00 – 15:00) for the group activities.

All group activities were held in the natural settings of the participants at Afrika Tikkun, Mfuleni (see appendix A for the research activities guide and plan). The venue chosen was devoid of distractions and was quiet. Materials provided for the activities include the following: coloured sticky notes, A4 pages, whiteboard markers, nametags, pens, and note-taking notepads.

On the second meeting (14 September 2019) for the activities, upon arriving, the participants signed their names alongside their preferred pseudonyms by which they wanted to be called during the activities. The use of pseudonyms was to ensure anonymity during the video and audio recording. The participants wrote their pseudonyms on nametags that they wore. Once everyone settled in, I informed them of their rights and read the individual consent agreement. All questions were answered and they were given time to read the consent agreement individually. They read, confirmed they understood it clearly and signed (see Appendix B). Nine youths were available, and one tendered an apology.

We had an ice-breaking session on fostering collaboration and effective discussion. This session lasted for about 15 minutes. Then I explained the next activity and the tool we would be using.

To understand the complexity of the research problem, unemployment and challenges of upskilling the youths, we needed first to dissolve the problem. This entails breaking down a problem into bits by doing systemic brainstorming to carefully understand how a problem interacts with other factors (Dostal, Cloete & Járos, 2005). Dissolving the problem first would help identify the activities and other entities that combine to create the problem. The notion here is that systemic problems are borne out of the co-production of other problems. The Biomatrix theory was used in this regard (see Figure 17). Biomatrix theory posits that to solve a systemic problem of a complex phenomenon, you first need to dissolve it. The biomatrix consists of an entity system (such as an individual, family, group, etc.) and an activity system (such as physical, biological, ecological, etc.).

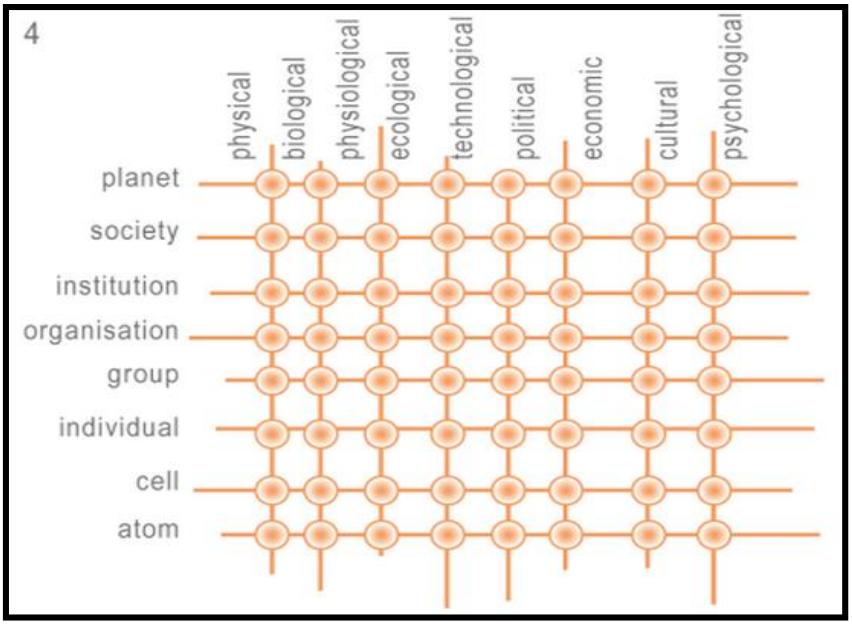


Figure 17: The Biomatrix web – entities vs activities Dostal, Cloete & Járos, 2005)

The affected entities associated with the research problem being explored as agreed by the group were the individual, family, organisations (companies – for and not for profit and educational), (governmental) institutions, and country and global organisations. The agreed activities were physical, biological, psychological, ecological, technological, physiological, environmental, economic, and cultural activities.

The systematic brainstorming and analysis of the problem resulted in a complexity matrix showing the interaction between the entities and the activities. The session was entirely informal. By using the Biomatrix tool, the discussions were in-depth and open-ended, allowing for the flow of conversations among the participants. These activities were recorded and transcribed for further analysis.

After the brainstorming session, I gave the youths a reflective and self-awareness task to carry out over three weeks. They were each given a notepad and a pen for the task. The participants were to keep track of their activities, taking note of the places they go to and at what time, and taking into consideration businesses or companies around them if any. The intention is that the youths identify what kind of opportunities could be available around them. In addition, they were to take note of the types of game(s) they play and for how long, what keeps them engaged in the game(s), what appeals to them in the games, and what situation made (motivates) them go back to the game. If they did not play games, I informed them to note other social media apps they use, such as Facebook, Instagram, and YouTube. The reason for this is that most social media apps

have successfully implemented gameful design to keep individuals intrinsically motivated to use the applications (Pellikka, 2014; Sitorus, Ferdiana & Adji, 2017). The principle here was that the youths have a clearer understanding of their personal experiences and were in the best position to note and describe why they carried out these actions.

Upon the completion of the three-week period, we reconvened for a group workshop to review the outcomes of the assigned tasks and to continue addressing the challenges related to skill development and unemployment. During the first session, the participants presented their findings from the task, and I asked follow-up (probing) questions to ensure that I fully grasped their responses. Throughout this process, I took note of the information gathered from the probing questions. After this session, I collected these notes for further analysis (see Appendix C for samples of the personal notes).

The second session of the day was to demystify and dissolve the problem even further. This session followed the table as seen below (Table 6).

Table 6: Biomatrix problem solving (Dostal, Cloete & Járos, 2005)

Problem **Protestor**	*co-causality* **Analyst**	*Ideal* **Dreamer**	*Strategy* **Code Breaker**
Unemployment of youths.	*What gave rise to the problem.(3+ co-causing factors)*	*Place an ideal/s in place of each co-causing factors. Ideals are by nature unattainable. Dreaming big.*	*How do we reach the ideal? Provide 3-5 strategies for each ideal.*
Lack of skills amongst youths	*What gave rise to the problem.(3+ co-causing factors)*	*Place an ideal/s in place of each co-causing factors. Ideals are by nature unattainable. Dreaming big.*	*How do we reach the ideal? Provide 3-5 strategies for each ideal.*

With the understanding we all had of the complexity of the problem being studied from the previous group activities (held three weeks before), we outlined the co-causing factors that gave rise to each problem. This was followed by brainstorming the ideas for each causality (Figures 18 and 19).

Figure 18: Brainstorming the ideals

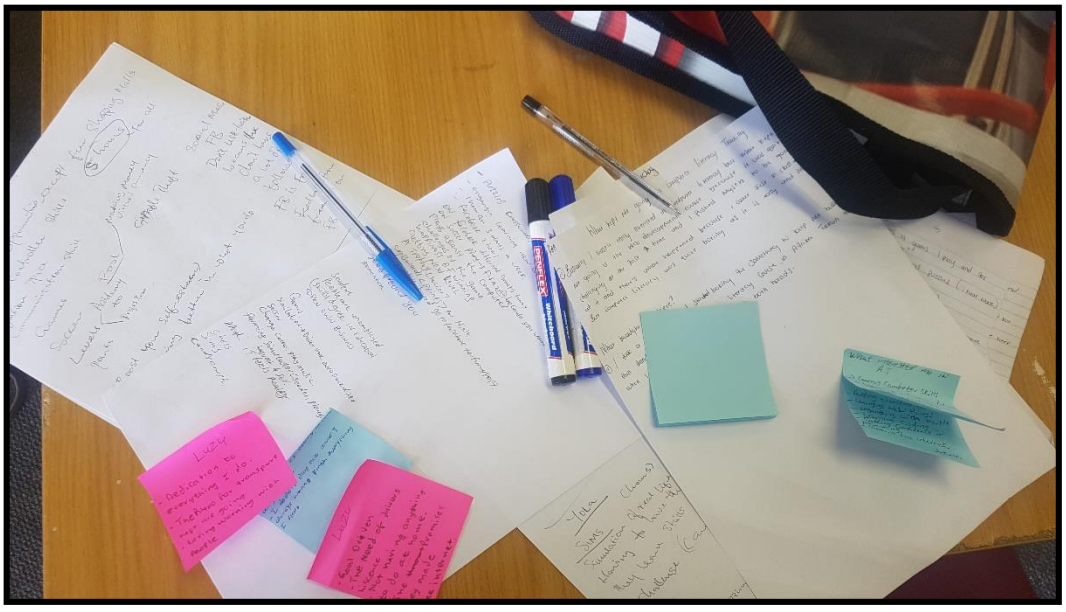


Figure 19: Notes on the ideals

The strategy section had not yet been addressed, as further analysis was required before presenting it to the group for the next stage. Further to these sessions, I enquired about their experience and journey at Afrika Tikkun by asking three ‘what’ (3Ws) questions; 1/ what made them start the skills development at Afrika Tikkun, 2/ what motivated them to continue, and 3/ what some of the challenges were that they faced. They noted their response, with their pseudonyms, and handed it to me. These questions were intended to find out 1/ what features could be added for on-boarding

the youths to the gameful application, 2/ the understanding of what led them to continue could be translated into gameful design features that would intrinsically motivate the youths to learn skills, 3/ brainstorm solutions on how to mitigate these challenges.

These tasks were carried out to prepare for the following set of activities, namely, Define and Ideate. Before conducting the next round of group activities, I analysed the data collected from the field. While some analysis had been carried out during the data collection phase, a systematic interpretation of the data was necessary to extract meaningful themes that emerged from the data. I initially analysed the data thematically using affinity diagrams. They are also called 'K-J Method Variation: thematic analysis' created by Jiro Kawakita, a Japanese anthropologist in the 1960s (Tague, 2005). The tool is used to organise, group, and theme a large number of ideas from user-centred workshop activities into their meaningful natural themes and relationships (Tague, 2005).

As the data were collected in various forms, such as recordings, notes, and observations, I had to code and synthesise the data to derive meaningful insights. The transcribed recorded group work (Appendix D) and notes (Appendix C) were subjected to further analysis using Atlas.ti software. The data were broken down into phrases and sentences that summarise what the participants said and what I observed. The findings identified six key considerations as themes for an effective gameful design to motivate youths to learn skills. I will outline and discuss these findings in the following chapters.

The defining and ideating stages followed immediately after the individual data analysis with two workshops on 23 and 28 November 2019. I conducted these workshops with three of the participating youths, and with the assistance of a UX/UI professional from the industry.

On 23 November 2019, I started the session by showing the group the findings from the data analysed shown on the affinity diagram. The youths present acknowledged these findings and then we mapped out these findings using empathy and a needs-mapping tool. At this point, it is necessary to state that the processes of analysis and testing were continuous, creating more meanings out of prior findings. The back and forth of the process ensured I tested and validated each idea.

To gain more insights from the youths and redefine the problem, I used the empathy mapping tool (Crandall, 2010). The empathy/needs mapping tool is used to help synthesise observations and gain more insights (Crandall, 2010; Dam & Siang, 2019). Having understood the youths (what they feel, hear, say and do), we only considered the pains (problems/challenges) and gains (goals) and to some extent the tasks (activities) that they would like to perform if they had an application to learn skills. This maps out the persona for the design of the gameful application.

Drawing insights from the mapping, storyboards were created for the two personas identified from the group (see Figures 20 and 21).

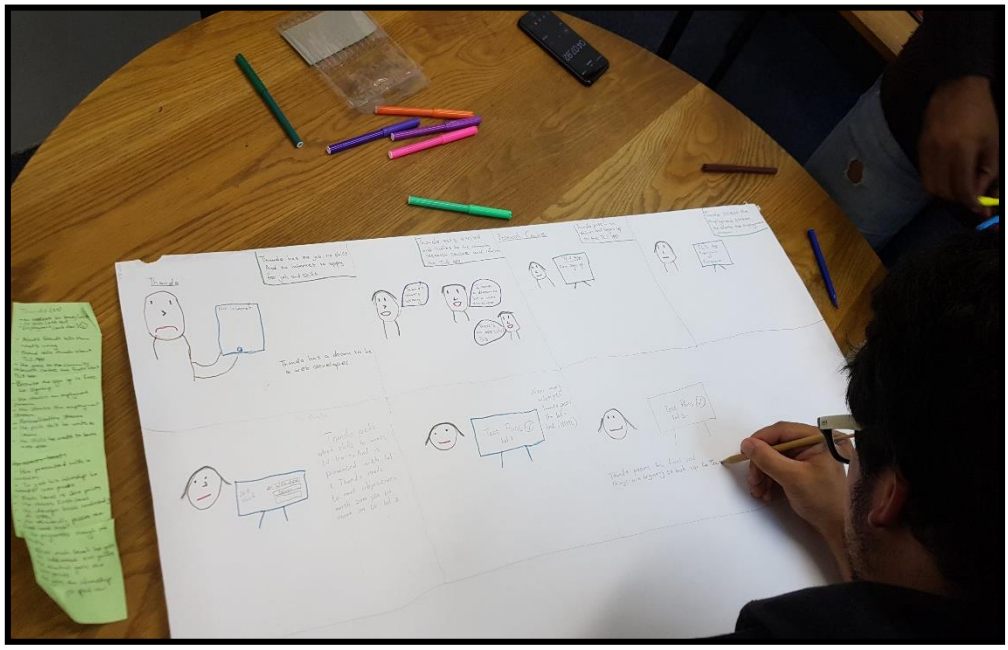


Figure 20: Storyboarding 1

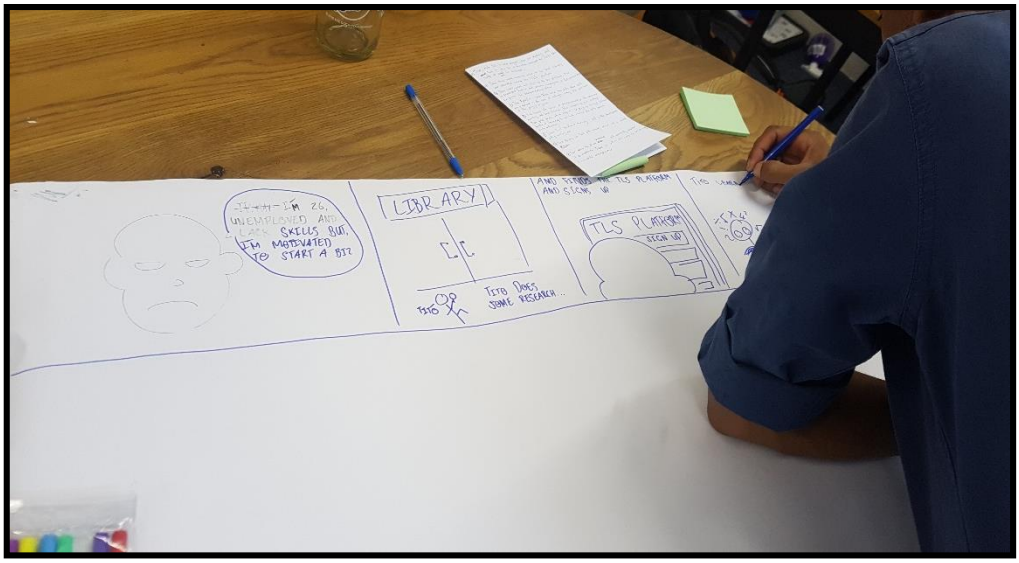


Figure 21: Storyboarding 2

The point of view (POV) was then framed and expressed in an actionable and meaningful goal-oriented way such as [User . . . (descriptive)] needs [need . . . (verb)] because [insight. . . (compelling)]. The purpose of the POV is to capture the design vision for the ideation phase (Dam & Siang, 2019).

To help spark the ideation process, we used the 'how might we' (HMW) question (Dam & Siang, 2019). Using the HMW paved the thought process of how to mitigate the known challenges (pains) the youths face to achieve the intended goals (gains). This led to a brainstorming session of ideas, including features on how gamified techniques could induce motivation.

After the brainstorming session, we rated and validated the ideas by:

Rating the "goodness" of the ideas on a scale of 1 to 3, with 1 being the lowest and 3 the highest. We validated these ideas by using the importance/priority matrix. The importance matrix is adapted from the impact/effort matrix (Figure 22).

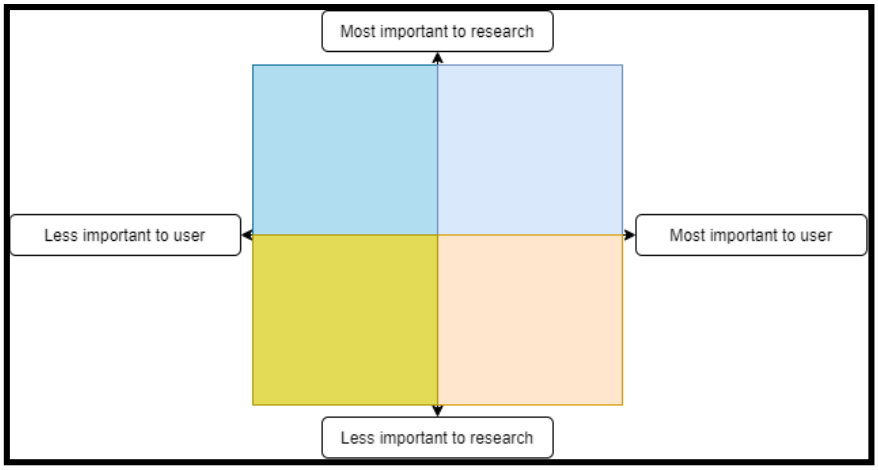


Figure 22: Tool used in validating the ideas (Author's construct)

The last phase of the process, testing, occurred in parallel with the other phases, as discussed above. The objective is to develop an application that is perceived by youths as a practical tool for skill acquisition, one that does not disrupt their daily lives, but instead keeps them engaged and motivated throughout the process of enskilment.

3.4 Delineation of the study

This study was delimited to the area of Mfuleni in Cape Town, Western Cape, South Africa, due to the physical presence of the researcher being necessary to employ the methodology of DA throughout the study. Additionally, this study was bounded within the context of the unemployed and low-skilled youths living in marginalised urban communities in Cape Town, Western Cape, South Africa. While the study followed a meticulous process, the focus was on an in-depth understanding and not on generalising findings across all youth groups. The limitation of only collecting data from a marginalised urban community is noted, and further research may be required across similar communities and rural areas across South Africa. However, the findings from this study may hold relevance to other youth groups in similar contexts.

Furthermore, the research was done using qualitative methods and an interpretivist research approach using a small group of young people. However, while this may be the case, the number of participants fulfils the criteria for in-depth focus group activities with community members. This allowed for an iterative process with the same participants.

Finance, time, and COVID-19 lockdown regulations affected taking this concept into development and further testing the system. Nevertheless, the findings and the incorporation of the game elements as seen in chapter five (see the user flow diagram)

gives a clear architecture for development and an indication of what the user experience would be if these challenges were not there.

3.5 Ethical considerations

Before conducting the research, permission to conduct this research was granted based on the research proposal submitted to the Research Committee of the Faculty of Informatics and Design (FID) at Cape Peninsula University of Technology (CPUT). Additionally, permission was granted by the gatekeeper (Afrika Tikkun) to conduct research with the alumni group of their programme.

Participants were also informed of the aims and objectives of this study before the start of the research. They were told what would be required from them during the research process. Participants were informed of their rights to participate and that they could withdraw without any implications. They all indicated an understanding of what they were told and indicated interest.

The ethical considerations comply with the ethical principles of the university and with general principles for scientific research, such as obtaining appropriate individual consent and ensuring confidentiality in the use and storage of data. Each participant signed an individual consent form. The consent form was first read to them, then given to them to read, and they were allowed to clarify any questions they had before signing the document. This ensured that participation in the research was voluntary. Participants were informed that they had the right to refuse to answer any question that threatened them and they have the right to remain anonymous. Participants were informed of their right to refuse to provide any sensitive data that may be requested. If any participant opted to withdraw, all data gathered until the withdrawal time would be destroyed.

The researcher ensured anonymity and confidentiality, assuring the participants that any information they shared would remain anonymous, confidential and protected. While most participants agreed for their names and images to be used, their identities were protected using pseudonyms and personas.

In this chapter, I have presented the use of Design Anthropology as the research paradigm in this study to investigate the research question. I have described the research methodology, including the research context, as well as the steps taken during data collection and analysis. Although I have provided some details regarding

data analysis, a more in-depth analysis of the data and research findings will be discussed in the following chapter.

CHAPTER FOUR
ANALYSIS AND FINDINGS: From Complexities to Gameful Design

4.1 Overview

This chapter explains the data analysis process and the corresponding findings for the thesis based on the research question. Mitigating the challenges of unemployment, one of which is the lack of the required higher-level skills for the 4IR economy and its corresponding digital foundation; requires the focused acquisition and up-skilling of the youth of South Africa. Thus, the central aim of this research was to explore the considerations (social, economic, and technical) needed to design a gameful system for unskilled or low-skilled youths living in marginalised urban communities within South Africa to motivate and engage them to acquire skills that could potentially reduce unemployment. Before conducting this study, it was unclear what game elements would motivate and engage the youth group to acquire/develop employable and entrepreneurial skills.

However, two issues were apparent before conducting this research:

1. The challenge of youth unemployment and skills acquisition in South Africa is a complex and 'wicked problem' (Cambra et al., 2017; Wilson-Prangley & Ngosi, 2018). Therefore, to understand this challenge, it was necessary to also understand these complexities from the youths' experiences and perspectives.
2. Gameful elements, *when applied appropriately*, have been shown to engage and motivate users in various contexts. To apply gameful design appropriately, these contexts have to be researched to understand how best to combine the game elements for success in a given context (Glover, 2013; Sitorus, Ferdiana & Adji, 2017).

To understand the complexities surrounding the youths mentioned above, I needed to use tools that would facilitate (dis)solving the problem while trying to place myself in the youths' context (refer to chapter three for further elaboration on the necessity and process of this). The outcome of those processes identified co-causalities that are grouped and discussed in themes. The understanding of these themes further led to clearly defining the problems for the ideation and design process.

These findings are presented in three sections. Firstly, the results (co-causalities) are presented based on the understanding of the complexities, which are broken down into themes that emerged from the data collected. Secondly, the findings are discussed in relation to (potential) game elements that emerged from participants' self-reflections

on the games they played and social media platforms they used. This analysis includes what they found engaging and motivated them to return to such applications. Finally, to consolidate and validate the findings from the data collected, defining the problem process towards the ideas generated for the features of the gameful application are discussed.

4.2 Understanding the complexities of unemployment and lack of skills among urban youths

As I outlined in the previous chapter, embedding myself within the context of the youths of Mfuleni took place from June 2019 to December 2019. This process involved an initial meeting with Afrika Tikkun, with an additional five intensive group activities. In addition to these activities, the youths carried out reflective and self-awareness tasks for three weeks. All of these activities provided a rich data pool which allowed me to better understand these youths' perspectives.

The complexity of the unemployment and skill acquisition challenges faced by the youth in South Africa required that the process for data collection should be carried out in a way that would facilitate finding co-causing factors that led to the stated problems. In addition, the data collected would have to be analysed to reduce misinterpretation and bias from the researcher. The data analysis was done continuously and concurrently throughout the research using various tools such as the biomatrix and affinity diagrams during the activities with the target audience, and with MS Word and using Atlas.ti for coding the transcribed data. In this section, I present the findings of the co-causalities that created these complexities of the problems set out by this study. These findings were mainly from the second and third sessions with the target audience.

I used the biomatrix tool (Figure 23) and affinity diagram (Figure 24) with the youths during the second and third workshop sessions to reduce misinterpretation and bias. For the second workshop (held on 14 September 2019), the biomatrix tool was used resulting in the complexity matrix below. With permission from the youths, the in-depth discussion session was recorded for further analysis.

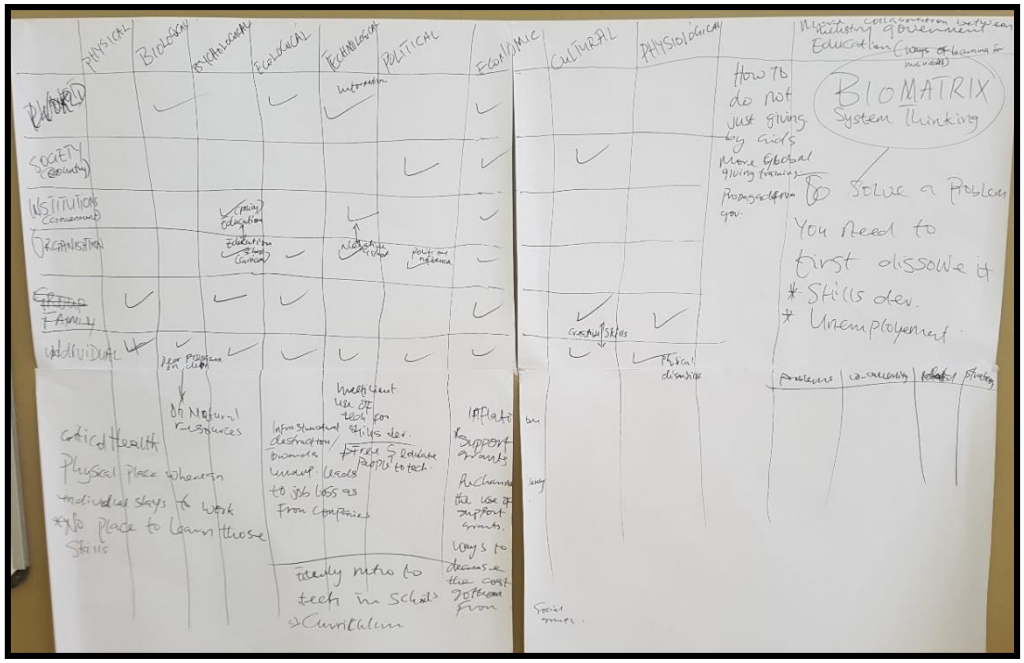


Figure 23: Biomatrix analysis

Following three weeks of assigning tasks to the participants, the third brainstorming session was conducted on October 5, 2019. As a result, the affinity diagram shown in Figure 24 (also outlined in Table 7) was created. Co-causing factors were depicted with pink sticky notes. Blue sticky notes represented the ideal state – characterized by perfect conditions. The strategy session occurred during the third and fourth workshops.

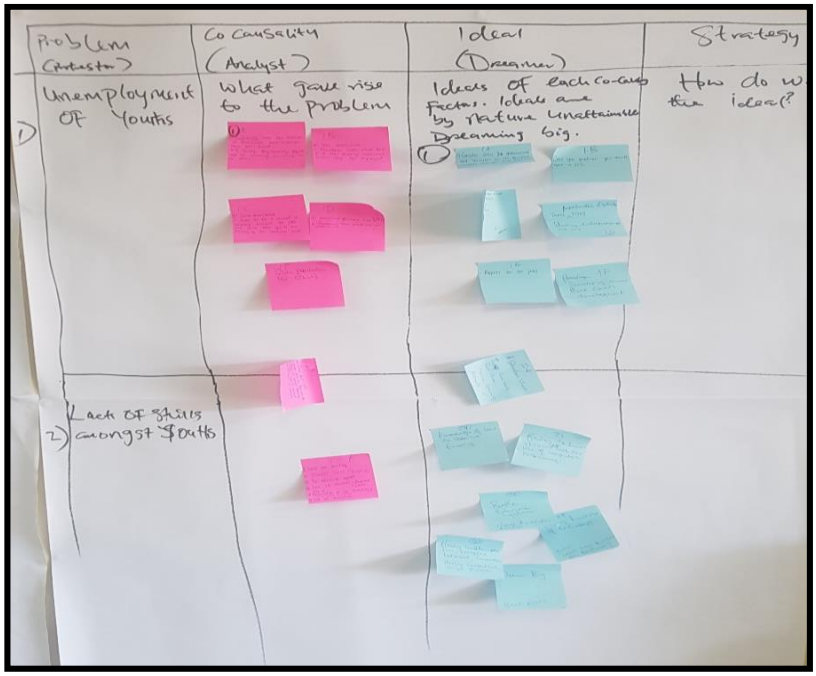


Figure 24: Affinity diagram

Table 7: The co-causalities outlined

Problem (Protestor)	Co-causality (What gave rise to the problem?) Pink	Ideal (ideals for the co-causalities) Blue	Strategy (how do we achieve the ideal?)
Unemployment of youths	• School drop-out – people tend to drop out of school to attend to family matters e.g. to become breadwinners or be a parent • Over population in major cities • Fear of taking risks/ failing • Being over qualified – seem to be a trend in companies where the CEO (recruiter) will think you will be managing the company soon (sees you as a threat) • Job experience needed – nowadays people must have 5-10 years working experience before they get employed • Undermining other jobs because of the particular qualification that you hold e.g. having programming degree and not wanting to work as a teller *** Jobs people see and undermine • Lack of secondary (high school) education	• Respect for all jobs • Developing areas ('Townships') that needs development • Have entrepreneurial skills • Take risks • Once you graduate you should get a job • Youths being able to consider other job opportunities • Get a job / Volunteering at a particular company that you hold qualifications of to get some experience. • Employ the person that deserves the position • A situation where they can work part-time • Online learning	
Lack of skills amongst youths	• Lack of funding • Lack of places to develop technical skills • Poor educational system • Lack of resources e.g. computers, internet data • Lack knowledge on the use of technologies in rural areas and Townships • Lack of ambitions	• Knowledge of how to source for funding • Better education system (change the current curriculum) • Having technical skills e.g. on programming, use of computers, web dev, etc. • Having knowledge on the use of technology • Have bigger dreams (Be goal-oriented)	

		• Having uninterrupted, free, uncapped internet connection • Youths having computers and phones	

The recorded video from the second session was first transcribed in MS Word, and by using open coding, the text highlighter was used to accentuate ideas that were noted by the youths as well as those that were emergent. Sets of sentences, sentences, and phrases were highlighted with no attempt to interpret the data. Using comments, these sets of sentences, sentences and phrases from the data were coded at face value in words and phrases that describe them. To ensure that the coded words and phrases retained their meaning from the collected data, the videos were reviewed for a second time, cross-checking with the biomatrix tool before proceeding to the next step using Atlas.ti.

After importing all the transcribed data that had been coded at the first level into Atlas.ti, I proceeded to analyse it further. Specifically, I searched for similarities and connections between coded phrases and words and merged those that were closely related. This process led to the consolidation of twenty-five ideas based on the youths' responses. Please see appendix E for the code report from Atlas.ti. Using Atlas.ti also made it easier to link the codes to the comments from the transcribed data.

The next step was to cross-examine these co-causality factors from the third session with the codes from Atlas.ti of the second session and look for commonalities. Similar ideas or codes were collapsed eliminating any repetitions. For instance, a lack of resources, lacking knowledge on the use of technologies in rural areas and Townships as well as a poor educational system were observed from both sets of data.

By carefully observing both sets of data, I rearranged and grouped the co-causalities with common (related) meanings. For each grouping, I provided a theme or appellation that describes the grouped co-causalities. For example, co-causalities such as educational system and curriculum challenges, lack of practical learning, school drop-out, lack of adequate qualifications (from High School and above) and learning programming skills were grouped under the theme training and education. This resulted in the emergence of six themes namely: knowledge and use of technology, funding and capital, resources for upskilling, opportunities, training and education, as well as physiological and psychological issues.

Thus, in breaking down the two main problems (unemployment of youths and lack of skills amongst youths) at the start of the study, six core causalities or themes emerged with thirty-one co-causality factors. Accordingly, I will discuss each of the themes with their corresponding co-causalities. A summary of the themes with the corresponding co-causalities is found in Table 8 and Figure 25 below.

Table 8: Themes and co-causality factors

Themes	Co-causality factors	No. of co-causalities
Knowledge and use of Technology	• Insufficient knowledge on the use of digital technology • Lacking suitable skills and industrial technologies leading to employment (employing expatriates and exporting the raw materials to other countries) • Learning digital and programming skills	3
Funding and capital	• Misuse of public funds (through corruption and greed) • Cost of living • Financial challenges (Not earning [stable] income) • Government and organisations funding community developmental centres (the lack of) • Misuse of support grant;	5
Opportunities	• Shortage of opportunities in rural/township areas • Nepotism and networks in finding opportunities • Lack of information on opportunities • Corruption and greed in tendering process • Cost of transportation • Jobs seen as demeaning • Automation of jobs • Experience and qualifications • Effects of global warming and natural disasters	9
Resources for upskilling	• Government and organisations funding community developmental centres • Lack of digital resources • Lack of skills development facilities around rural areas	3
Training and Education	• Educational system and curriculum challenges; • Lack of practical learning • Lack of adequate qualifications	3

Physiological and Psychological issues	• Fear of technology taking over jobs (through automation of jobs) • Cultural influences • Demotivation and discouragement • Physiological challenges and needs; • Psychological manipulation through propaganda • Lack of ambition • Fear of taking risks/failing (towards entrepreneurship) • Influence on youths from older people to do 'bad stuff' (need for mentors and mentorship)	8

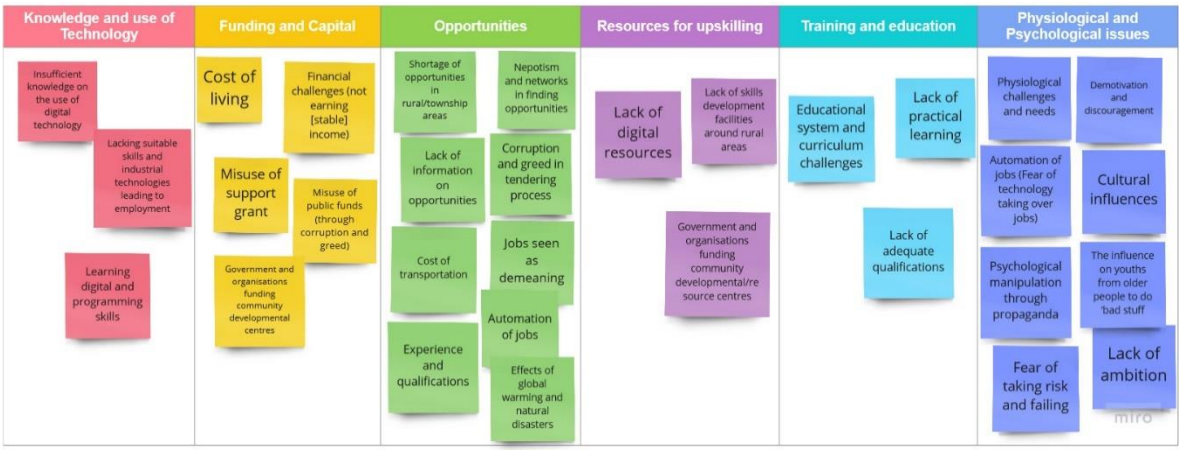


Figure 25: Themes and co-causality factors

I present these themes based on the number of occurrences and not based on importance as these themes are linked to each other in other ways.

4.2.1 Theme 1: Knowledge and use of Technology

The findings show that knowledge of the functionalities and the use of digital technology, especially smartphones, plays a role in youth development and skilling. The participants acknowledge the role digital technology plays when they have more knowledge of its use and how to source more information for training and development, opportunities and funding using digital technologies. Additionally, the lack of this information, including learning digital and programming skills and knowledge of industrial technologies, deprives them of opportunities. The following co-causalities provided further details about this theme.

4.2.1.1 Insufficient knowledge on the use of digital technology

The data show that youths in low socio-economic communities still have some challenges understanding the full functionality of digital devices (especially

smartphones) and what they can do with them. Most of the functions used by youths are social media platforms (such as Facebook, Instagram and WhatsApp) and to some extent camera and photo gallery functionality.

> There are other functions of the technology in our phones, right? …just go out on the streets, just for an example, take anybody, any random person and ask them which apps do they actually use on their phones. It will only be WhatsApp, Facebook and their gallery and then they don't use the other apps, they don't know what they are for **(Andy)**.

The reason for this insufficient use of technology centres on the youths' lack of knowledge and lack of information on the functionalities of other applications and, to some degree, the other functionalities of smartphones. "They find them useless… they don't know what they are for. So people are not informed of it." Andy said, and reiterated by Yola**,** "People [don't] know what it is used for." These functionalities include searching for opportunities and learning skills online. Alonzo said:

> I feel people that are not from backgrounds that are very privileged you know... sometimes the information in terms of [how to use it]; they don't know what they're searching for [while] using technology. It's hard for someone that doesn't actually know 'okay, what am I gonna type on Google?' you know for scholarship or types of schools **(Alonzo)**.

The lack of knowledge and/or lack of information on the functionalities of digital technologies is because these technologies are not introduced early enough or are rather non-existent among the youths within these communities. Luzu, Yola and Alonzo stressed that trying to play 'catch up' about how to use digital technologies is challenging for the youths. They assert that coming from their 'disadvantageous background' makes it more difficult as such knowledge is not 'dispersed' early enough. They, therefore struggle to attain even the basic skills later in their lives.

> So for people like us who know nothing for the first thing that were invented (sic), when the new things come up, it's too much for us, it is hard for us to catch up because we have to learn a lot **(Luzu)**.

> I think it's about implementing it from a young age. Cause like, like the simplest thing for me, like with my phone…So it's like if you were able to implement it from a young age where it's as things develop we are developing with the products rather than I have to play catch up now **(Yola)**.

> Because like, for people that are coming from disadvantageous background... like backgrounds that are not technological, like it's very hard to disperse [the knowledge of] technology in a way **(Alonzo)**.

Introducing technologies early enough in their 'disadvantageous background' could help mitigate these concerns and challenges.

4.2.1.2 Learning digital and programming skills

To mitigate the challenges of insufficient knowledge on the use of digital technology, participants suggest that introducing digital training from the early stages of their education (from primary school) would be beneficial to them. Early introduction through educating young ones from less advantaged communities Alonzo said can help "[community members] understand the basics." These basics should include how to use digital devices (desktop and mobile) and applications, and basic programming skills. According to Amos this introduction to "technological stuff" has to commence "from primary" education. Tee added:

> …educate people about technology. Because I feel like people don't know about the technology. So if they would be more educated, and tell them about it, introduce technology to people **(Tee)**.

I curiously asked who could read and write in their local language (for instance, Xhosa, Zulu). The intention was to find out whether online learning would best be conducted in local languages or English. Only one youth confirmed they could read and write in their home language. While they could all understand their languages, a training programme in the local language(s), namely, isiXhosa, might not have the benefit envisaged. While the argument for an audio training programme could suffice, the assessment for digital skills could also be a challenge as most software is written in English.

Apart from the digital technological skills, skills needed in other industries are said to be lacking among youths in these communities.

4.2.1.3 Lacking suitable skills and industrial technologies leading to employment

The participants believe that lacking suitable skills for technologies used in some industries for local production leads to unemployment. These include skills to operate some manufacturing machinery, the absence of this machinery within the country to process and manufacture raw materials and not having the technical expertise to process and manufacture raw materials. This means companies would resort to

employing expatriates or/and exporting raw materials for processing and manufacturing. The result leads to people remaining unemployed. Luzu said:

> Like here in South Africa, we all know that we are rich in minerals, but we lack the resources (skills and machinery) to manufacture them. So we lack the skills to make [use of] these machines so most times we take people from the other countries and machines from other countries to manufacture these products. Or we export them from here to there because we do not have the necessary skills to manufacture them. And then people [remain] unemployed because they don't know how to **(Luzu)**.

Luzu suggested companies invest (more) in training youths "They need to be taught."

During the data collection process, it was observed that some of the young participants did not own smartphones, with two of them confirming this. This seemed to be a common issue among youths in the area, which raises concerns regarding the development of a mobile-based application. However, it was noted that these participants had access to the digital world through computers located in the Afrika Tikkun development centre and the community library.

4.2.2 Theme 2: Funding and Capital

The participants argue that having the financial means for skilling and education is nearly impossible. Finding start-up capital for an entrepreneurial endeavour is often exceedingly difficult. The annual increase in the cost of living, corruption and greed, low funding of community developmental centres by government and organisations, misuse of public funds, material and cultural deprivation, misuse of support grants, not earning [stable] income, lack of funding and financial challenges to access higher education are co-causing factors that limit upskilling for employment and entrepreneurship.

4.2.2.1 Cost of living

One of the reasons given as a co-causing factor is the yearly increase in the cost of living due to inflation. The incomes of most families in these communities are not enough to provide basic needs like food and clothing let alone have the finances for training, development, and education. Alonzo stated that inflation makes it difficult for families even to get their basic needs met:

> For individuals and [their] family it could be the cost of living like inflation. So, if inflation is high it's difficult for families, you know, to get their basic needs **(Alonzo)**.

With families focused on trying to make ends meet, upskilling and education take the back sit. Individuals and families not earning stable incomes is one of the main reason people are struggling.

4.2.2.2 Financial challenges: not earning (stable) income

The financial challenges faced by families hinder the development of the youths. Financial challenges lead to material deprivation and hence hinder them from accessing what they need to gain skills.

> It's like if you don't have access to what it is that you need to then gain skills, or your parents can't afford, or like your living situation doesn't accommodate for a good learning environment, it just doesn't help in any way **(Yola)**.

In addition, the inability of family members to earn a stable income presents a challenge in purchasing other basic things such as data to connect to the internet. This was revealed when I quizzed them about taking advantage of some of the benefits of using technology online such as free online training. They all exclaimed, "Because we don't have money!" (for data). In addition, access to funding (and educational loans) from financial institutions is also near impossible. Rea explained how she missed an opportunity to study in a higher education institution and how her funding application was turned down because her mom "…was not working by that time, they didn't approve".

> I applied at [institution's name withheld] business school in Sandton uh, and I went there only to find out that their college is a private college so they don't consider NSFAS, so I applied for uhm, for the scholarship (sic) in, what's this bank? [Institution's name withheld]. But then because my mom wasn't, was not working by that time, they didn't approve. So I had to look for other opportunities **(Rea)**.

Financial challenges and the cost of education also lead to some youths dropping out of school to become family breadwinners. "People tend to drop out of school to attend to family matters e.g., to become breadwinners or be a parent" (Luckitz). Yola stated, "If now people are meant to be in education and they have to take care of individuals in their family, it's very restrictive." She added that higher education institutions could

educate at “cheaper rates then that would allow for people to then develop themselves into where they need to be, or what they want to be”.

4.2.2.3 Misuse of public funds (through corruption and greed)

The misuse and misappropriation of public funds especially through corruption and greed, the youths argue, is one of the co-causing factors of unemployment. These public funds include foreign funds for investments in South Africa. The youths feel that the government is not doing enough because funds meant for youth development are being used for personal gain by government officials. These funds include but are not limited to funds for youths’ training, bursaries for education, the creation of job opportunities, and internships, and assisting start-ups and entrepreneurs.

> If [a government] fails to produce more jobs or, if [the government] fails to use the money that is meant to be used to create jobs that will lead me not to be employed **(Luzu)**.

> …our leaders, they are corrupt. And that goes back to not getting enough ways to [get] jobs. And we don’t have skills enough based on that **(Amos)**.

> So it’s just, when that tax money is taken, it’s not really invested back into the community properly. Into the right areas, so to say. So then, it does affect an individual, their chances when it comes to gaining employment **(Yola)**.

Through corrupt practices, some SMMEs (small, medium and micro enterprises) ‘suffer’, as these funds are given to companies that have ties with some government officials. Luzu said with anguish in his voice:

> …businesses will not be able to [have fundings] because the money is used by the same company each and every day **(Luzu)**.

According to their perception, insufficient funding for SMMEs and young entrepreneurs implies that these smaller entities may struggle to compete and subsequently "fail to generate additional funds," exacerbating the issue of unemployment.

Luzu added that funds that have been allocated for a particular purpose, when embezzled, create a negative connotation that could further affect future investments. The economy is affected by reduced investments, which in turn affects the country’s unemployment rate.

> [let's say for instance] if someone [have] one billion and allocated it to create jobs, like to build a mall. The person may say I would not invest my funds in this country because of the corruption. So the economy will not be in a better position because people will not want to invest in us **(Luzu)**.

Misusing these funds means that the government will not always deliver the resources that the youths need for their development. Tee suggested that the reason she feels the government “doesn’t deliver the financial resources” is that a political party thinks that even if they do not deliver, people would “still continue to vote for it.”

A more transparent and open process of funding using information technology is suggested as a way forward. While the misuse of public funds worries the youths, the misuse of support grants by youths was observed to be more worrisome for the participants.

4.2.2.4 Misuse of support grant

According to all the participants, the inappropriate use and exploitation of government support grants by certain youths is a cause for concern. Viewing the grant as a means of making money leads to various difficulties, including a lack of motivation among young people to work, an increase in childbirth, and a reluctance to seek out money-making opportunities.

Amos said that because of the “support grant they get”, some youths “don’t want to work because they are lazy.” Probing further as to why they think this affects the matter being discussed, Luzu responded, “because that leads to a lot of births. A lot of money is allocated to that.” “So you’re suggesting that they scrap it?” I questioned. Everyone said in agreement “Yes”, adding, “They keep giving birth each and every year, each and every year...” Andy summarises their thoughts by saying “I kind of feel like that grant money is more like a reward for having a baby.” Everyone in agreement said, “Exactly.”

While they hold a strong view that social grants are been abused and cause other challenges, Tee suggested a solution should be the rechannelling of some of these grants to support youths that finish their matric 'to find their feet'.

> Why don’t the government give a stipend for you (sic) maybe if you pass matric and they promise you maybe R2000? They give you R2000 so that you can be able to find your feet after matric because we know how difficult life is after matric especially in South Africa. So I feel like maybe if there was (sic) that money (is

rechannelled) so that you can maybe find your feet and see where you going. Instead of giving out R490 per child every month **(Tee)**.

Luzu added:

> …like what she just said, in terms of the money allocated to the child, they [should give the] basic needs of the child. Like the child needs A, B and C. If the government could stop providing funds (money) and start providing the items for that person, maybe that could work. [Let's] say two childs (sic), that's close to R1000 but, if ever they need clothes, if you're saying we need uh, one bottle of milk we're going to buy [it] for you and then give it to you, so that would decrease the demand of this money... **(Luzu)**.

They seem to believe that the government needs to do more to avoid the abuse of the support grants given and rather than reward youths "for having a baby", these funds should be used to motivate youths to complete at least their matric.

4.2.2.5 Government and organisations funding community developmental centres

The youths rue the lack of funding for their development. They suggest that governments and organisations (businesses) should fund more youth developmental centres, similar to Afrika Tikkun. While they acknowledge the corporate social responsibilities (CSR) of 'big' businesses towards, for instance, the environment, they ask that these 'major players' in various industries focus more on corporate social investments (CSI). This, they say, could also boost these businesses' B-BBEE (Broad-Based Black Economic Empowerment) score and, at the same time help develop the youths in their communities. Some of the responses include:

> …there's something called corporate social responsibilities. Yeah? I feel like more the major players in terms of the big businesses, they are encouraged to like take care of the environment, more like the physical and the biological aspects, you know. So if we can find a way [similar to] CSR, that can help with skill development, because for me, I don't think it (CSR) really helps, you know, [in the] long term, it's more like a short term type of thing, you know? Yeah. It's not really long term **(Alonzo)**.

> Both of them – the CSR and the CSI, they work hand-in-hand. They have to give back, right? So they have to provide things, like we have in Afrika Tikkun because of these businesses. They are giving back to the economy, so they are increasing their triple BEE scores, which was introduced **(Luzu)**.

In addition to being from low-income households, other obstacles that were discussed, such as funding and capital issues, further diminish the likelihood of young people receiving the training and education required for their development.

4.2.3 Theme 3: Opportunities

Judging from the responses from the youths, sourcing for and finding opportunities for funding and jobs is one of the biggest challenges they face; from their perceived lack of or shortage of opportunities in rural/township areas to their lack of finding information on opportunities available. The following co-causalities give further insights.

4.2.3.1 Shortage of opportunities in rural/township areas

Growing up and living in a rural/township area means that the opportunities around you are limited, said the participants. With Luzu stressing how "very disadvantaged" they are, and the other participants all agreeing with him saying “all of us”, the perceived shortage of opportunities is a major stumbling block for the youths. Coming from a low-income household, they say, makes them disadvantaged when it comes to opportunities.

Although the participants generally concurred with each other's viewpoints, there appeared to be some discord among the youths regarding the availability of opportunities in urban versus rural areas. Their individual experiences inform their worldview. Luzu, Alonzo, Tee and Amos say there are little or no opportunities for youths if you are from a rural area especially areas in the Eastern Cape Province. Youths move to urban cities such as Cape Town in search of opportunities. Tee noted “…there are also no jobs” in rural areas with Luzu adding:

> …But more chances are where? Are in Cape Town and in the Western Cape. In the Eastern Cape, they are limited. So one member decided to move from one province to another. Then when I came here I found out there are many more opportunities here than back home. So if ever you have family members are in different locations it allows you to explore and learn new things **(Luzu)**.

"I disagree," Rea said firmly. "I think this thing goes with luck", she adds. Rea argued that it is more with luck and does not have anything to do with where you come from. Her notion for this is that Johannesburg is supposedly known to have opportunities, but from her experience, it was difficult to find opportunities.

> …based on what he said, he said he’s from the Eastern Cape and then he came here and found opportunities. I’m from Johannesburg, there are so many

> opportunities in Johannesburg. I didn't find any opportunity. I came here and found those opportunities so, backgrounds doesn't matter. I think this thing goes with luck **(Rea)**.

Amos immediately countered, "With Eastern Cape, it is a different story." He adds, "I agree with Luzu because I come also from the Eastern Cape and opportunities (shook his head meaning no opportunities)." Alonzo and Tee backed his assertion: "Yes because I'm also from the Eastern Cape." (Alonzo). "Eastern Cape does not have opportunities" (Tee).

While it may be challenging to find opportunities in rural areas, the research findings indicate that individual perspectives were shaped by personal experiences and the information available to them regarding locating opportunities (see additional contributing factors below). Regardless of their opinions, the participants appeared to concur that it is challenging for young people to find opportunities. It could also mean that the Western Cape, though limited, provides more opportunities for youths to develop compared to other provinces in South Africa. Youth migration to cities in search of opportunities implies that the limited opportunities available in major urban centres will result in overcrowding of young people and fierce competition for the few available opportunities.

For instance, Luzu said he came from Eastern Cape to Mfuleni, in the Western Cape at the beginning of 2019 and immediately got the opportunity to do the development programme with Afrika Tikkun. Upon graduating and becoming an alumnus of the programme, he was allowed to intern as a business administrator. This opportunity he argued would be hard to come by if he had not left the Eastern Cape for the Western Cape. Knowing no one, having no family members or even having a clue of what lies ahead, he left the Eastern Cape and headed "straight to Mfuleni". "I have no one living in Cape Town, so all of my family were living in the Eastern Cape" (Luzu). This also shows the risks some of the youths take to find opportunities. You need to take the risk he said, "If you want to get a job".

The data further revealed that the lack of, or shortage of opportunities is also linked to other co-causalities such as the youth having little to no information about opportunities, the nepotism problem, and their sparse network of contacts.

4.2.3.2 Lack of information on opportunities

The perceived lack of opportunities sometimes stems from the youths' inability to access information on available opportunities for funding, bursaries, internships, training or jobs. Probing further to understand Rea's reason for not finding opportunities in Johannesburg in relation to the preceding co-causality, she explained that she searched for free online courses but "could not find anything". Rea only discovered that there were four other Afrika Tikkun centres in Johannesburg after she came to Afrika Tikkun in Cape Town.

> I had to look for other opportunities, uhm. I looked online to find free online courses but then I couldn't find anything… I didn't know that Afrika Tikkun was also in Johannesburg. I found out that when I was here they said they have, they have five centres. And I was like "what?" Four centres are in Johannesburg and I came here **(Rea)**.

Rea continued by saying, it "depends on the information that you have". Amos "I agree" and Alonzo "Yeah. There's no information." backed this statement. Rea recounted how after the program at Afrika Tikkun she was sent to a company for an internship at Bellville. She stated she did not know the company was close by. "I didn't even know there was a place like that close by". Of her found interest in information technology skills she added she is not aware of IT job opportunities in and around Cape Town "if I do, I will definitely go there" she said.

Their inability to find free online courses or other opportunities online is also linked to insufficient knowledge of the use of digital technology to search and find available opportunities.

> It's hard for someone that doesn't actually know "okay, what am I gonna type on Google" you know for scholarship or types of schools. Would that also be a link to technological in a way? Like there's no information **(Alonzo)**.

4.2.3.3 Nepotism and networks in finding opportunities

The amount of information they have depends on the people they know and their limited networks. Most information about opportunities they get to know about is from relatives and friends. "…my aunt told me that there's Afrika Tikkun, that they offer three months' course. That's when I came." Rea. "It depends on who you know" Andy.

While they say there are opportunities in Johannesburg, they argue that youths only get an opportunity when they know someone or have the right network of 'people in

high places'. This they say is the difference in finding opportunities in Johannesburg in comparison to Cape Town. This nepotism of favouring only those known to the 'people in high places' limits those who do not have such networks.

> Based on my experience, uh, there were learnerships at Joburg, I applied for them and some other learnerships they said they'll respond after two months and all that… So I had to look for other opportunities **(Rea)**.

> Between like Johannesburg and Cape Town, there is a big difference I would say... In Joburg, you need a lot of networks, right? You need to know people in high places in order to get those opportunities. Yes, there are a lot of opportunities but, it depends on who you know as compared to Cape Town. **(Andy)**.

Another factor is nepotism among the political class to favour people they know or businesses they know. Tee and Luzu assert that nepotism does not allow for the distribution of the nation's wealth to everyone, but it enriches 'the same people' and 'the same company' that get favours from the political class.

> It's like spoon-feeding one person instead of distributing the wealth amongst the whole. Just putting the, spoon-feeding the same company and then the company employs the same people, not the whole of the country, [which creates] poverty and hunger **(Luzu)**.

> …a political party will favour its people [they know] obviously. So, and we know that uhm, there's a political party, here in South Africa that doesn't favour [everyone] but, they still continue to vote for it **(Tee)**.

Furthermore, coming from a low-income household creates cultural deprivation for the youths, which impacts how easily they can grow their networks. It can also create perceptions of mistrust in the youth since they are coming from low-income homes.

> It's like the more you know from outside of school, the more you're able to do in essence, like the more you know about other people's cultures, it's easier for you to adapt in certain situations and circumstances. When my cousin finished studying at Rhodes University… he didn't have cultural deprivation, through his friend's dad law firm connections were made; now he has a job **(Yola)**.

> In terms of the employment, your background does play a role. 'OK I'll give you a job whereby you have to Handle a lot of money', and then when I look into your

> background I find OK, Amos is used to, like he comes from a family that has money, so he's used to handling money. Then on the other hand, Ori let's say comes from a poor family, they're not used to handling money. So I prefer having Amos, because Amos is used to handling money as compared to Ori. **(Amos)**.

4.2.3.4 Corruption and greed in tendering process

The youths perceive that the greed of corrupt public officeholders reduces their prospects of getting tenders and opportunities for business growth. Companies influence public office holders through bribes for favourable tender proceedings. The data revealed that lobbying and bribery for tenders based on corrupt practices are among the reasons that businesses fold. Suggesting a more transparent and open process for funding and tender biddings, Luzu noted that:

> I think we should just start with the word corruption or greediness. Like in most cases [these] are linked to political parties, so this affects us in this form… the businesses will not be able to make funds because the money is used by the same company each and every day. The same company gets the tenders, the same company, so the other companies are suffering **(Luzu)**.

While these corporations make significant economic contributions, they also wield political influence to push for policies that favour them, potentially jeopardizing the existence of smaller businesses and resulting in employee layoffs. "Like most businesses do contribute to the economy. Like through taxes and yeah, [they also have] political influence" (Alonzo). "They are also contributing to politics, politically" (Luzu).

4.2.3.5 Jobs seen as demeaning

The youths see some jobs as demeaning. Yola stated, "Some things that you look at and you're like, oh that's a good job to do. And other things that are not so good to do." Providing examples, Alonzo said, "Some people don't like wanna clean" or "having programming degree and not wanting to work as a teller"

'Townships' such as Mfuleni are limited in that jobs on offer are mostly seen as demeaning. For instance, Amos narrated how he got an opportunity to work at Shoprite at the mall located in Mfuleni, which he was happy about. When he started the job, he was given flyers and told to distribute them around to passers-by. This Amos said he did for three days and then resigned. When asked why he resigned, he said it was not about it being a low-paying job, but that it was not challenging for him and he was not

learning anything. Others indicated that he should have continued until he got another job, but he insisted that he would remain at home to wait for another opportunity as that was a waste of his time and energy.

4.2.3.6 Cost of transportation

Job opportunities that they see as challenging and 'good to do' for their development are mostly located far from their homes. Youths lose employment opportunities due to the distance and the cost of transportation. The high cost of transportation to areas such as the Cape Town CBD means that their mobility in search of opportunities is limited to areas around them. "Also, I think general mobility. Like your ease to get from where you live to where you work… It may cost too much money" (Yola). Sometimes, this is due to the wages the employers are willing to pay. They perceive the cost of transportation may result in employers rejecting candidates based on the cost back and forth; the costs between where they live and the location of the business. Luzu said:

> That's why they ask where you stay because, they're trying to find out [that] the amount they're going to pay you will not be allocated to the whole transportation from one place to another. They cannot employ you if you use maybe, let's say maybe [they] pay you R2000 and you use R1500 for transportation. So, it's more like you're working for transport so they decide to say 'no, we cannot employ you' **(Luzu)**.

4.2.3.7 Automation of jobs

The use of technologies to automate processes and possibly take over jobs is seen as a threat (Luzu). Rea noted that this results in the youths' search for upskilling or reskilling:

> I would say technology tends to... people become unemployed because of (companies' adoption of) technology. You have to find new skills and you have to learn new skills in order to survive out there, cause of technology **(Rea)**.

While they acknowledge that technology improves services provided to customers, "it tends to happen that more people are being retrenched", Tee said, citing a bank that "retrenched so many people".

To buttress her point Tee explained, "Let's say my dream job was to be a [Bank's name withheld] consultant, and now I'm being retrenched, I do have the qualifications and all

that, but technology is taking over. I have to go back and study something else. You see, so technology, it does have advantages and disadvantages at the same time."

4.2.3.8 Experience and qualifications

Automation of jobs is perceived to create challenges to getting opportunities and is making skills redundant. However, the years of working experience needed for a job can be a barrier. "…nowadays people must have 5-10 years working experience before they get employed" (Luckitz)

Furthermore, the youths added that being overqualified for a position also reduces their chances of getting a job. Instances given are "companies where the CEO (recruiter) will think you will be managing the company soon (sees you as a threat)" (Nonzie).

4.2.3.9 Effects of global warming and natural disasters

The data revealed global warming, which causes some natural disasters, as one of the causes of unemployment, especially for local farmers and SMMEs. Tee stated that:

> We are the ones who pollute the atmosphere so we tend to pollute the atmosphere but in return, that causes global warming. Hence, we have a higher rate of unemployment. So I think we are the ones responsible for the unemployment **(Tee)**.

Probing further to explain the link between global warming and unemployment amongst youths, Tee explained that through the destruction of infrastructure caused by environmental factors, some uninsured companies and farmers tend to incur losses and costs to the company. These events could lead to retrenchments.

> …those greenhouse gasses. They tend to have a high tendency of heat, which causes global warming in the country... and when temperatures are rising, rain tends not to fall regularly in particular. So yeah, it affects the farmers. When it affects the farmers sometimes, they experience floods and all that. When the floods happen what happened to the farmers? Like it happened here (Afrika Tikkun's farm). Their yield gets destroyed or their infrastructure gets destroyed, so which means there will be unemployment. Let's say the whole apartment was not insured. If it was not insured, which means people will not be able to come back to work. The unemployment rate will go high (**Tee)**. **Luzu** adds "And it goes back to the whole economy."

4.2.4 Theme 4: Resources for upskilling

While the opportunities may be lacking and some are seen as demeaning, the resources needed to learn the skills they deem challenging and 'good enough' is limited or lacking. The lack of funding for community development centres, the lack of (digital) resources, and the lack of skills development centres in rural areas affect the upskilling of youths.

4.2.4.1 Lack of skills development facilities around rural areas

One of the challenges of acquiring skills for the youths is the lack of training centres with facilities in rural areas. This makes it difficult for youths to find a place to learn skills that can earn them an income. In addition, it leads to the migration of youths to urban cities in search of greener pastures for growth and development, which in turn leads to overpopulation as previously discussed. While rural areas are plagued with little or no job opportunities, there is also the challenge of having "no place to even learn those skills" (Tee).

> …for instance, let's say you stay in a rural area. There are no places that you can go for skills development, it's hard to find places like those **(Tee)**.

This lack or shortage of skills development facilities to train for skills means that the youths migrate to urban cities in search of opportunities without skills, with most of them ending up in Townships in cities. This creates a vicious cycle, as development centres for skills development are also lacking in some Townships.

4.2.4.2 Lack of digital resources

The lack of access to digital resources such as a free digital platform to train for skills, internet connection, and mobile and computer devices are some of the resource issues the youths face in the township and rural areas. One challenge that impacts their development of skills and sourcing opportunities, is not knowing any available applications for learning and upskilling. This is beside them not having access to appropriate information. Tee noted that for youths to be able to learn and be comfortable using digital technologies, technology has to firstly be available and then young people also have to be able to have access to these technologies. She added:

> Most youths, especially in townships, they're not, they don't have access to technology, [and] to technological resources **(Tee)**.

As previously mentioned the youth of Mfuleni find themselves in a resource-poor context. They are under-resourced with regard to digital technologies such as

computers and smartphones (some youths do not have phones that are capable of connecting to the internet), and they do not have the finances to buy data to connect to the internet.

While some of the youths have smartphones that could connect to the internet, Rea mentioned, “it is not that” some do not have smartphones but that they “don’t have data” to access the internet. The reason for no data they echoed is “because we don’t have money”.

Furthermore, while they say they would like to have applications that would help in their upskilling, these applications need to be free to use because of their financial challenges. “You can make those apps free” Amos added.

4.2.4.3 Government and organisations funding community developmental/resource centres

In addition to the above, for the youths that are not educated, trained, and/or employed to gain valuable skills, government and private organisations need to assist in the funding of developmental/resource centres. This funding can help bring development centres similar to Afrika Tikkun in Mfuleni to ‘townships’ and rural areas. Luzu and Alonzo argued that this can help youths in the long term, and at the same time, increase companies' Triple BEE scores.

> If we can find a way [similar to] CSR like, how can [companies] help with skill development, because for me, I don't think CSR really helps, you know, for the long term. (CSR) is more like a short term type of thing, you know **(Alonzo)**.

> …they have to give back, right? So they have to provide things, like we have in Afrika Tikkun because of these businesses, they giving back to the economy, so they [are] increasing their BEE, triple BEE scores, which was introduced (**Luzu)**.

Although there is a clear need for additional resources and funding, the participants also identified the training and education sector as another co-causing factor to unemployment and upskilling.

4.2.5 Theme 5: Training and education

Providing training and education to young people from low-socioeconomic communities may give them an advantage in seeking out opportunities. However, according to the participants, the current education system needs to be revamped to achieve this goal. Additionally, they emphasised the importance of practical training,

as opposed to purely theoretical instruction, to prepare youths for the difficulties they may face in the future.

4.2.5.1 Educational system and curriculum challenges

The challenge of skills acquisition starts from the time formal education begins; from primary to the high school level. The participants say the educational system and curriculum need overhauling, as it does not equip them for 21st-century challenges. “Overhaul the whole education system." and “The education system and curriculum should be changed” are some of the ways they expressed their opinion.

> I think it starts at high school…. each and every level, primary school, secondary school and high school because us as youth we get to see the extent of life when we enter grade 11. And then you see you start asking yourself the questions, ‘where am I going?’ **(Luzu)**.

The proposal to overhaul the education system is linked to the belief that the current school system and curricula fail to recognize that individuals have varying learning styles. The current system does not adjust the pace of curriculum delivery to meet the needs of learners, whether they are slow or fast learners. Furthermore, it should also cater for different students who “learn through doing, through hearing, through seeing.” In other words, learning styles should be considered in teaching and learning programmes.

> …you can dismantle it to then go to make it better…And then in terms of like education, if you have like one type of education, it doesn't suit all. Like you need to diversify the manner in which you want to teach people because people don't all learn the same **(Yola)**.

> Like there are slow learners, people that slow learn, then there's the fast learners **(Alonzo)**.

> there's people that learn through doing, through hearing, through seeing **(Yola)**.

4.2.5.2 Lack of practical learning

Besides not catering for different learning needs, the lack of practical training in educational and training centres is also a co-causality of unemployment. The participants agree that for youths to be well equipped and prepared for opportunities and working environments, they need to experience real-life scenarios or practical experiences. Putting theory into practice enables them to ‘fish’ for themselves.

> …people think giving people aid is solving the problem, but you're just putting a bandage on the problem. Rather teach people how to do, than give them. Like you know the whole saying of, you know, if you teach a man how to fish, he'll have fish for the rest of his life, but if you just give them the fish, he won't. You know what I mean? **(Yola)**.
>
> it's also the same in terms of some schools, you know. Like some schools when they're studying, it's all about what is in the book, you know. They don't really have something practical in a way, you know, like how to experience it, like similar in the industry in a way **(Alonzo)**.

Alonzo indicated that finding ways to train for skills should be the aim of first-world countries trying to help developing countries. Training people how to use "technologies to avoid disaster" before disasters happen is better than only providing resources when it happens. Skills such as learning digital and programming skills, and soft skills are some of the skills they listed as important for all to learn.

4.2.5.3 Lack of adequate qualifications

The lack of adequate qualifications (High School Matric and above) due to early school dropout is noted as a co-causality of unemployment. This is due to many struggling financially and sometimes having to cope with being the breadwinner of the family as previously discussed. The youths noted that government should find a way to make it mandatory for everyone to have a terminal high school leaving certificate or a National Senior Certificate.

4.2.6 Theme 6: Physiological and Psychological issues

The participants identified some physiological and psychological issues that also play a role in the unemployment and skills development challenges of youths. The youths become demotivated or discouraged from learning new skills, setting goals or even applying for jobs. Older people in the community who engage in criminal activity and/or substance abuse, influence some of the youths. Some of the co-causalities discussed here are cultural barriers, fear of automation of jobs, demotivation or discouragement to learn new skills and apply for jobs, and fear of taking risks.

4.2.6.1 Physiological challenges and needs

The physiological challenges and needs refer to illness, hunger and thirst, and any other physical challenge to the body. The youths perceive that these physiological challenges and needs hinder their upskilling and their ability in executing or obtaining

certain jobs. Luzu argued that health challenges lead to some youths not meeting the fitness requirements of certain jobs.

> If you are unfit, if you are seen unfit, in terms of sickness, so you will not be fit enough to perform certain jobs because of the condition of your health… **(Luzu)**.

Certain youths would tend to want to prioritise their physiological needs first before thinking of upskilling.

> You cannot be creative [think of finding ways to upskill or perform optimum] while you are hungry **(Luzu)**.

In support, Andy added that "is kind of similar to what Luzu was saying. Like physical disabilities… People tend to judge you on the way you look, let's say it's a little bit difficult for someone with one arm. And then there's someone else with two arms and they tend to think 'no you can't do the job because you only have one arm'".

The search to fulfil their physiological needs leads to some youths committing a crime and creating security issues within the community. Moreover, with community members not financially stable, getting security is an expense they cannot afford.

> It is hard for them to buy things for themselves, to employ securities for around the community, around the community so that they could be safe **(Luzu)**.

> …it leads to crime because people are hungry they need something to eat **(Luzu)**.

4.2.6.2 Fear of technology taking over jobs (through automation of jobs)

The automation of jobs creates the fear that technology is, and would take over jobs. The psychological effect of fear may be borne out of their feeling of not having the skill that would enable them to be relevant in the 21st century.

> Let's say my dream job was to be a [Bank's name withheld] consultant, and now I'm being retrenched, I do have the qualifications and all that, technology is taking over. I have to go back and study something else. You see, so technology, it does have advantages and disadvantages at the same time **(Tee)**.

Tee also noted that "...people become unemployed because of (companies' adoption of) technology. You have to find new skills and you have to learn new skills in order to

survive out there, because of technology". Luzu added in support that technology "is a threat" that reduces the opportunities the youths have.

4.2.6.3 Demotivation and discouragement

Some of the co-causalities discussed above often lead to the youths feeling demotivated and/or discouraged to learn new skills to develop or to apply for future opportunities. The rejection of their application for an opportunity could sometimes psychologically lead to demoralising or discouraging the youths to do anything and lose interest in pursuing any endeavours. "[They] take much time to rest. Like they're given the chance to do nothing… so they lose interest." (Luzu). For instance, Luzu noted if an organisation rejects an application based on the youth's distance to travel and cost of transportation and "they decide to say 'no, we cannot employ you'", rather than the youth trying to understand the reason, they think to themselves saying "'no, I was unfit' or something like 'they don't like me'".

4.2.6.4 Cultural influences

Cultural influences psychologically create barriers towards the development and expression of youth's creative skills and the development of the creative economy. When I asked how culture influences the said challenges being discussed, there was a deep sigh from the youths. Luzu responded, "That's not useful to your life." It's not useful?" I probed. Everyone responded, "Yes, there's no money there." Probing further, they say they recognise the opportunities in the creative economy but parents and guardians view it differently. "There is a lot of money!" (Tee). "They do not understand and see that" (Amos and echoed by all participants). Luzu added, "We gotta make them see it. How it works."

Apart from the above, the youths also expressed that females in society are mostly affected by cultural beliefs but they acknowledge that this is changing.

> …in terms of fashion, [for a] wife, in many cultures, you're not allowed to wear certain clothes. So, if ever you're interested in fashion designing, most people believe that if you make something you gotta show it by yourself. If you are creating a certain thing, certain [type] of trouser or T-shirt you gotta wear it. So sometimes it's difficult for black, for us black people wives who are special to design a top. [They will] maybe design a top wrap and end up not wearing it. And if ever you're introducing her back in the village and people know she designed these for these people, [they will look at you saying] 'you are making our children

> look as prostitutes', you know. Because this is not normal to us, you know. So it, it, it blocks us somehow **(Luzu)**.

> …maybe back in the days. Maybe woman in a way, they were not allowed to go to school, you know what I mean. They would be like, be in the kitchen and such stuff, you know… something like that. But nowadays I feel like it's more free (sic) yeah anyone can actually. It's freer than what it used to be **(Alonzo)**

Yola highlighted that the view of women, their positions, and roles within society is still "restrictive". Luzu narrated that he heard "someone saying that she visited the United States and then there on the other side it is totally different from this side because there, most men stay at home and they look after the children and then women are the ones who go to work... And this side, in this side, we tend to go and work and women stay at home." He further stated that "It is changing now but, but [in our] mentality we believe both. Like me, in my home, I believe that if I get a wife, no wife of mine can work, I will supply. I will supply." Amos added that such beliefs and mentality are ingrained in the society. "It is our society", he said.

4.2.6.5 Psychological manipulation through propaganda

Politicians psychologically manipulate youths through propaganda without doing anything that would help transform their situation. The manipulations Luzu said have the youths voting for the same set of people who tell them what they need to hear because they know the youths' dilemma.

> They see the problems, and they know what we need, so one breaks from this party and forms his own party and then says 'I know you want this. Vote for me, I will do it.' Because he knows the exact thing. He knows our minds. What we want in order for us to survive. So they give us the right words and then we vote for them **(Luzu)**.

Other findings that emerged from the third session held on 5 October 2019 are the youths' ***lack of ambition*** towards pursuing a goal. Their lack of ambition is linked to their being discouraged as previously discussed. The ***fear of taking risks and failing*** has resulted in some youths not taking up the challenge of entrepreneurship. They would need to learn how to 'fail better' without so much risk. In addition, ***the influence on youths from older people to do 'bad stuff'*** is also a call for more mentors and mentorship for youths in these areas.

In addition to the findings discussed above, in the next section, I discuss the findings from the three weeks' exercise, which reveals the possible game elements that would keep the youths engaged and motivated for learning skills.

4.3 Skills and gameful elements for motivation and engagement: the youths' perspective(s)

One aspect is comprehending the intricacies and obtaining a deeper understanding of the characteristics that a gamified application for skills development for urban Township youths would possess. Understanding what skills to train for and how to keep them engaged and motivated, is another. In this section, I present the findings from the three weeks' task given to the participants with the follow-up 3Ws questions and the resulting gameful elements that could be incorporated.

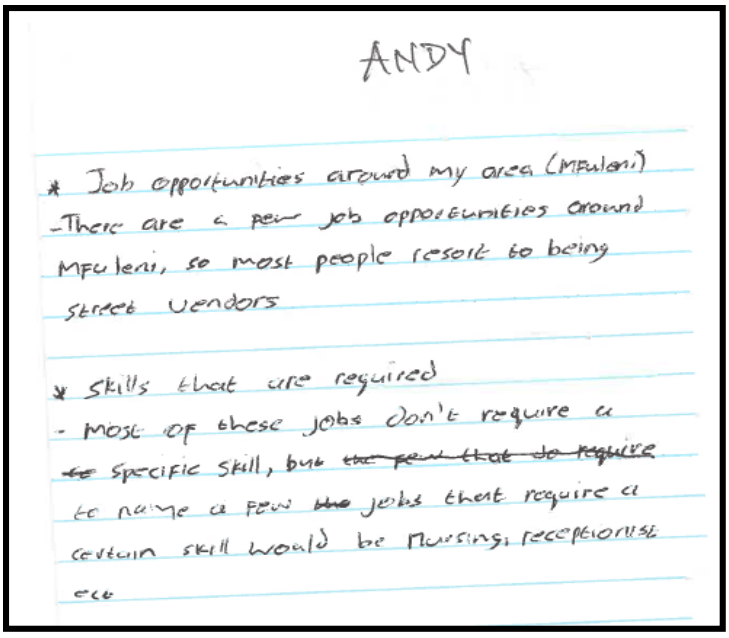
4.3.1 Identifying the skills

At the end of the group workshop activities held on 14 September 2019, I tasked the participants to keep track of some of their activities and to reflect on them for three weeks. Their first task was to take note of the places they frequent and the businesses or companies around them if any. The intention was that the youths identify what kind of opportunities could be available around them. This could translate into the skills they could learn on the application.

As stated earlier, my objective was to grasp the available opportunities in the local vicinities of the youths to determine which skills could be incorporated into the application. This would enable them to apply for job openings within their area if they possessed those skills. The feedback received from the youths was consistent with my observations during my time in Mfuleni (refer to my reflection and observations in the previous chapter). There are little to no opportunities around except for the shopping mall and "most resort to being street vendors". They noted that these jobs do not entail any specific skill. Additionally, they acknowledged that certain professions, like nursing at the local clinic, would necessitate specific skills training.

They elaborated on the skills they require in pursuit of their career goals. The skills they highlighted are the ones they consider essential to attain their individual career aspirations. All participants noted soft skills and most of them noted entrepreneurial skills. These skills (soft skills and entrepreneurial skills) seem core to the development and success of the application. Listed below are other skills they noted (Figures 26 and 27):

- Teaching and training skills towards being an educator **(Luzu & Luckitz)**
- Farming skills (“because I want to retire being a farmer”) **(Luzu)**
- Air traffic controller and aviation **(Andy)**
- Nursing and primary health care skills (“I wanted to be a medical doctor”) – triggered interest from the people around him **(Amos)**
- Business management skills (Actuaries, Risk assessors, external auditors, financial advisor, Business Administration) **(Rea)**
- Information Technology (System integration specialist, network specialist, database specialist, software development, web development etc.) **Rea** noted from the exposure she got interning and job shadowing at Netcampus.


ANDY

* Job opportunities around my area (Mfuleni)
-There are a few job opportunities around Mfuleni, so most people resort to being street vendors

* Skills that are required
- most of these jobs don't require a specific skill, but ~~the few that do require~~ to name a few ~~the~~ jobs that require a certain skill would be Nursing, receptionist ect

Figure 26: Sample of participants note for skills 1

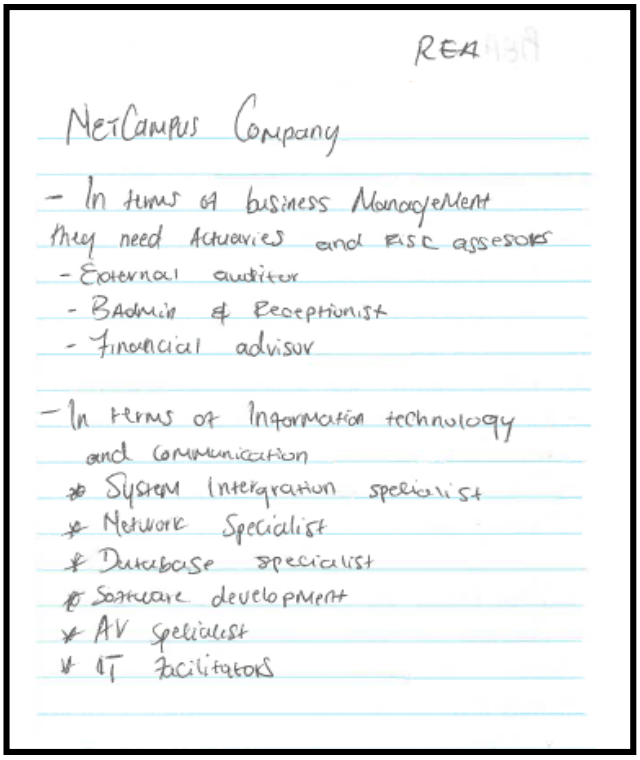


Figure 27: Sample of participants note for skills 2

They mentioned these training programmes should be simulated and practical for easy understanding.

4.3.2 Identifying the gameful design elements

The second task was to take note of the types of game(s) they play and for how long, what keeps them engaged in the game(s), what appeals to them about the game(s), and what situation made (motivates) them go back to the game(s). If they did not play games, I informed them to note the social media apps they use such as Facebook, Instagram, and YouTube. The reason for this request was that most social media apps have successfully engineered and implemented gameful designs to keep individuals intrinsically motivated to use the applications (Pellikka, 2014; Sitorus, Ferdiana & Adji, 2017). The principle is that the youths have a clearer understanding of their personal experiences and will be in the best position to note and describe why they carry out these actions.

In addition to the second task, I enquired about their experience and journey at Afrika Tikkun. I asked three 'what' (3Ws) questions; 1/ what made them start the skills development at Afrika Tikkun, 2/ what motivated them to continue, and 3/ what were some of the challenges they faced? They noted their responses, used their pseudonyms, and submitted the answer sheet to me (Figures 28, 29 and 30). These questions were intended to explore 1/ what features could be added for on-boarding

the youths to the gamified application, 2/ the understanding of what led them to continue at Afrika Tikkun could be translated into gameful design features that would intrinsically motivate the youths to learn skills, and 3/ suggest solutions on how to mitigate these challenges.

The participants played multiple types of games and used social media platforms for an average of 5 hours per day. This shows that a well-designed gameful skills development application could potentially fuel their interest. Some of the games played are sports games like football (soccer), puzzles (Candy Crush and Crosswords), role-play games (RPG), and simulation games (farming and driving). All listed Facebook and/or Instagram as the social media platforms they use.

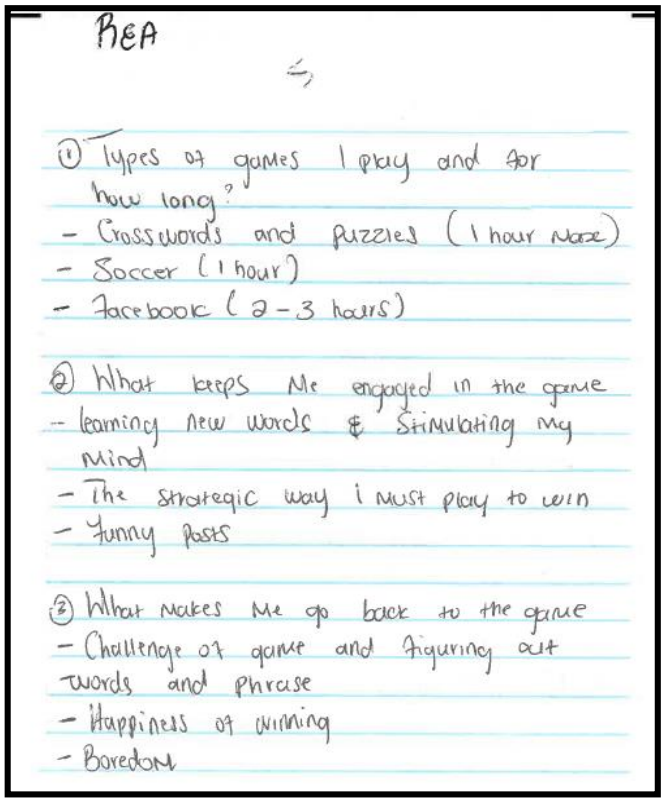


Figure 28: Sample of participants note for games played 1

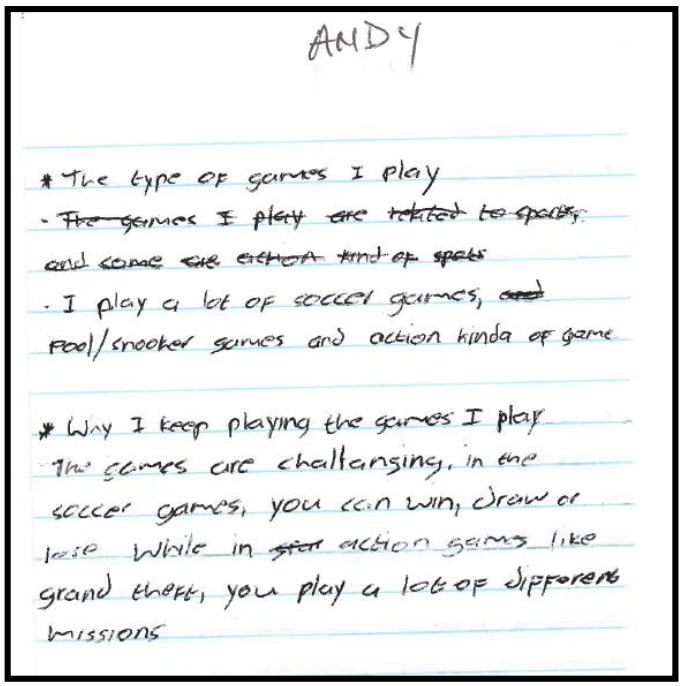


Figure 29: Sample of participants note for games played 2

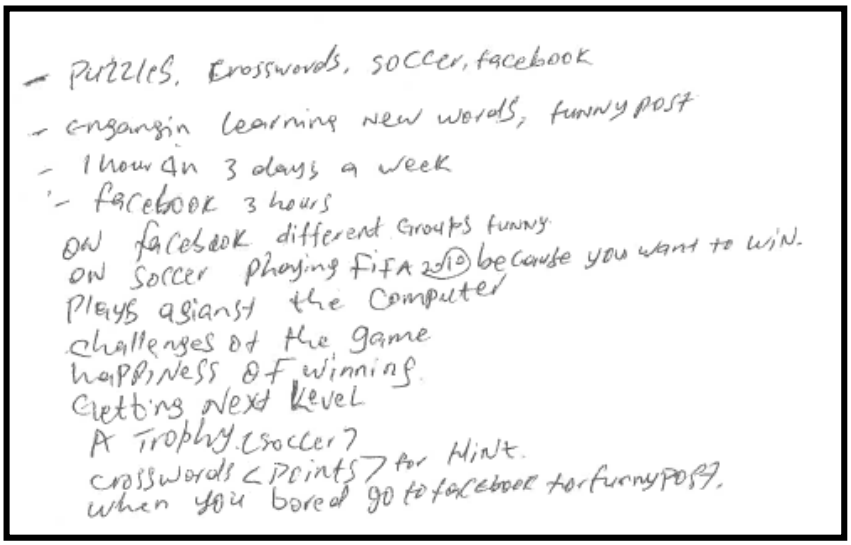


Figure 30: Sample of participants note for games played 3

Examples of what engages and motivates them about the games they play and the social media platforms they use are: achieving a trophy, gaining points they use for hints, virtual currencies, getting to the next level, and happiness of winning. Others are challenges of the game, the strategy needed to win, stimulation of the mind, the feeling of games being real, and communication with fellow users. They also noted the following about the games: they have clear missions, funny posts, the ability to learn, personalisation (use of avatars, changing colours, and playing background music or not), followership and engagements with people on social media.

The participants shared experiences of their journey at Afrika Tikkun with the 3W questions, which gives further insight into features to consider:

1) What made them start the skills development at Afrika Tikkun?

One of the main reasons stated by the participating youths for starting the training they completed with Afrika Tikkun, was that they knew the outcome of the programme before they started. This way, not only did they know what training was being offered, but also, had a hint of the outcome for each skill. To create an initial interest for the youths, the onboarding should have a clear goal (or mission) from the onset about what skills they could learn on the application and/or what they could achieve with the skills learnt. For instance, knowing he will “learn computer skills, driving skills towards a learner’s / driver’s license, and having job readiness training” made Amos start the training at Afrika Tikkun. Luckitz, Rea, and Luzu also echoed this sentiment.

Luckitz noted that having an opportunity to improve his self-confidence and presentation skills made him embark on the programme. Luzu’s notion of being goal-driven and dedicated to everything he does was ignited because of the “promises they (Afrika Tikkun) made” and a chance to get a driver’s license through the programme. Rea's desire to stay occupied during her gap year and her fascination with computer education prompted her, with the assistance of her aunt, to enrol in computer skills training at Afrika Tikkun.

In addition to what developed their interest, boredom or maybe frustration before getting the opportunities at Afrika Tikkun existed among the youth. They stated that they were “sick of staying at home” and having “nothing to do at home”. When such opportunities appeared as they did at Afrika Tikkun, they “grabbed the opportunity with both hands”. This demonstrates that some youths have the interest and willingness to develop and grow despite the specific dire circumstances surrounding them.

2) What motivated them to continue?

According to the feedback provided, the youths emphasised that their interaction and camaraderie with one another were among the primary factors that motivated them to persist and finish their training. They were able to share their experiences and learn from each other. Examples of statements used were “Engaging with fellow youths at Afrika Tikkun” and “I Love working with people”. In other words, a well-designed application that creates this form of engagement could create a better user

engagement and learning experience for the youths. See appendix C for the notes from the youths. Luckitz statement summarises the general sentiment:

> The relationship I had with my fellow learners. It was amazing how people shared their personal [experience] and situations that occurred in their lives at the time and how they trusted me with that information. Also learning from other people that were there **(Luckitz)**.

The quality of the content or resources for training is also a factor that can increase or decrease their interest. Amos reported that the soft skills training, specifically presentation skills, boosted his confidence in doing public presentations. Both Rea and Amos stressed that the process of acquiring a skill should not be overly simple and monotonous. They highlighted that the demanding nature of the web development training stimulated their interest in the program more than the computer literacy training did. The learning of a skill should be scaffolded taking into consideration the levels of difficulty that increase as the youth build confidence in their ability to complete a skill. To put it differently, designing challenges that display progress and increased complexity would impart to the youths the notion and conviction that they are gradually gaining proficiency in a skill. In addition, Amos stated that completing the training of a skill, should not end there but it should open up another opportunity for the youths to learn a new skill if they wanted to.

Another element is the perception of attaining a sense of accomplishment. This could be manifested through acquiring achievements (in the form of badges) and/or securing a top position on the leaderboards. Rea added that although the web development training she had was challenging but said cheerfully, "…I pushed myself to be good at it… and I came first in class". This feeling of being *'first in class'* creates an impression of accomplishment.

Additional incentives that spurred or sustained their drive to complete their skills training included receiving complimentary internet access and transportation allowances. Luckitz and Luzu stated that the transportation fare (R400) and the internet use at Afrika Tikkun made it easier to travel to the developmental centre for training.

3) What were some of the challenges they faced?

Two main challenges surfaced during the programme at Afrika Tikkun; financial and travel distance. Regarding the financial hurdle, the stipend disbursed to the youths solely covered their commuting expenses to the development centre and did not cover

their living costs. For instance, Luckitz said he thought to himself if he should continue the training even though he “was not getting [paid] much” and had to travel a long way to be in time for the training sessions.

Thus, twenty-three in-system gameful elements (summarised in Table 9) were identified from the findings. These findings combined the reflective and self-awareness task given and their experience and journey at Afrika Tikkun as discussed above. The gameful elements are shown in the table below and are discussed further in the next chapter (see Chapter five, section 5.4).

Table 9: Gameful elements identified from the study

No	Elements	How it was experienced
1	Onboarding	One of the main reasons stated by the participating youths for starting the training they completed with Afrika Tikkun, was that they knew the outcome of the programme before they started. The initial learning experience of general soft skills experience got them hooked on their training.
2	Mission	The mission is the end goal or outcome the individual expects from undergoing the training. They expressed knowing what they would achieve at the end of the training. This element is linked to the onboarding.
3	Challenges	While the mission is broad, the challenges element is for breaking up the mission into manageable steps.
4	Feedback loops	This element was evident in the feedback they received during their learning journey at Afrika Tikkun and what made them go back to using the apps that were explored by them.
5	Social engagements loop	The connection they made while learning together and their shared experience created a bond that kept them going. This element is necessary for social bonding
6	Time pressure	They had a set time for the training Afrika Tikkun and this made them determined to complete the training at the set time. This element ensures they have the same experience
7	Allies/Opponents play	Some of the participants like Rea and Luckitz expressed that to become *first in the class* was a motivator. Not all participants deemed this necessary, so this could be optional.
8	Personalisation	The youths expressed that their ability to personalise some apps to their liking was an appeal they liked about these apps they have been able to use.
9	Communication (and information sharing) among users	This aspect is linked to the social loop, where the participants are able to express themselves to each other and to their trainers. “Engaging with fellow youths at Afrika Tikkun” and “I Love working with people” are some of their expressions.

10	Sharing achievements on social media	The ability to share their achievements from game apps on social media gave them a sense of accomplishment.
11	Winning strategy	This is evident from their use of game apps that give them hints on what to do.
12	Content quality	The quality of the content or resources for training was an important factor that kept them engaged in their training. They expressed how the content quality improved their presentation and web development skills.
13	Realness	The participants were engaged and motivated to continue their training at Afrika Tikkun when they realised the real-world applicability of the training.
14	Opportunities (includes internship, job, funding)	The initial knowledge that they had from Afrika Tikkun was that they were going to be getting opportunities after their training. This was one of the motivating factors for their experience in completing the programme at Afrika Tikkun
15	Competition	This is the feeling they derived from *competing* with each other by using the Allies/Opponents play element.
16	Fellowship	This is the feeling they derived from *competing* with each other by using the Social engagement loop and communication elements.
17	Discovery (the feeling of learning)	This is their feeling about what they learnt in their journey at Afrika Tikkun.
18	Expression (include Happiness of winning)	The feeling of their achievement in completing the training.
19	Amusement (Funny post)	The feeling derived from reading and watching people's posts.
20	Levels	Linked to the Challenges element this helps in showing their progress
21	Badges	Linked to the experience of levelling up.
22	Points/virtual currencies	They expressed the ability to use this element in apps they are accustomed to *purchasing something* as an important element to aid their progress. This element is linked to the Winning Strategy element.
23	Leaderboards	This is linked to their sense of achievement and competition and would be optional, similar to the Allies/Opponents play element.

These elements were further analysed using the MDA (mechanics, dynamics and aesthetics) framework discussed in chapter two (sub section 2.3.2). This framework helped in categorising these elements in three parts namely:

1. **Mechanics**: The elements from the above include mission, challenges, levels, badges, points/virtual currencies, and leaderboards.

2. **Dynamics**: The elements from the above include onboarding, feedback loops, social engagements loop, time pressure, allies/opponents play, personalisation, communication (and information sharing) among users, sharing achievements on social media, winning strategy, content quality, realness, and opportunities (includes internship, job, funding).

3. **Aesthetics**: The elements from the above include competition, fellowship, discovery (the feeling of learning), expression (including happiness of winning), and amusement (Funny post).

In addition to the above, free internet, physical resources (including digital technologies) and financial assistance were other external factors that kept the participants engaged in the programme.

4.4 Defining the problem to ideation

The next question was how to design a system that could incorporate all of these findings (from sections 4.2 and 4.3). Design workshops were held on 23 and 28 November 2019 to tackle this challenge. These two sessions were three hours long and consisted of the researcher, a UI/UX specialist from the industry who assisted me, and three youths. We started by defining the problem.

First, I had to validate the findings. I presented the findings to the youths and confirmed with them through member checking that these were valid. Any emphasis made I noted. It is necessary to note that the findings above are the validated; member checks were applied (Birt et al., 2016). This strengthens the internal validity or credibility of the findings. Hereafter we mapped out the findings using an adjusted empathy map (Crandall, 2010). As noted in the previous chapter, we only highlighted the pains (problems/challenges) and gains (goals) and added some tasks (actions/activities) that they would like to perform if they had an application to learn skills. This helped to map out the persona for the design of the gameful application. See Figure 31 and Table 10 (the pains, gains and tasks outlined) below. The pains are the co-causalities from the findings above, the gains are the goals the youths intend to achieve, and the tasks are some of the actions they deem necessary to want to carry out. The similar gains and tasks listed by the youths were grouped as seen in the figure and table below.

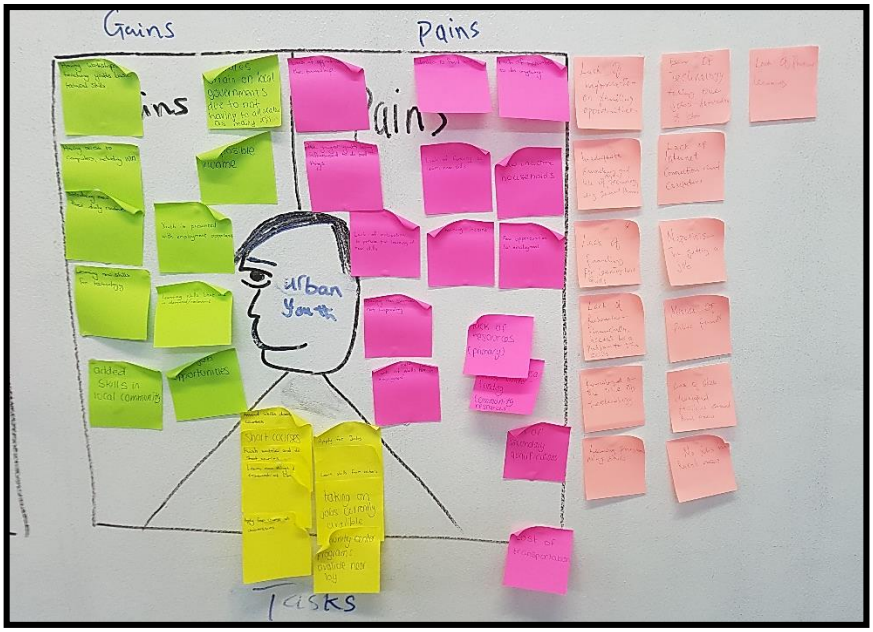


Figure 31: The empathy map

Table 10: The empathy map details outlined

Pains	Gains	Tasks
Lack of practical learning	Learning new skills, especially in technologies Learning programming skills	Be able to apply for jobs Learn skills from others Taking on [apply for] jobs currently available Have community centres nearby Be able to take short courses Enable youths to finish Matric Be able to learn new things Be able to apply for courses at universities Attend skills development courses
Automation of jobs (Fear of technology taking over jobs)	Learning skills that are in high demand/relevant	
Shortage of internet connection and computers Lack of resources – financially and access to a platform to gain skills Insufficient knowledge on the use of technology e.g. smart phones	Having access to computers, including Wi-Fi	
Nepotism in getting a job	Openness to the job process	
Misuse of public funds (through corruption and greed) Not earning [stable] income Financial challenges to learn new skills Coming from low-income households	Households having more disposable incomes	

Physiological challenges and needs		
Lacking suitable skills and technologies leading to employment	Having workshops for teaching youths basic technical (and soft) skills	
Shortage of job opportunities in rural/township areas	Youths are presented with job opportunities	
Demotivation (Lack of motivation to pursue the learning of new skills)	Added skills in local communities/townships	
Lack of information on funding opportunities Inability to find work	Raising awareness on opportunities (jobs, funding, etc.) Raising more entrepreneurs with skills in local communities More job opportunities in local communities/townships	
Cost of transportation (to areas where there are possible job opportunities e.g. to Cape Town CBD) Lack of skills development facilities around rural areas	Creating job opportunities to alleviate strain on local governments due to not having to allocate as many resources	
Lack of adequate qualifications (from High School and above)	Have adequate school qualification	
Doing/having the same routine every day without improving Demotivation/discouraged and demoralisation (Lack of motivation to do anything including applying for jobs)	Introducing new things to their daily routines	
Influence on younger youths from older people to do 'bad stuff'	Having mentors in the community	
Government organisations underfunding community resources	Job opportunities within the local communities/townships	
Effects of global warming and natural disasters	Reduce the effects of global warming	

With the insights from the mapping exercise above, we created two storyboards for two personas of youths that would use the proposed system; a youth seeking to learn skills for employment (Figure 35; employment stream), and secondly, a youth seeking to learn skills to start up their own business (Figure 39; entrepreneurship stream).

First, the youths narrated the user journey (Figures 32 and 36; as stories), and then these stories were transferred to a storyboard (Figures 33-35 and 37-39). I used Diagrams.Net to sketch the storyboard.

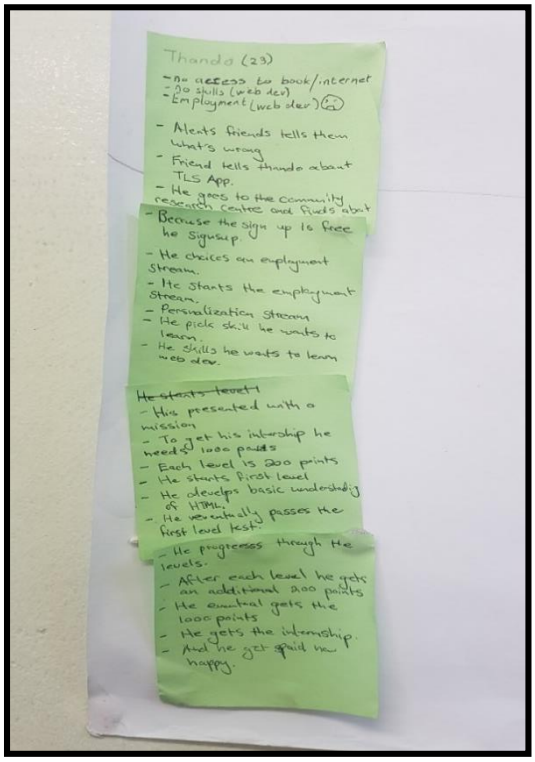


Figure 32: The persona story written out (employment track)

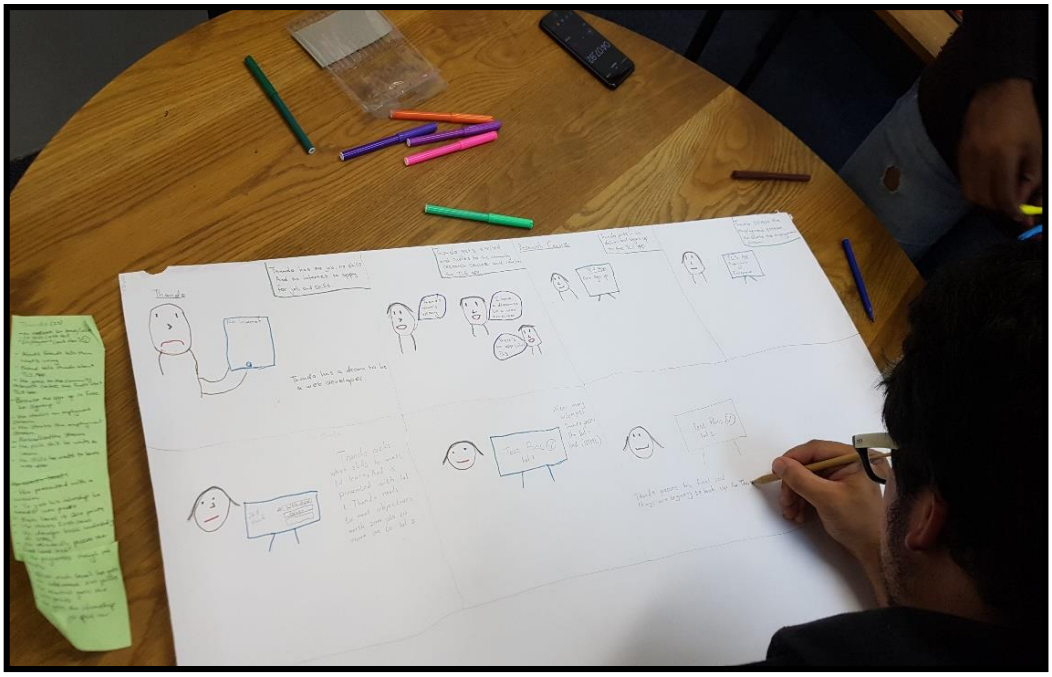


Figure 33: Sketching out the storyboard for employment track

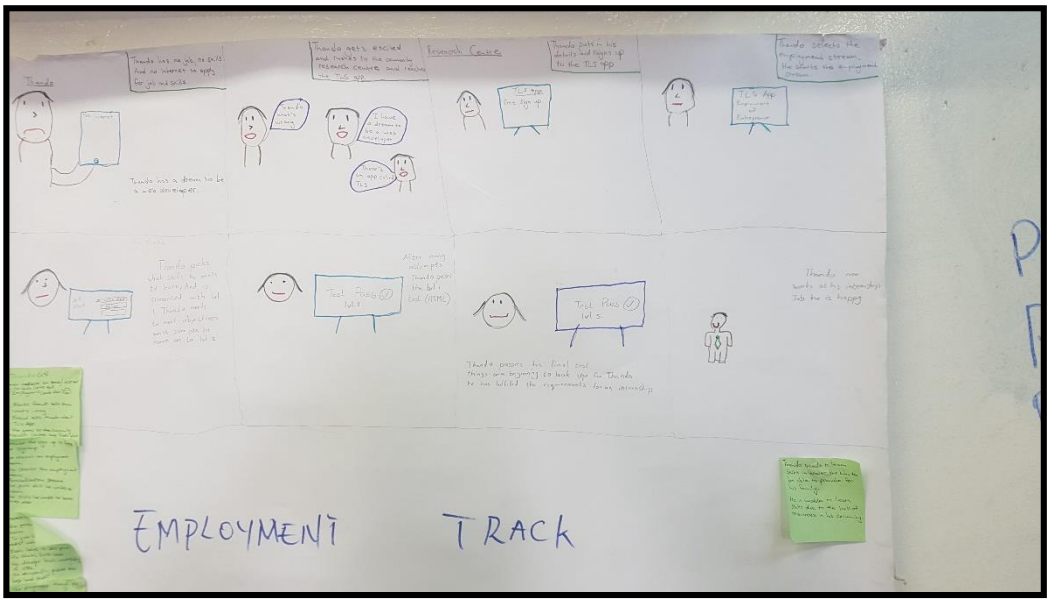


Figure 34: The sketched out storyboard for employment

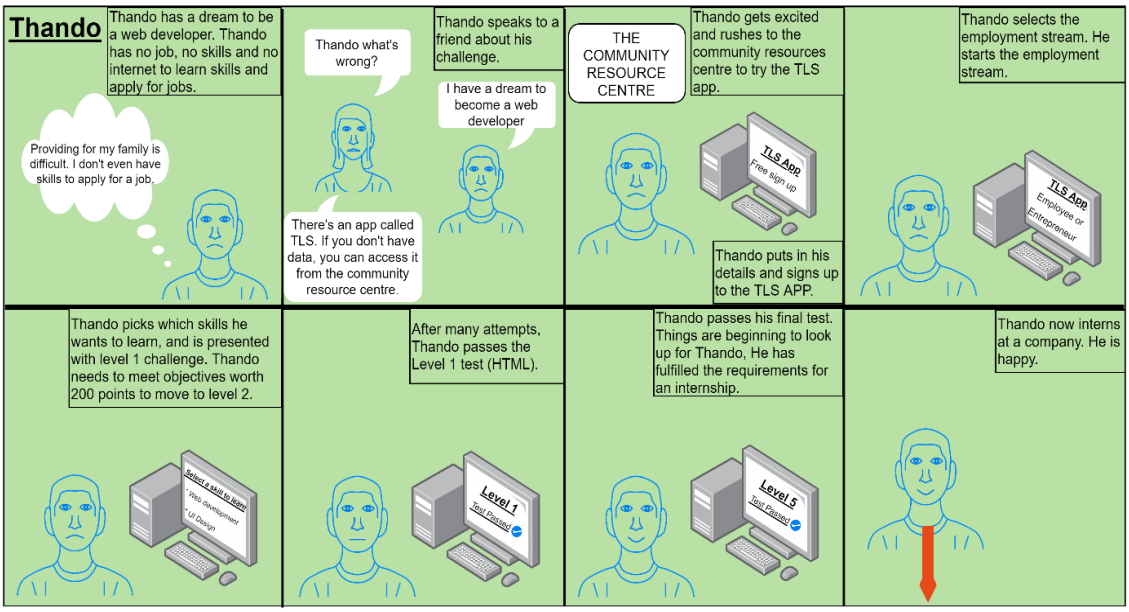


Figure 35: The employment track storyboard (Author's construct)

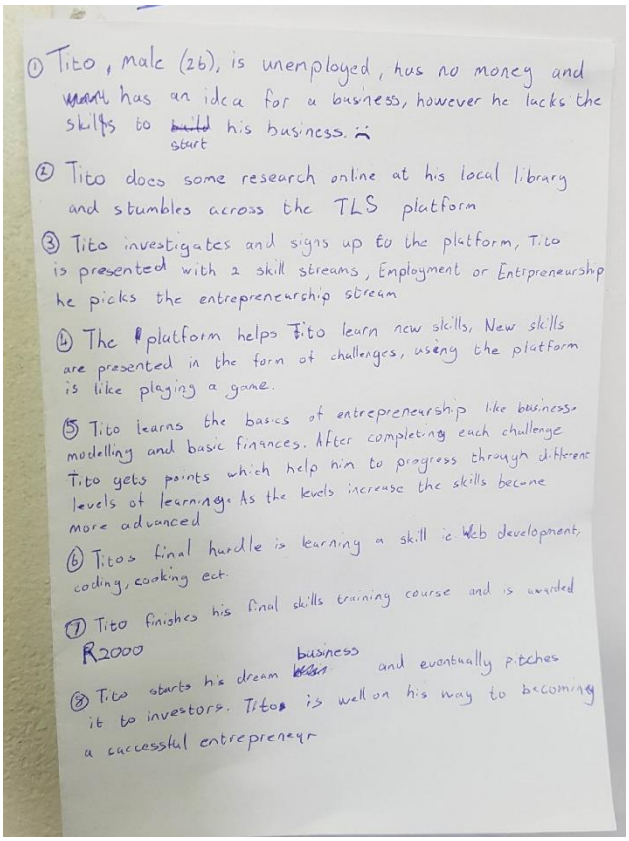


Figure 36: The persona story written out (entrepreneur track)

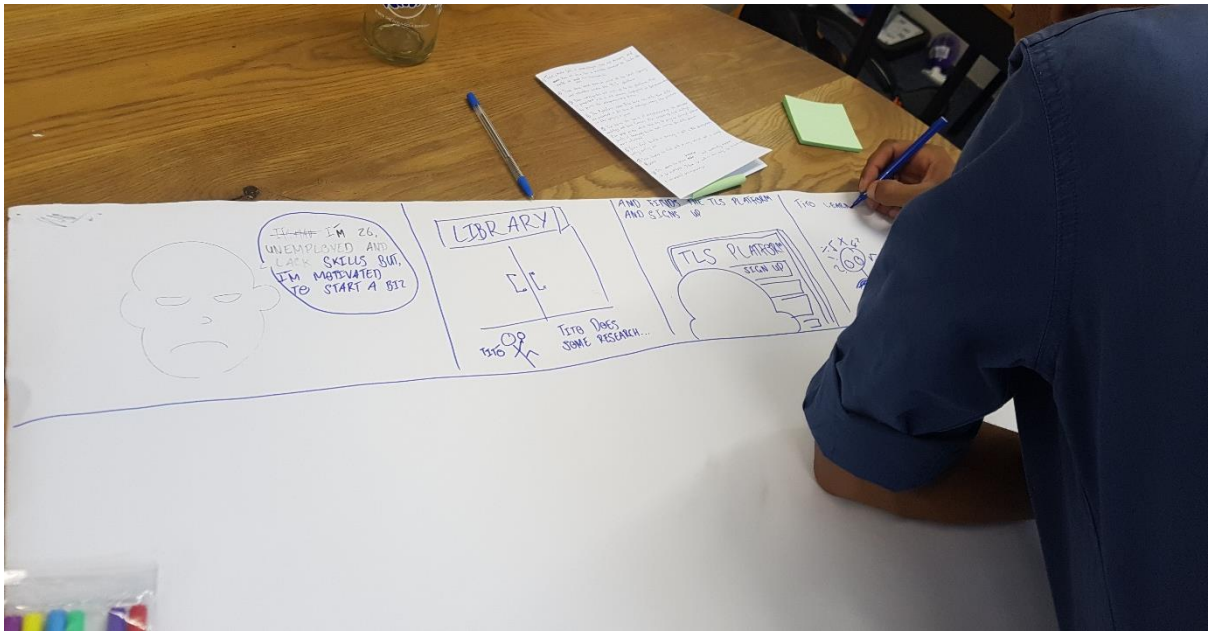


Figure 37: Sketching out the storyboard for entrepreneur track

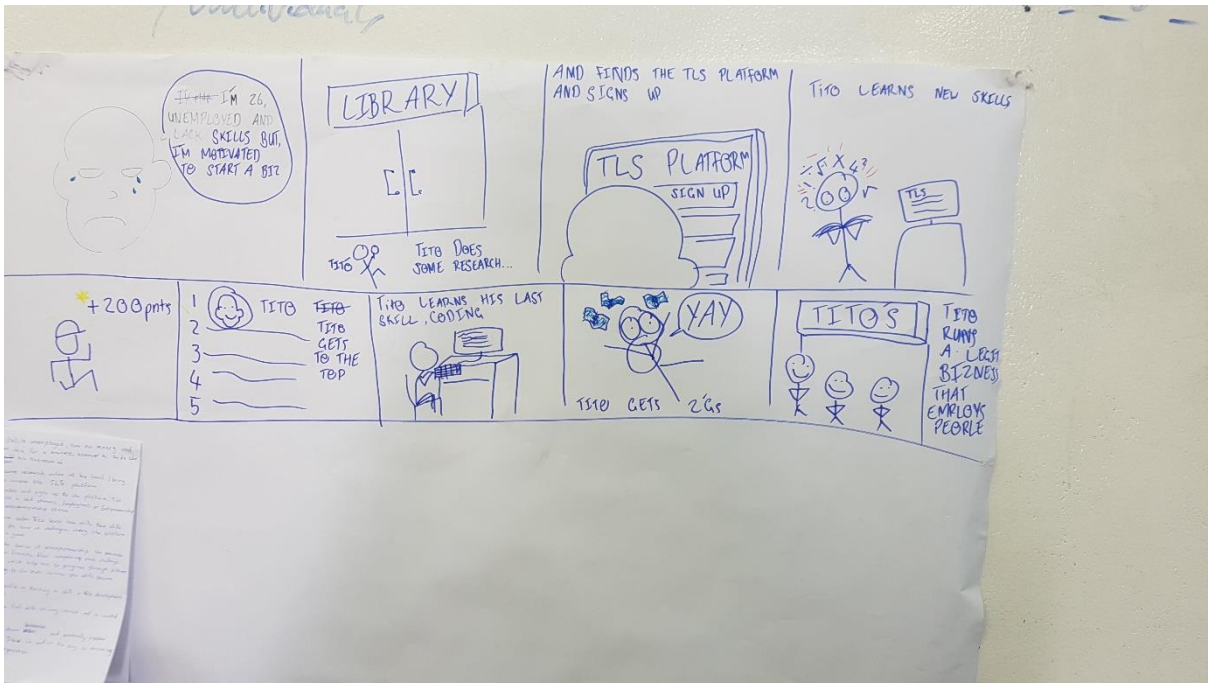


Figure 38: The sketched out storyboard for entrepreneurship

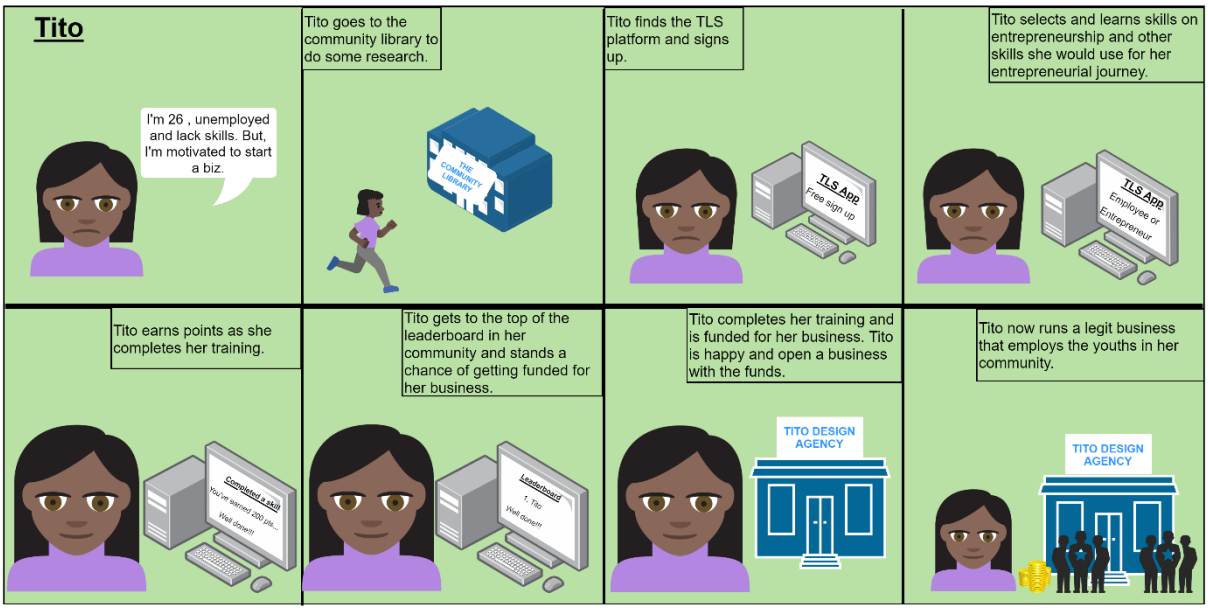


Figure 39: The entrepreneur track storyboard (Author's construct)

We then framed the point of view (POV) (Crandall, 2010; Dam & Siang, 2019) from the above empathy map and storyboard to capture the design vision for the ideation phase. Below are the POVs:

> **POV 1:** Youths without skills need to have places and opportunities available to them to develop the skills required to gain employment to help them alleviate poverty in their lives.
> **POV 2:** Unskilled youths need to learn skills to provide for their families. They are unable to learn skills due to the lack of resources in their communities.
> **POV 3:** Unskilled youths need to find work to earn money; however due to their lack of resources and opportunities they are unable to learn employable skills.

To help spark the ideation process for the above-outlined POVs, we used the 'how might we' (HMW) question tool (Dam & Siang, 2019). The purpose of utilising the HMW (How Might We) question tool was to facilitate the thought process for generating ideas through brainstorming. For instance, POV 1 was rephrased as 'How Might We' design an application that would be available to youths to develop the skills required to gain employment. In turn, this would help them alleviate poverty in their lives. POV 2: 'How might we' design the process to make accessible the resources for them to learn skills in local communities, POV 3: 'How might we' make it easier for the youths to find work or create opportunities for themselves?

The HMW enabled us to brainstorm ideas (on features for the gameful system), keeping in mind our understanding of the complexities of the problem, the identified

gameful elements, and the gains and tasks the youths identified. We wrote these ideas on sticky notes. After brainstorming ideas on the features, we rated and validated these ideas in the following ways:

- We consolidated the ideas based on similarities/duplicated ideas, resulting to 21 main features identified.
- On a scale of 1 to 3, we rated the “goodness” of the ideas, with 1 being the lowest and 3 being the highest
- We validated these ideas by using the importance matrix and to understand what features should be prioritised. The importance matrix is adapted from the impact/effort matrix (see Figure 40).

The youths were then asked to place these features in the most suitable quadrant. All features rated 3 were placed in the urgent and important quadrant, and those rated 2 were placed in the urgent and less important quadrant. Only one rated 2 was placed in the less urgent and important quadrant, while the ones rated 1 were placed into the less important, less urgent quadrant. See Table 11 below.

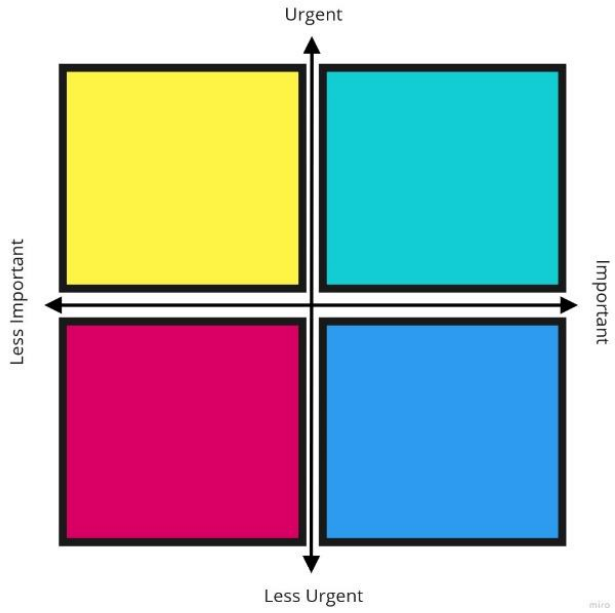


Figure 40: The importance matrix is adapted from the impact/effort matrix (Author’s construct)

Table 11: Validated ideas as features for the gameful designed system

Important / Urgent	Urgent / Less Important	Less urgent/ Important	Less Important and Less Urgent

• User avatar (customisable / personalisation)
• Have leader board (e.g. top 10 to complete a skill for a recent posted opportunity – for an interview)
• Fun pictograms (icons) for the skills available
• User profile page (where you can see total points earned, your current level in a current skill journey, be able to change personal details, see all badges earned, flares etc.).
• Sign in and log in page
• Home page having
  ○ current skill track
  ○ skill leaderboard
  ○ progress bar for progress made
  ○ points earned from the current track and overall
• Challenge page (for learning skills)
  ○ Current learning activity (video, text, etc)
  ○ Source for more info
  ○ Highest score board***
  ○ Current group leaderboard (for job/internship opportunities)
  ○ Each challenge / level point worth
  ○ Current goal (+earning extra points for completing tasks faster than others using leaderboard)
  ○ Time / days remaining to
	• Follow or add a friend feature
	• Success stories (of users of the platform)
	• Finding others in a community to work with (collaboration/form partnership)
	• Have a community forum for QnAs with online mentors (e.g. for business ideas)
	• Have a physical touch to it where youths of a community can gather to network, pitch ideas, etc. Preferably at a community centre.
		• You can die in the game (loose lives—LIVES MATTER) e.g. getting wrong answer in a challenge/quiz. It could be used as a way to ensure/measure their knowledge of the skill being acquired.	• Save offline feature
			• Extra tips (of how of real-life scenarios) while in game (using) the application.

complete challenge/tasks ○ Track your progress • Notifications for ○ New opportunities – funding included ○ Current status with others • Extra tutorials to gain general workplace skills (ask a mentor) • Tasks based on difficulty levels • On-boarding tutorials ○ Learn how to use the application (how it works- mechanics and dynamics) ○ Visit other pages ○ Earn first badge • Investors' page ○ Info on what they want ○ Funding available ○ Possibly a place to advertise too • Be able to see/view other youths' achievements. See your best achievement of tasks done.			

The above was to emphasise what features they deem would be the most important to add in the first iteration of the minimum viable product (MVP) and version of the gameful system. This is the first column of the table above - *Important / Urgent*. Newer versions can then follow the table from column *Urgent / Less Important* to *Less Important and Less Urgent.*

This chapter presented the procedures of data collection and data analysis and presented the findings of the study. The findings, illustrate the complexities associated with the 'wicked problem' of unemployment and skills development among marginalised youths in South Africa. The outcomes also comprise gameful design elements that could create engagement, and motivation and promote the retention of youths to learn skills that would ensure their readiness to take up employment opportunities. Furthermore, the attributes of the gameful design system were delineated in more detail. In the next chapter, I present the discussion of the findings.

CHAPTER FIVE
DISCUSSION – Towards a gameful designed system

5.1 Overview

In this chapter, the findings from the previous chapter are discussed relative to the themes identified. These findings emanated from the aim of this study, which was to explore the considerations (social, economic and technical) for a gameful designed system for youths in marginalised urban communities in South Africa. The aim was to motivate and engage them to acquire skills to mitigate the challenges of skills acquisition. The latter would enable them to access opportunities in the digital era and move closer to achieving the South African National Development Plan 2030 goals. With this aim in mind and guided by the study's adopted theory, the following objectives were set:

1. Understand the social context and complexity of the social issue to design for meaningful experiences.
2. Identify gameful design elements that will be combined and utilised to promote motivation for skills acquisition and development within the social context of the community.
3. Understand how best to combine these elements to achieve motivation, engagement and participation of the youth on the gameful system.
4. Identify the appropriate technological platform(s) for use by the youths.

Thus, in line with the aim and objectives of the study, the research asks the question: What are the considerations – social, environmental and technical – to design a gameful system for youths living in marginalised urban communities to mitigate the challenges of skills acquisition and unemployment?

To answer this research question, the research question was broken down into the following sub-questions:

1. What are the complexities and contributing factors (social, environmental, cultural, and technical) to consider for designing meaningful experiences for these youths?
2. What gameful design elements can be identified and adapted from the youths' lived experiences?
3. How can the identified elements be incorporated and used in a gameful-designed system?

The previous chapter outlined the findings from the data collected concerning the set aim and objectives as well as the research question and sub-questions. The findings were categorised into three parts. Firstly, the study revealed the complexities (or co-causalities) of the phenomenon – unemployment and lack of skills among youths living in marginalised urban communities in South Africa. These complexities were presented and grouped into six main themes: Knowledge and use of Technology, Funding and capital, Opportunities, Resources for up-skilling, Training and education and Physiological and psychological issues. Secondly, the findings reveal the gameful design elements that would create engagement and motivation for learning and skilling among these youths from their lived experiences. Thirdly, the study showed how to incorporate these findings in a gameful designed system through the facilitated workshops.

The current chapter discusses the emerging findings from an interpretive perspective and contributes theoretically and practically to the evolution of the ICT4D field termed ICT4D 3.0 (digital-for-development) body of knowledge. From here on, I will refer to ICT4D 3.0 as digital-for-development (D4D).

The discussions presented in this chapter are based on the core elements of the study's adopted theory–- constructivism. This theory helps in comprehending the philosophy of learning and positions the study within an interpretive context, where the acquisition of skills has a subjective aspect that can arise from the exchange and creation of social meanings among individuals (Monette et al., 2014; Anderson, 2016). The constructivism theory allows for a profound understanding of the phenomenon being investigated by utilizing a methodology such as design anthropology to explore the youth's context within their community. By combining the theory and design anthropology methodological approach, the study's findings become more comprehensive and shed light on the multifaceted challenges that hinder youths from acquiring the digital skills required for the digital economy. Furthermore, the discussion shows how the gameful design elements identified might be used to address these complexities, thereby answering the research question. The chapter discusses the theoretical perspective in relation to this study within D4D and then discusses the findings.

5.2 Mapping out the theoretical considerations with this chapter discussion

In chapter two, section 2.2.4 I discussed the theoretical perspective of the study and argued for the adoption of constructivism theory instead of theories such as diffusion for innovation. According to the theory, the acquisition of new knowledge and skills by

individuals is shaped by the interplay between their pre-existing ideas derived from past experiences and the information present in their surrounding environment (Juvova et al., 2015; Hof, 2021). In this regard, the construct of new digital and creative skills by youths living in marginalised communities can be most effective when the youths perceive that the contexts and tasks towards achieving these skills are authentic and hold meaning in their everyday lives and lived experiences (Anderson, 2016; Hof, 2021). As Hof (2021) argues, this theory historically is closely linked to technology as a means of self-expression, and technology should be understood from the cultural background of the individuals who would use the technology. It is from this view that the theory can be applied to digital-for-development.

As noted, this theory has five underlying principles and these principles guided the study's objectives and research sub-questions including how best to study the phenomenon. Figure 41 and Table 12 summarise and map out the principles and how they link to the study's objectives and the sections where they are discussed in this chapter.

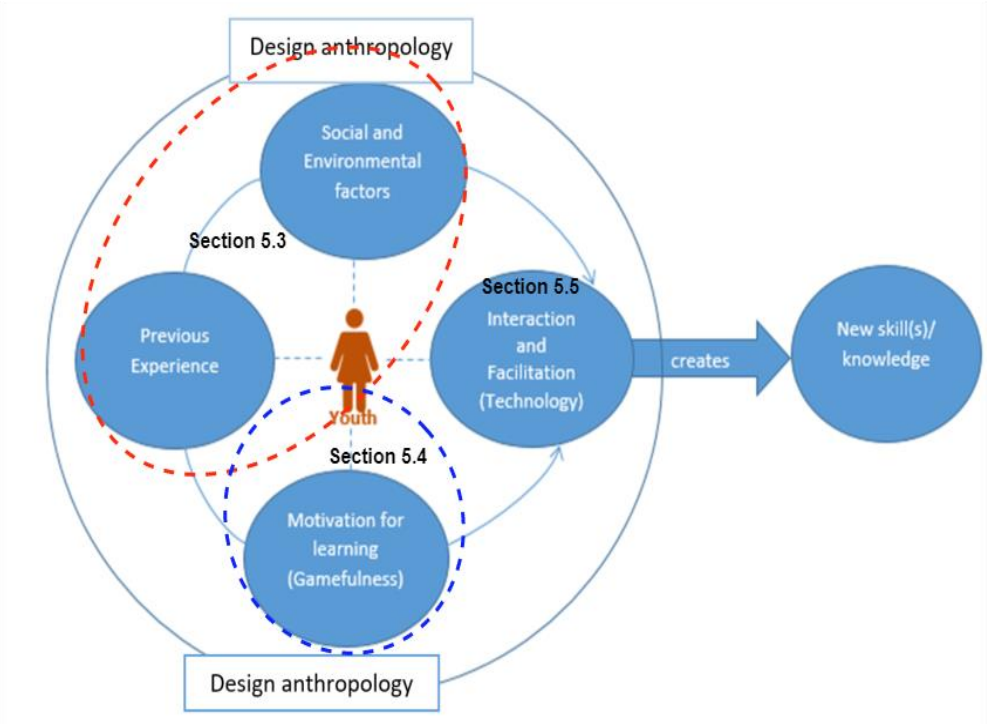


Figure 41: The conceptual framework indicating the sections of discussion (Author's construct).

Section 5.3 is indicated with the red-dotted lines and section 5.4 with the blue-dotted line. The combination of all the findings is then incorporated in section 5.5.

Table 12: Adopted theory mapped out with the discussed sections

Principles of the learning theory of constructivism	Linked to the thesis objectives	Sections in Chapter 5
The *first principle* is that learning, although a personal journey, is influenced by factors such as social and environmental factors surrounding the individual (Anderson, 2016; Hof, 2021). The *second principle* notes that the previous experience of an individual should be taken into consideration (Hein, 1991; Amineh & Asl, 2015; Anderson, 2016; Hof, 2021).	To understand the complexity and context – social, environmental, cultural, and technical – of the unemployed youths living in urban marginalised communities to design meaningful experiences.	Section 5.3
The *third principle* notes that while the contexts are considered carefully, there needs to be motivation for learning (Hein, 1991; Amineh & Asl, 2015).	To identify gameful design elements that will be combined and utilised to promote motivation and engagement for skills acquisition and development within the youths' context.	Section 5.4
The *fourth principle* is the means of facilitation (Amineh & Asl, 2015). The *fifth principle*, creating meaningful interactions and collaborations (Woo & Reeves, 2007; Anderson, 2016).	Combined to shape the third and fourth research objectives. These objectives are set to understand how best to combine these elements to achieve motivation, engagement and participation of the youth on the gameful system and secondly, to identify the appropriate technological platform(s) for use by the youths	Section 5.5

The first two principles are discussed in Section 5.3 which outlines the gap in knowledge of these complexities as themes (discussed in sub-sections 5.3.1 through to 5.3.6) which should be considered when designing meaningful experiences for skills development for youths from marginalised communities. The findings reveal that these complexities go beyond the issue of digital technology accessibility (of the digital divide) and effective use of technology (from the community informatics perspective) to a more holistic perspective of digital-for-development (in the area of youth skills development).

The third principle shapes the second research objective and sub-question of the study. Although some aspects of the first two principles also help create what motivates the youths to learn skills. Section 5.4 discusses these identified gameful design elements.

The fourth and fifth principles are combined to shape the third and fourth research objectives. Thus, answering the third sub-question on how the identified elements can be incorporated and used in a gameful-designed system. Section 5.5 shows how these findings (in sections 5.3 and 5.4) can be incorporated into a carefully designed ecosystem that affords youths the opportunity to be skilled for the digital economy (Gunn & Donovan, 2012; Drazin, 2021) and a platform that is a 'democratised' community-based technological innovation (DCTI).

As seen from the conceptual framework, design anthropology (DA) was the lens through which was used to uncover these complexities and gameful design elements. Thus this study also contributes to the discussion of how to conduct research in D4D using DA as a methodology. The choice of DA was appropriate as it engages the stakeholders to connect with being part of creating solutions or changes for themselves through their personal experiences and culture (Ventura & Bichard, 2016; Drazin, 2021). I discussed in-depth the choice and the steps in chapter three, section 3.3 and the methodological contribution of the study in my reflection on the study in chapter six (sub-section 6.2.1). This chapter discusses mostly the theoretical and practical contributions of the study.

5.3 Beyond digital divide and towards D4D in skills development: Understanding the complexities and contributing factors affecting the youths

As Previous research has identified two main views on upskilling youths in marginalised communities with digital and 21st-century skills. The first view argues for *access* to digital technologies (termed the digital divide) (Lediga & Fombad, 2018; Krönke, 2020; Cariolle, 2021). The second view proposes the *effective use* of these technologies (from the perspective of community informatics) (Gurstein, 2003, 2007; Carroll, Shih & Kropczynski, 2015; Parra et al., 2015; Huang, 2018; Williams & Durrance, 2018). While these two views are essential in the development of digital skills, this study highlights that the issue at hand is more complex than just *access* and *effective use* of technology. In other words, the digital divide and CI perspective alone do not holistically capture the challenges and how best to upskill youths in marginalised communities. Therefore, this section captures these complexities and contributes to the more holistic emerging field of D4D (see Heeks, 2020a). As mentioned, this section and its following sub-sections are based on the adopted first two principles of the constructivism theory which provided an in-depth understanding of the youths' experiences and factors that create unemployment and low skill levels in these marginalised urban communities (see Figure 42).

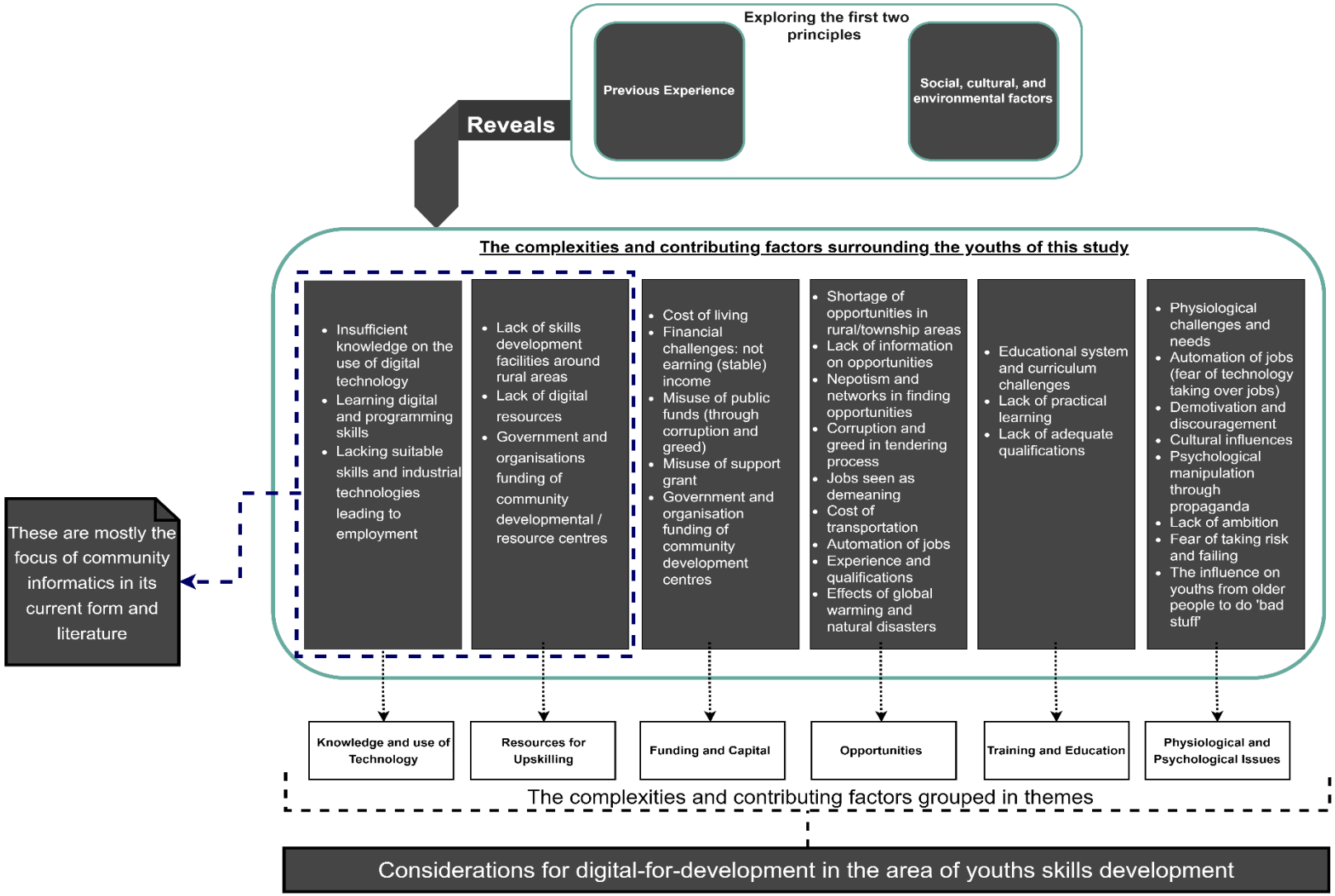


Figure 42: The complexities derived from the exploration and understanding of the first two principles (Author's construct)

As shown in Figure 42, the two themes – Knowledge and use of technology and Resources for upskilling highlighted in dotted dark blue are mostly the current discussion of the digital divide and CI in the extant literature. While I do acknowledge several references (such as Gurstein, 2003; Williams & Durrance, 2018) talk about financing, it is more about financing the resources (digital technologies and infrastructure) than other perspectives that this study reveals. This study thus argues that the premise in the extant literature focusing on dealing with *access to* and *effective use* of digital technology is not enough to bring about digital innovation, transformation, sustainability, and inclusion in urban marginalised communities. For a holistic digital-for-development to take place, these six themes have to be considered.

The consideration of these themes when designing a gameful system for youths in these communities could lead to addressing the shortage of digital skills and unemployment. These themes also form the basis or foundations for considerations of the key characteristics a digital skills-learning platform for youths in marginalised communities should have. In other words, if these complexities are addressed, it could lead to an increase in the number of highly skilled youths in South Africa. Although these themes are addressed separately, they are interconnected, and one cannot exist entirely without the other. All the other themes, in some way, are linked to the first theme - knowledge and use of technology.

5.3.1 Complexity 1: Knowledge and use of technology perspective

This sub-section discusses the complexity based on the knowledge and use of digital technologies among youths in marginalised urban communities. This discussion is based on the findings from the youths' perspective and literature. As mentioned in chapter two, the use of digital technology is central to the drive towards the 4IR (the Fourth Industrial Revolution) and the future of the SA economy like any other economy of the world economy (Magwentshu et al., 2019; Maule, 2019; Dicks, 2020; NYP, 2020). However, the fast pace of this development means that youths in marginalised communities could remain excluded from the economy if nothing is done (NYP, 2020) and it is already a national crisis (Dicks, 2020). Although there are benefits to the digital era, as it creates opportunities, these opportunities need the youths to possess digital skills that are sustainable for their personal and community development.

The South African youth play an important role in filling these new digital and creative opportunities (Magwentshu et al., 2019; NYP, 2020). However, as revealed from the findings, the youths in marginalised urban communities of South Africa are still impeded by the lack of knowledge and use of digital technologies. The knowledge and

use of technology which interlinks with the availability and access to digital technologies (see sub-section 5.1.3) such as the Internet, computers and the Web is still a huge challenge for the youth to date. For instance, as seen in the case of Mfuleni at the time of this study, having a daily cap of free Internet access of 50 MB and the shortfall of computers in the area affects their ability to effectively use digital technologies; this is a huge concern (Gurstein, 2013; Williams & Durrance, 2018). This contributes to the worsening inequality and contributes to the continuous unemployment of youths in these areas (VPUU, 2019; Mlaba, 2021). As with the case of Mfuleni, organisations such as Afrika Tikkun, step in to mitigate these inefficiencies but are still not enough.

Nevertheless, this complexity in no way implies that the youths in marginalised urban communities have no clue as to what technology is but instead, it implies that they do not know how to use it effectively. Awareness of technologies does not always translate to the knowledge and effective use of technologies (Gregory, 2018; Huang, 2018) in their case. While the youths in these marginalised urban communities are aware of technologies such as smartphones, desktop computers, and the Internet, most do not maximise their use due to insufficient knowledge (or lack of basic knowledge) on how to use these technologies' functionalities optimally. For example, from the findings, while some of the youths do not have a smartphone, they are aware that it exists and would like to have one. However, those who have a smartphone mostly use basic functionalities such as making a call, texting, social media apps, the camera, and picture gallery functions of the phone.

The negative effect of not using the few available technologies optimally contributes to the social problem of obtaining skills and employment. Most youths in these communities to some extent still find some functionalities of smartphones "useless" which includes using the phone to learn skills or using the search functionality to perform basic searches on the Web using the Internet. For instance, as the youths mentioned, even if opportunities to up their digital skills and gain opportunities exist online, they have no clue what to search for, what functionality of the device they would use, and what steps to take to find it. More on this is discussed in section 5.3.4 on opportunities.

Concerning opportunities, it is important to note that the aspect of the effective use of digital technologies in D4D is key to enable the *sustainable development of communities* through digital technologies (Huang, 2018; Heeks, 2020a) and should *link community development with opportunities* that are emerging (Pigg, 2005). However,

from the findings, for this to occur, it is crucial to recognise that within the context of these youths' digital technologies are either not introduced early enough or are often absent in their environment during their formative years. This affects them in future from knowing how to use these technologies to search for opportunities. As indicated by Luzu, Yola, and Alonzo in the findings chapter, growing up in a "disadvantaged background" implies that these youths do not have early exposure to digital technologies and must continuously strive to catch up with their peers from more privileged communities. Mitigating this would mean introducing and prioritising basic digital skills in basic education and early secondary education for all youth in all schools (De Lannoy et al., 2018; Dicks, 2020; NYP, 2020). This should include introducing how to use digital devices (desktop and mobile), and other digital skills noted by the participants to introduce early enough in their community were basic programming skills.

Digital and 21st-century skills such as machine learning/artificial intelligence, robotics, nanotech, biotechnology, creativity and entrepreneurship have to be introduced to youth early enough to prepare them for the digital era. This corresponds with the goal highlighted by the National Youth Policy for 2020-2030 (NYP, 2020) and it is important to gain the basic of these skills before grade nine (Graham & De Lannoy, 2016). This is because a lot of youth drop out of school as early as grade 9 due to poverty (Graham & De Lannoy, 2016; Yu, 2013; NYP, 2020). While it should be noted that leaving the educational system from grade nine is not ideal, if they are skilled, it does at least give them something (skills) to build their careers and lives on.

One thing that can be observed of the youths in urban marginalised communities is that their suggestion of digital skills to learn, the gameful design elements identified, and their need for more access to digital technologies may have been influenced by external cultures. This could be from their exposure to online environments through global apps such as games and social media, as well as the mentoring and training they received from organisations like Afrika Tikkun. This aligns with the argument for D4D, which recognises the growing digital and knowledge convergence across boundaries (Horner & Hulme, 2019; Heeks, 2020). When conducting community-based research in D4D, it is important to consider how external cultures may be influencing the social context of these youths, despite the unique characteristics of their local context.

While starting early with certain skills training and exposure, is ideal, most of these youths currently are older and not in education, and would likely not go back for basic

education or early secondary education. Accordingly, they might not gain any sort of digital use training. For these youths, that means to get them up to speed, *training for the use* of digital devices should be prioritised before training for any other skills in the gameful system. Therefore, to create a successful gameful skills-learning platform, the initial consideration should be to empower the youth to utilise these technologies proficiently and maximize the functionalities of digital technologies. Even if a system is designed 'by', 'with' and 'in' a community as suggested by Gurstein (2013), clarity on the general use and functionalities of digital devices need to be made clear for their efficient use (Bon & Akkermans, 2014; Gregory, 2018). To do this, in the case of the phenomenon being studied, the onboarding process of the gameful designed system should endeavour to introduce the youths to how to use digital technologies, including search functionalities. How this should be integrated using the gameful element of onboarding in a gameful system is discussed further in section 5.4

One other factor to consider for D4D in designing for the effective use of digital technologies is the cultural and linguistic issues that may arise with its use. This raises the issue of localisation of technology and gameful designed systems. Localisation is currently regarded as a "necessary evil" that designers, developers and technology producers have to consider. It is the process of adapting digital technology culturally, linguistically and/or technically to meet a particular population or territory's needs (Mangiron, 2018). It is necessary to state that the term localisation is preferred here when compared to other terms such as Africanisation or decolonisation. Terms such as Africanisation or decolonisation in the digital society (although not the focus of this study) create a perception of *separation* from the unfolding uniqueness of D4D which focuses on the sustainable global development of ICT (Horner & Hulme, 2019; Heeks, 2020a). On the other hand, the term localisation creates a sense of (cultural) *convergence* of local communities with the rest of the world through the use of digital technologies (Mangiron, 2018; Horner & Hulme, 2019), and this should be the characteristics and focus of D4D, especially in upskilling digital skills.

The implication of culture and language to the knowledge and effective use of technology was evident from the findings. Therefore, it is important to ensure that technologies, including digital devices are localised in the youths' context. English is not a first language for many; hence, the argument for the development of learning content in local languages – such as Afrikaans, isiXhosa and Zulu (Aziakpono & Bekker, 2010; Heugh & Stroud, 2020). While this argument might seem feasible for formal education, the findings suggest otherwise as not all youths in marginalised

urban communities (referred to as Townships) and rural areas could read and write in their local languages. While the participants speak and understand their local language, some youths find reading and writing in their language difficult. Only one of the participants was able to fluently read and write in their local language. To properly localise the gameful designed system, one has to consider this factor. If the content for the youth has to be in any local language, the best way to disseminate would be in audio rather than in written text. A subject matter expert would probably need to provide instruction on digital logic and offer training in vocalized local languages while being cognizant that the majority of digital technologies and programming are in English.

One challenge that may arise is testing the user's proficiency in their local language after they have acquired the necessary skills. How best would you test the knowledge of the user, in audio or text, especially for digital skills such as programming and machine learning, which are mostly in English? If the content is to be developed in local languages, content creators should ensure that the users understand the logic and can apply these accordingly when practising, being tested or in applied development. Another aspect that could aid in localising and easing the use of digital devices is if producers of digital technologies consider the context and technological background of these youths in the design of their manuals and provide information on how to use these devices more efficiently.

Furthermore, although the shortage of digital skills to fulfil the demand for labour in South Africa deprives youths of opportunities (De Lannoy et al., 2018; Magwentshu et al., 2019), the findings indicate that the absence of contemporary industrial technology skills also restricts the opportunities available to young individuals. Luzu, one of the participants, noted that when local production and manufacturing are not supported by the development of local industrial technology skills, it can lead to a lack of opportunities for the youth and a reliance on importing and hiring skilled labour or exporting raw materials (outsourcing production to other countries). This can be detrimental to the local economy and can prevent young people from gaining valuable experience and skills. Investing in developing these industrial technological skills among the youths can help to address this issue and support the growth of local production and manufacturing. This can also help to create more opportunities for the youth and a more sustainable economy.

Other challenges that would affect the preparation of the youth for digital skills and opportunities are access to funding and capital and access to resources (digital

technology and internet access). This is discussed under the theme of Funding and Capital and the theme of Resources for Upskilling.

5.3.2 Complexity 2: Funding and capital perspective

Access to funding and capital is fundamental for providing digital literacy, skills, and education in marginalised communities. While knowledge and use of technology are intricate to the development of young people for the 4IR and the digital era, funding and capital are needed to equip and give them access to developmental and digital resources. Unfortunately, most of the youth in marginalised communities are trapped in a vicious cycle of poverty that makes it difficult for them to access these resources (Yu, 2013; Graham & De Lannoy, 2016; NYP, 2020). Financial instability is a common hardship for the youths in these areas, and obtaining funding or investment to support their education, skill acquisition, or entrepreneurial endeavours can be significantly challenging.

The inability of youths to attain higher levels of education and skills is the primary contributor to unemployment, including inequality and poverty (NYP, 2020). On the other hand, the high cost of living due to the continuous rise in inflation, exacerbated by the COVID-19 pandemic, means that the income of most families in these communities is not sufficient to provide basic needs like food and clothing let alone finance training, development, and education. This includes the funds for buying digital technologies or paying for data to access the Internet. This also has implications for achieving the digital skills acquisition drive. Apart from not knowing how to use digital technologies effectively (including searching for opportunities and funding as discussed in theme 1 above), the cost of buying data to learn online (even for free courses) is a challenge for the youths; they *"don't have money to buy data"*.

In many of these marginalised communities, young people struggle to continue pursuing higher levels of education as they struggle to cope with their studies due to a lack of financial resources. This often leads to them dropping out of school before they even reach grade 9 (Yu, 2013; Graham & De Lannoy, 2016). While the participants understand the importance of getting educated and skilled, the cost of pursuing these is usually too high and having no other source of funding means that they *"tend to drop out of school to attend to family matters e.g., to become breadwinners or be a parent"*. Balancing the responsibilities of studying and taking care of a family can be incredibly challenging for the youths. As a result, they often have to make difficult choices between the two, which can lead to them dropping out of school and attending to family responsibilities.

This is quite a challenging situation because statistics show that having higher education (at least with a Matric – high school – certificate) or skills increases one's chances of finding a job in South Africa (Stats SA, 2021). Unfortunately, many young people are unable to complete their education due to financial constraints, which limits their opportunities for employment and a better future. It is crucial to prioritise efforts to encourage young people to stay in school and complete at least a Matric certificate. This will equip them with the necessary skills to compete in the job market and improve their chances of securing meaningful employment.

However, the results even for those who manage to complete their Matric are often not that great (De Lannoy et al., 2018). The findings suggest that this may be a result of the lack of concentration on their school work as they tend to family needs at the same time. Therefore, youths like Rea who would have loved to study further are not accepted in public institutions because of the low grades scored in their results. Even when they get accepted into private institutions for studies, their application for a National Student Financial Aid Scheme (NSFAS) loan to study at a private higher education institution is often rejected. Applying for funding to study further from banks is also denied due to no steady income from their guardians. The dilemma discussed above adds to the creation of the vicious cycle, leaving most of these youths without education and skills, and being discouraged.

The study reveals that funding and capital meant to alleviate these challenges from the government are sometimes misused, misdirected, mismanaged or embezzled through corrupt practices. Despite the well-written policies such as The National Youth Policy for 2020-2030 which recognises the importance of providing financial support to youth with low academic competencies and from low and middle-income households to help them access education and diverse skills training (NYP, 2020). The reality on the ground with the youths in marginalised communities is different. For example, although interventions like the NSFAS exist, they only benefit a small fraction of those who require financial aid and are exclusively available to public higher education institutions.

These funding are necessary because, as a participant noted, higher institutions do not provide education at *"cheaper rates that would allow for people to then develop themselves into where they need to be, or what they want to be"*. This is significantly important. If it is already hard enough for the youths to source enough funds to complete a Matric, how much harder would it be to source funds for university? Again, if a youth has a higher chance of studying further and gaining employment if they have

at least a Matric (Graham & Mlatsheni, 2015), shouldn't this be made a priority and more funding be given to youths to complete at least a Matric? This sentiment is also shared by the participating youths who also gave some suggestions on tackling this issue; deal with corruption and greed that leads to the misuse of public funds, deal with the misuse and abuse of support grants, and provide more funding from government and organisations to community developmental centres.

The misuse of public funds, while this is not unique to South Africa, Mlambo (2019) noted it has become a stumbling block to the implementation of the country's policies and development plans (Mlambo, 2019). When these funds are "*not used or invested back into the economy*" (Yola), it indirectly affects these communities. This misuse tends to hinder or limit funding for training, bursaries for education, creation of job opportunities, paid internships, and financial assistance for entrepreneurs and start-ups the findings disclose. According to the youth participants in this study, the government is not doing enough to curb this and the funds that could be used for youth development are siphoned for personal use by some government officials. They believe that this affects the government's ability "*to produce more jobs*" and the funding for them to be skilled (Amos) and those who benefit from it are "*the same people, not the whole of the country*".

Corrupt practices, such as not following due process in awarding contracts or funds to companies, also affect SMMEs (small, medium and micro enterprises), thereby neglecting companies who 'suffer' for those few that benefit. When "*the same company"* consistently wins *"the other companies" suffer* (Luzu). These neglected companies would not be able to compete and close down. Furthermore, the non-transparency and corruption in the use of public funds cause reduced foreign investments as it steers possible foreign investors away. Strategies currently in place to address these issues are inadequate and have yielded minimal results (Mlambo, 2019). For the gameful system, a strategy using digital technology (such as blockchain) could allow for openness and transparency when funding entrepreneurs or start-ups. This way transactions can be viewed and audited easily. However, this would have to be backed up with strong institutional frameworks and a culture of transparency and accountability to effectively combat corruption (Aarvik, 2020).

Another aspect of the complexity of funding and capital not so evident in current literature is the misuse of support grants by some youth. While some young people rely on these grants to help them meet their basic needs and improve their

circumstances (Yu, 2013; Dicks, 2020), from the findings some youths abuse the grant and see it as *"a money-making scheme"* due to "*being too lazy to work"*. The participants noted some youths *"don't want to work because they are lazy"* (Luzu) and because of the *"support grant they get"* (Amos). This is borne out of the notion that giving out support grants has made some youths in these low-income communities reliant on this as a stream of income. According to participants, this can lead to more births in these communities as more "money is allocated to" those who have more children, thus increasing the population in the already crowded Townships. The youths are in support of the idea of scrapping the grant or re-channelling the funds more efficiently.

The re-channelling of the funds for education will enable funding youths to complete at least Matric. This should ultimately deal with the issues of unemployment and give the youth access to employable and paid jobs. The re-channelled funds could also be used as an extrinsic motivation (as stipends) for youths to continue and complete schooling (only paid to them if they attend with good grades) or used to pay for their school fees. The monthly stipend could be a motivating factor to keep the youth in school with good grades. The stipend could also help those who have completed Matric to find their feet after completion because of *"how difficult life is after Matric"* for these youths. Other means noted could be giving items for the child's needs and upkeep per month rather than physical cash. This could lead to a reduction in unplanned births and substance abuse.

Concerning a gameful designed system, the allocation of funds should be in a transparent manner that reduces corruption in this process. Each training upon completion should lead to specific types of funding they would need to apply for/receive. For instance, the youth can apply/receive funding for entrepreneurship after completing entrepreneurship skills training, and bursaries if they want to study further after completing skills training equivalent to a Matric (NQF level 4). More on this is discussed in the section on incorporating gameful design. Being able to apply for or receive funding in the same system prevents the youths from searching aimlessly for opportunities as discussed in sub-section 5.3.1 and more in 5.3.4 regarding opportunities.

In addition, the findings support the notion that development centres such as Afrika Tikkun play a vital role in the development of the youth in communities where they are established (Graham & De Lannoy, 2016; Magwentshu et al., 2019). More funding (from public or private organisations) to have such establishments in low-income

communities and rural areas is encouraged and advocated for. These centres provide valuable services and resources (including digital resources) to young people, including education, career/vocational training, and support as observed in the case of Afrika Tikkun. The positive impacts of these centres as observed with the youths at Mfuleni can also be duplicated in other marginalised communities. For instance, the research participants, previously from various Provinces in South Africa including urban and rural areas, noted that if there were establishments such as Afrika Tikkun from where they were from, it would help improve the skills and way of thinking of youth.

5.3.3 Complexity 3: Resources for upskilling perspective

Access to adequate resources for upskilling youths in marginalised communities is crucial. While access to technologies has been one of the major goals of previous versions of ICT4D to the address digital divide (VPUU, 2019; Krönke, 2020; Cariolle, 2021), this study also reveals that the resources needed for these communities go beyond just digital technologies – development centres are also necessary. The absence of these centres can lead to more skills shortfalls and drive population increase in cities as youths search for opportunities. More on this complexity is discussed below.

Access to key resources for upskilling is fundamental to the development and sustainability of local communities (Wilson, 2006; Bornman, 2016). Lack of access to key digital resources in these communities can lead to unemployment of the youth in these communities in the digital economy (VPUU, 2019; Mlaba, 2021). For the youths to learn and be comfortable using digital technologies (discussed in 5.3.1), these technologies must first be available and accessible to them. The previously discussed complexities interlink with the lack of access to resources for upskilling – there will be no knowledge and efficient use if there is no access to resources. At the same time, to gain access to these resources, funding and capital are necessary.

Regarding development centres, many youths living in rural areas and townships often lack the opportunities that were provided to the participants in Mfuleni through Afrika Tikkun. In search of better prospects, they often travel from one locality to another where they believe they may have better chances of success (Leibbrandt et al., 2010; Mayombe & Lombard, 2016). It is important to note that not all marginalised urban communities have access to developmental centres. For instance, some youths had to travel from other townships, like Khayelitsha, to Mfuleni for training. Additionally, as observed from Rea and Luckitz, the movement of youths is not limited to rural-to-urban

areas but can also occur between different urban areas. The absence of skills development centres in rural areas and townships, often due to insufficient funding, limits the resources available to equip and develop young people. This results in their migration to urban centres in search of better prospects and opportunities. This competition for limited opportunities, usually in the form of manual labour jobs, underscores the need for investment in skills development programmes in these marginalised communities. The migration thus affects the population and puts a strain on these migrated urban cities (especially the township communities) creating more chaos for the unemployment problem (Mayombe & Lombard, 2016).

The findings indicate that establishing development centres in rural areas could lead to a reduction in young people migrating to cities in search of growth and development. This could lead to the development and sustainability of these rural communities. The acquired skills can then be used to create employment opportunities within their local communities. These development and training centres should be well-funded and equipped with resources that would be difficult for youth to acquire on their own, including access to digital technologies as noted before. Since many job opportunities in urban areas require high-skilled individuals, whereas migrants are typically unskilled and unable to meet the labour demand (Lam, Leibbrandt & Mlatsheni, 2008; Burns, Edwards & Pauw, 2010; Yu, 2013; Graham & De Lannoy, 2016; NYP, 2020), it is imperative to have such centres, so that even a drop-out at grade 9 can have access to skills development. If such a young person migrates to another location in South Africa, they can apply for these opportunities in urban regions.

The need for more developmental centres is important to address the youths' lack of "*access to digital technologies and other technological resources*" and skills development. The centres should provide the youths access to digital resources such as the proposed gameful system digital platform to train for skills, internet connection, and mobile and computer devices. Apart from providing the resources and sheltering the resources, the shared space can be a valuable asset to the community and could foster a sense of belonging and connection. Luckitz highlights this point clearly; "The relationship I had with my fellow learners. It was amazing how people shared their personal [experiences] and situations that occurred in their lives at the time and how they trusted me with that information. Also learning from other people that were there."

To adequately equip the youth for the challenges of 2030 and the challenges of the digital era, a significant investment must be made in resources aimed at preparing them. Even being one of the fortunate communities to have a development centre, the

youths at Mfuleni still struggle with Internet access and limited access to computers. They use the computers at Afrika Tikkun and as of the time of the data collection five computers at the local library. They struggle to get connected to the internet as they are allowed only 50MB a day when they are around the library. To make any real impact, more investment is needed in Internet connectivity, increased data caps (1GB or more a day) for those who have smartphones or any digital devices, and digital devices in secured labs in developmental centres or libraries.

While this aspect of the complexities being discussed may not be entirely incorporated into a gameful system, it is crucial for its success. These resources are essential for the successful implementation of the gameful learning platform. These centres and libraries can house the resources like computers with Internet connectivity that gives them access to the skills learning platform. It will also be a space where the youths can collaborate and connect with themselves and their mentors (discussed more on the last complexity – sub-section 5.3.6). A well-equipped community development centre can improve skills and address the supply side of De Lannoy and colleagues' (2018) theory of change.

5.3.4 Complexity 4: Opportunities perspective

From D4D focuses on global and macroeconomic development and the empowerment, transformation and inclusivity of communities (Horner & Hulme, 2019; Heeks, 2020a) towards the new opportunities the digital era creates (Schwab, 2018; Magwentshu et al., 2019; WEF, 2023). However, it raises the question of how marginalised communities can know about these opportunities and prepare for them. These are the challenges and questions that were posed by this study's findings. The findings clarify the perspective from which opportunities should be looked at.

The complexity of finding and creating opportunities is one of the main challenges D4D should address. Based on the findings, a significant emphasis was placed on finding opportunities related to jobs, funding (including bursaries, scholarships, and start-up funds), skills development (including Learnerships), and tenders. Finding opportunities is one of the major challenges the youths in marginalised communities face and should be a key focus of D4D research. Living in marginalised communities often means that opportunities are *perceived* to be scarce or hard to come by. The findings indicate that the experiences of those who moved from rural areas to urban townships versus those who moved from one urban township to another sometimes vary. Regardless of their personal experiences, all of them agree that it is challenging for young people to find or obtain opportunities.

Putting this in context, while those from rural areas all agreed that there were no opportunities around them, leading them to move to urban cities, those from other urban cities argue that while there may seem to be opportunities in cities "*it depends on who you know*" (Amos and Yola) and "*the information and luck*" (Rea) you have. This is sometimes linked to the lack of access to digital resources and the knowledge and effective use of technology previously mentioned. For instance, Rea (from Johannesburg) only discovered that there were four other Afrika Tikkun development centres in Johannesburg where she lived before coming to Cape Town.

> *…I looked online to find free online courses but then I couldn't find anything… I didn't know that Afrika Tikkun was also in Johannesburg. I found out that when I was here they said they have, they have five centres. And I was like 'What?' Four centres are in Johannesburg and I came here* **(Rea)**.

In addition, Rea did not know that a company where she interned existed in a suburb (Bellville) close to Mfuleni. "*I didn't even know there was a place like that close by*" Rea stated. Access to information is critical for the development of the youths and the lack of it also causes unnecessary movements of youths from one place to another.

This *perceived* shortage of opportunities in rural areas means that some of these youths put aside the thought of risking their lives and travel to unknown destinations – the urban areas (Leibbrandt et al., 2010; Mayombe & Lombard, 2016). This understanding corresponds to the findings as the youths acknowledge knowing "*no one living in*" these cities and leaving behind "*all of [their] family*" members (Luzu) to migrate to cities. The migration to major cities for opportunities means the increase of many youths in these cities competing for the few opportunities available (Mayombe & Lombard, 2016). From observation and feedback from the participants, many of these youths remain unemployed as the available opportunities may have been already occupied. Not finding opportunities causes some youth to resign to the life of crime, doing jobs they see as demeaning, while some resort to starting *shisa nyama* (barbecue) businesses. Hence, the argument for long-term sustainable solutions of creating opportunities within their localised communities (Mlatsheni & Ranchhod, 2017; De Lannoy et al., 2018).

One issue that was observed with regard to the lack of finding opportunities is that most information about opportunities and the application process is often available and done online. As noted in 5.3.1, these youths do not have the resources to access information online and the necessary skills to search for these opportunities. While

some applications are done data-free (an example is the sayouth.mobi for the Presidential Youth Employment Initiative), the process of discovering information, and using the devices effectively to apply may be a challenge for the youths. As a result, a significant number of youths are left out of available opportunities due to their lack of awareness of such opportunities. The youths expressed their concerns about not knowing what to "*type on Google*" and feeling like there is "*no information*" available. This further highlights the importance of digital literacy and the effective use of digital devices and technologies.

In addition to the above, companies and organisations (public and private) use youth programmes, learnerships and internships (especially for graduates) in South Africa to help mitigate the challenge of lack of opportunities. However, if youth unemployment is still relatively high (Stats SA, 2021) despite these efforts, the effectiveness of these interventions is uncertain. For instance, Kruss et al. (2014:2) noted in Hall (2015), claim that "70% of apprenticeship and 86% of learnerships participants who completed their qualification 'experienced a smooth transition directly into stable employment'." However, the Kruss and colleagues' data sets were from Sectoral Education and Training Authorities (SETAs) and the Department of Labour. In essence, the majority of the youths who took part in these learnerships have completed at least high school level education (Matric), meaning that a significant number of youths who dropped out of school before completing grade 9 or have no educational background are still left out (Rankin, Roberts & Schöer, 2014).

It is important to note that Kruss and colleagues at the time of their research obviously could not have taken into consideration the current state of post-COVID-19 and accounted for the job skills currently needed. Nevertheless, Kruss and colleagues (2014:7) acknowledged the need for these programmes to shift their focus from "basic and intermediate skills levels towards more intermediate and high skills levels" in preparation for the future of work. The question then is, how do we get to upskill and keep the youths (not just those with Matric) motivated and engaged to gain these high skills? Secondly, how do we ensure that the youths are not just receiving training but are getting *stable* jobs? In this context, *stable* means permanent and well-paid jobs.

To put this in another perspective, take for instance the Presidential Youth Employment Intervention (PYEI) which is one of the recent initiatives from the President's office (Dicks, 2020), currently entering into phase 4. This initiative implemented as the Basic Education Employment Initiative (BEEI) with the Department of Basic Education (DBE) is said to be "making excellent progress" (DBE, 2022). While on the surface level, it is

said to have “created more than 830,000 employment opportunities, thus making a meaningful contribution towards addressing the challenges of youth unemployment nationally” (DBE, 2022: paragraph 2), there is no information on what happens to the youths after the programme. At the end of the programme (which takes about 5 to 9 months), the youths are encouraged to use the skills, competencies and knowledge that were acquired through this initiative, and are wished well for their future plans (South African Government, 2022). Do we judge this initiative to be successful? What criteria do we use to judge a programme as successful or not? Or what do we define as employed, if these youths are trained or are in ‘employment’ for a short period (12 months max) and then left alone? Do we call this success, if the youths return to be part of the unemployed numbers?

The youths must be trained in a way that guarantees stable employment, especially those without at least a Matric. The gameful system while designed to motivate and engage, should be designed in a more sustainable way to train for skills, track the progress of the skills learnt, keep track of those who are trained, and those trained can successfully apply for funds, jobs and other opportunities, and then keep track of those who get stable employment. In addition, these acquired high skills should lead to academic achievements. It should be an ecosystem that will allow organisations and companies to co-exist together and be more collaborative in solving the issue of unemployment (De Lannoy et al., 2018). This can also be done in collaboration with development centres in the community.

The role of development centres cannot be overemphasised in solving the youth's lack of skills and unemployment challenges. These centres can act as a central place where youths in a local community can find and access information for opportunities, especially for those without access to digital devices and data connectivity. For instance, a search for some opportunities (even for someone who knows what to search for) resulted in various programmes for youth (see the literature review). This scattered information about opportunities creates chaos for the youth (De Lannoy et al., 2018) even if they know what to search for.

The distance and cost of travel from these Townships to where more opportunities are available is another factor that affects the youths in obtaining opportunities. These communities are located far from job opportunities (Mlatsheni & Ranchhod, 2017; De Lannoy et al., 2018), and transportation networks are often unreliable (Mlatsheni & Rospabe, 2002; De Lannoy et al., 2018). The findings acknowledge that the cost of transportation from a place like Mfuleni to areas such as the Cape Town CBD means

that their mobility in search of opportunities is limited to areas around them. This is emphasised by Yola who noted that *"general mobility like the ease to get from where you live to where you work cost too much money*".

Another general perception regarding this is that one of the implications of cost and distance to a prospective place of work is that potential employers use it as a ploy to deny a youth from these communities' job/internship offers. From the findings, it is noted that when employers "*find out [that] the amount they're going to pay [the youth] will*" only be allocated to transportation, they may likely reject a youth from these communities (Luzu). Luzu adds "*They cannot employ you if you use maybe, let's say maybe [they] pay you R2000 and you use R1500 for transportation. So, it's more like you're working for transport so they decide to say 'no, we cannot employ you'*". This enforces the belief about the difficulty of finding jobs around their community and the need to create opportunities for themselves within their immediate vicinity. One way to address this aspect would be to develop a sustainable economy in and around these Townships. Most of these Townships are close to affluent areas and that could be fulcrum for economics of scale with the local businesses such as *shisa nyama*, using digital and creative ways to deliver services and products to surrounding areas.

Furthermore, in addition to the aforementioned complexities regarding opportunities, having a network of individuals who can aid in finding opportunities is considered a crucial factor. The information and opportunities the youths find sometimes depend on their limited networks. These networks are mostly from their family members and friends from the same vicinity, this however limits their knowledge of opportunities beyond their surroundings. While there may be opportunities in the findings noted in Johannesburg, there is a higher chance of getting these positions, if they "*know someone or have the right network of 'people in high places'*". This perception the youths say is the difference in finding opportunities in Johannesburg in comparison to Cape Town. This nepotism of favouring only those known to the 'people in high places' limits those who do not have such networks.

The limited networks that some youths have can be attributed to their cultural and socio-economic backgrounds, which can sometimes affect the type of job or level of trust they are offered by potential employers, even if they are qualified. Moreover, the number of years of job experience required for a position can be discouraging for youths, and higher qualifications may even be perceived as a threat by recruiters. To address this, De Lannoy and colleagues (2018) suggest that employers should be open to providing youths with skills and experience regardless of their background,

and should be incentivised to do so. Another aspect where nepotism is noticed is from the political class who favour people they know or businesses they know. Tee and Luzu say nepotism does not allow for the distribution of the nation's wealth to everyone, but it enriches '*the same people*' and '*the same company'* that get favours from the political class.

To deal with issues of perceived nepotism and lack of networks, a *central hub* as discussed with regards to the gameful system is needed, where organisations can place opportunities that youths can apply. In addition, this should be a seamless process and would not need youth to leave the system to look for these opportunities. This includes those interested in entrepreneurship, the process of getting a tender or funds could minimise the bribery and corruption in the process. This can be the driver that can help develop youth-owned businesses and removing barriers such as this can help youth businesses thrive (NYP, 2020). Youth entrepreneurs should be trained on tender processes, and key players ensure a more transparent and open process for funding and tenders.

Another concern for the youths is the automation of jobs with the improvement of technologies is taking over jobs that were once performed by people. Examples of these are the recent retrenchment in banks and the digital disruption in the banking sector, including the use of technology for self-services in the food and retail sectors. While this means needing more skills towards technological-driven jobs, it displaces youths without technological skills. This threat is linked to the first discussed theme concerning the need to develop more skills that are relevant to 4IR. Furthermore, another relevant challenge to getting a job is the years of working experience needed even for a job that does not require highly skilled individuals (Luckitz). Sometimes being overqualified for a position also reduces their chances of getting a job. Nonzie one of the participants noted that "*companies where the CEO (or recruiter) will think you will be managing the company soon*" might see the applicant as a threat. While their concerns are valid, it is the believe that if they are equipped with the right skills, these fears could be dealt with.

Finally, the findings suggest that global warming and its indirect impact on natural disasters can also contribute to unemployment, particularly affecting local farmers and small, and medium-sized enterprises (SMMEs) in rural and low-income communities. The youths participating in the study emphasise the need for greater awareness of global warming among youth in marginalised communities. In the gameful system this aspect can be a compulsory learning component for all learners.

5.3.5 Complexity 5: Training and education perspective

Having the youths in marginalised communities go through proper and quality training and education plays a critical role in ensuring that the youths have an edge in searching for and getting a job. However, the level of quality of education and training received in these communities (for those who attend), is not up to standard and does not equip the youths for the challenges ahead. This calls for the 'overhaul' of the education system and an update to the curriculum. We need a curriculum that is more practical and in line with the digital and 21st-century skills needed for the economy. Three main co-causalities revealed from the findings are lack of adequate academic qualifications, lack of practical learning in schools, and the challenges in the educational system and curriculum.

As noted previously in the theme funding and capital, the high dropout rate from high school is a challenge that is caused by the financial struggle faced by the youth and their households. This results in the lack of adequate academic qualifications among the youths (Yu, 2013; Ismail & Kollamparambil, 2015; Graham & De Lannoy, 2016; NYP, 2020).

According to the NYP (2020), only 52% of young people in the country have completed Grade 12, compared to 70% in other developing countries. Dropout rates increase significantly from Grade 9, peaking at almost 12% in Grades 10 and 11. Consequently, there has been discussion and proposal for a General Education Certificate for the completion of Grade 9. While recognizing Grade 9 as a significant educational milestone aligns with government policy, it may have unintended negative consequences. The findings from the study support the notion that poverty and unemployment issues are linked to low levels of skills and education (Graham & De Lannoy, 2016; NYP, 2020). This view is even stated in the youth policy. It is concerning that the policy still suggests giving certificates at Grade 9. Offering certificates after Grade 9 would not effectively address the issue of low levels of education and skills among young people, and may even discourage them from pursuing further education and skill development, ultimately hindering progress toward achieving the NYP 2030 goals.

The findings indicate that the youth are willing to complete at least a Matric if they are supported, and getting a Matric should be made compulsory. Thus, stakeholders should be finding ways to encourage the youths to complete at least Matric and not a grade 9. Some suggestions from the findings are funding and other extrinsic motivations (see Theme for Funding and Capital). Retaining youth in school through

incentives could keep them focused on school rather than focusing on how to survive. Since we know from Stats SA (2021) that those with at least a National Senior Certificate (high school grade 12) are likely to be employed, should the focus not be on having a financial support scheme for these marginalised youths to complete High School? In addition, since youth are more likely to pursue higher education once they have a National Senior Certificate (Graham & De Lannoy, 2016), then ensuring that they complete a National Senior Certificate should be a priority.

The root cause of low skills among young people is the absence of practical learning opportunities in schools, from basic education to high school, particularly in low-socioeconomic communities. Additionally, the teaching and content being delivered are not always applicable to real-life situations. Therefore, restructuring the education system is necessary to prepare young people for the challenges, skills, and work life of the 21st century. The curriculum should also consider and cater for how people learn differently (visually, auditory and kinetically). The design of the educational system and curriculum should also acknowledge that "*there are fast and slow learners*", and those "*that learn through doing, through hearing, through seeing*" the participants stated.

In addition, the overhauling need to take into account the mismatch between the demand for labour and the supply of skills (De Lannoy et al., 2018), especially towards the digital era. Numeracy and literacy skills at primary schools are below the international standard, and the low pass rate of mathematics and science in grade 12 (NYP, 2020) inhibits the interest and growth in Science, Technology, Engineering and Innovation in higher education, and potential of skills development required for the 4IR (Magwentshu et al., 2019; Maule, 2019). As the research participants suggest, the non-practical nature of these subjects makes them boring and to gain more interest in these subjects, these subjects should have elements of practicality to make them fun. This means they are also taught to learn "*how to fish for themselves*". These suggestions should also be critically considered by the subject matter experts when designing the content for the gameful system.

Besides the educational aspect, the participant's interest in learning certain skills towards their career goals shows that they have insight into skills they need to remain relevant in the future of work and entrepreneurship. All the participants deem soft skills necessary, and these should include basic digital skills as previously discussed. Some of the skills the participants noted they would love to have if given the opportunity are Information Technology (System integration specialist, network specialist, database specialist, software development, and web development), Business and management

skills (Actuaries, Risk assessors, external auditors, financial advisor, Business Administration). Others are Air traffic controller and aviation, Medicine and health (medical doctor, nursing and primary health care), Teaching and training skills towards being an educator, and farming skills.

5.3.6 Complexity 6: Physiological and psychological issues perspective

In addition to the above-described complexities from the youth's personal experiences, some physiological and psychological issues were identified and also play a role in the unemployment and skills development challenges that should be considered in D4D. The struggles the youths go through lead to these psychological and physiological issues and make the youths become demotivated or discouraged from learning new skills, setting a goal or even applying for jobs. It is impracticable to separate the challenges the youth in marginalised communities go through without discussing their physiological and psychological effects on the youths and in addition, how these effects shape their social construct.

The physiological effects here mean that members of marginalised communities would always place their basic needs first before the thought of educating or skilling themselves. With the little or no income, they receive, their priority is often shelter, food, water, and sometimes (if they can afford it), medication. As one of the participating youths puts it; "you cannot be creative [think of finding ways to upskill or perform optimum] while you are hungry" (Luzu). Poverty and the search to get these basic needs have led some youths to get involved in criminal activities. Thus, increasing the security challenges in these communities. For instance, during the data collection of this study, the Afrika Tikkun computers were stolen from the lab and to expect the community to pay for security against these activities would be costly.

Some health conditions can sometimes, due to poor dieting and lack of adequate medication, create a challenge (Tshabalala, 2014). Many youths do not have enough money to take care of themselves properly; this can result in them becoming unfit to perform certain jobs. This also includes the aspect of physical disabilities, as people tend to prejudge people with disabilities even if they can do the job better than those without physical disabilities. Youths with disabilities are known to even lag more behind in attaining high-level skills and equal access to education (NYP, 2020). One way to address this is through stipends to address the physiological aspects as discussed in 5.3.2.

As mentioned, physiological issues can cause some youths to enter a life of crime. This is due to the lack of 'good' mentors in these marginalised urban communities which makes the unemployed young people look up to some older people in the community who 'do bad stuff'. The finding noted that social interactions of the younger persons with the older people without any proper guidance lead to social vices such as the abuse of drugs and criminal activity. The psychological effects of unemployment could sometimes also lead to some committing suicide (Tshabalala, 2014). This is the worldview some youths grow up to know. Through mentorship, the youths can look up to people who can be of positive influence in their lives. These mentors can be a 'bridging system' at various 'crucial hinging points' that informs and supports them (De Lannoy et al., 2018). Through the path of mentorship and guidance, the youths can be assisted or assist each other to reach their full potential. Mingling and discussing with other youths at development centres showed to have had an impact on youths' psychological well-being. It is imperative that the gameful designed system also incorporates mentoring. The incorporation of mentoring using gameful design elements is discussed later.

Other psychological factors that affect the youth and need to be addressed include:

- The fear of technology taking over most manual jobs has led to discouraged youths not searching for jobs. This fear could be addressed by acquiring high skills that are 21st-century-proof.
- In addition, the rejection of a youth job application also leads to discouragement and demotivation. This results in a psychological state of feeling rejected and discouraged. Making them lose interest in looking for jobs in future.
- The lack of ambition by the youths towards pursuing a goal. With proper mentoring and guidance, this could be addressed.
- The fear of taking risks and failing has kept youths from venturing into entrepreneurship. Practical training on entrepreneurial skills should teach the youths the required skills about how to 'fail fast' and learn without so much risk.
- Cultural influences from older people (especially parents or guardians); psychologically create barriers towards the development and expression of youth's creative skills and the development of the creative economy. Creative skills such as acting and music are sometimes frowned upon as "not useful" for the youths to pursue. These cultural influences, although changing, also affects the role of females.

- Politicians psychologically manipulate youths through propaganda without doing anything that would help transform their situation. Training for the effective use of technology, e.g. on search functionality, could help the youths search by themselves and identify ‘fake news’.

The use of design anthropology led to the emergence of these important factors to consider for community innovation. Any community innovation for skills development should critically consider these six aspects. While the perspective is from youths in marginalised urban communities, some of these could apply to those in rural areas; many youths in these communities were originally from rural areas.

Table 13 summarises the key characteristics and elements that emerged from this section. This needs to be considered in D4D research that involves skills development in marginalised communities, especially in developing countries. These key characteristics and elements are features that a gameful designed system for skills development for youths living in marginalised urban communities should incorporate to ensure success.

Table 13: Summary of the features for D4D derived from the discussed complexities

Themes	**Summarised features derived for a gameful designed system**
Knowledge and use of technology	• First, ensure the youths have the knowledge and the effective use of basic digital devices and critical functionalities such as the search functionality through the onboarding process. • A more global convergence of digital skills with sustainability in mind as with the ethos of D4D. • In line with the previous point, training should be localised in verbal local languages and the subject matter experts should be sure to ensure to explain digital skills in a way that the youths can understand and apply. This should be made available as an option for those who struggle with English. • Digital skills such as machine learning/artificial intelligence, robotics, nanotech, and biotechnology should be included as skills to learn.
Funding and capital	• Youths should be able to apply for/get funding (bursary and scholarship) or capital (for entrepreneurship). While they are informed from the beginning of the goal and what they can

	apply for before the start of a skill, they are only allowed to apply after the completion of a certain skill. • Funded with stipends while getting trained for skills.
Resources for upskilling	• While not directly an in-system feature, is an important factor for the successful implementation of the system. These resources include access to digital technologies and Internet connectivity. • Resource centres such as developmental centres or libraries where youths can meet or use the resources there.
Opportunities	• Be able to apply for available opportunities such as learnerships, internships, jobs, and tenders linked to the specific skill upon completion. • Train for skills, track the progress of the skills learnt, keep track of those who are trained, those trained can successfully apply for funds, jobs and other opportunities, and then keep track of those who get stable employment. • It should be an ecosystem that will allow organisations and companies to co-exist together and be more collaborative in solving the issue of unemployment.
Training and Education	• These acquired high skills should lead to academic achievements linked to the NQF. • The training should be very practical and applied in real-life scenarios. • Training should also include the following skills: Information Technology (System integration specialist, network specialist, database specialist, software development, and web development), Business and management skills (Actuaries, Risk assessors, external auditors, financial advisor, Business Administration). Others are Air traffic controller and aviation, Medicine and health (medical doctor, nursing and primary health care), Teaching and training skills towards being an educator, and Farming skills.
Physiological and Psychological issues	• The system should be mentorship-driven – with mentorship and guidance the youths can be assisted or assist each other to potentially reach their potential.

The following section explores the gameful design elements identified in the findings. These elements, in combination with the themes discussed above, shape the overall experience that youths anticipate engaging with and that will motivate them intrinsically and extrinsically to learn new skills.

5.4 The gameful design elements

This section discusses the findings which are based on the third principle of constructivism. This principle argues that for complete constructive learning to take place, the understanding of what motivates an individual to learn has to be clear (Amineh & Asl, 2015). A review on gameful design by Koivisto and Hamari (2019) argues that health, education and crowdsourcing have remained the common contexts for gameful design research, thus other aspects such as this study's context have received less attention. They opine that there is still a lack of coherence in the discussion and theoretical foundations of gameful design research. This discussion intends to fill that gap and contribute to the theoretical and practical foundations of gameful design in D4D.

To get to understand if there are more factors (apart from the identified discussed findings above) of what it is that could motivate and engage the youths, the participants were tasked for three weeks to keep track of some of their activities and reflect on these activities. In addition, they were enquired about their experience and journey at Afrika Tikkun using three what (3Ws) questions. More on the methodology is found in sub-section 3.3.2 and sub-section 4.3.2 for the findings. The analysis of their personal experiences, including what motivates and engages them to use the applications and complete their training at Afrika Tikkun, is summarized in Figure 43.

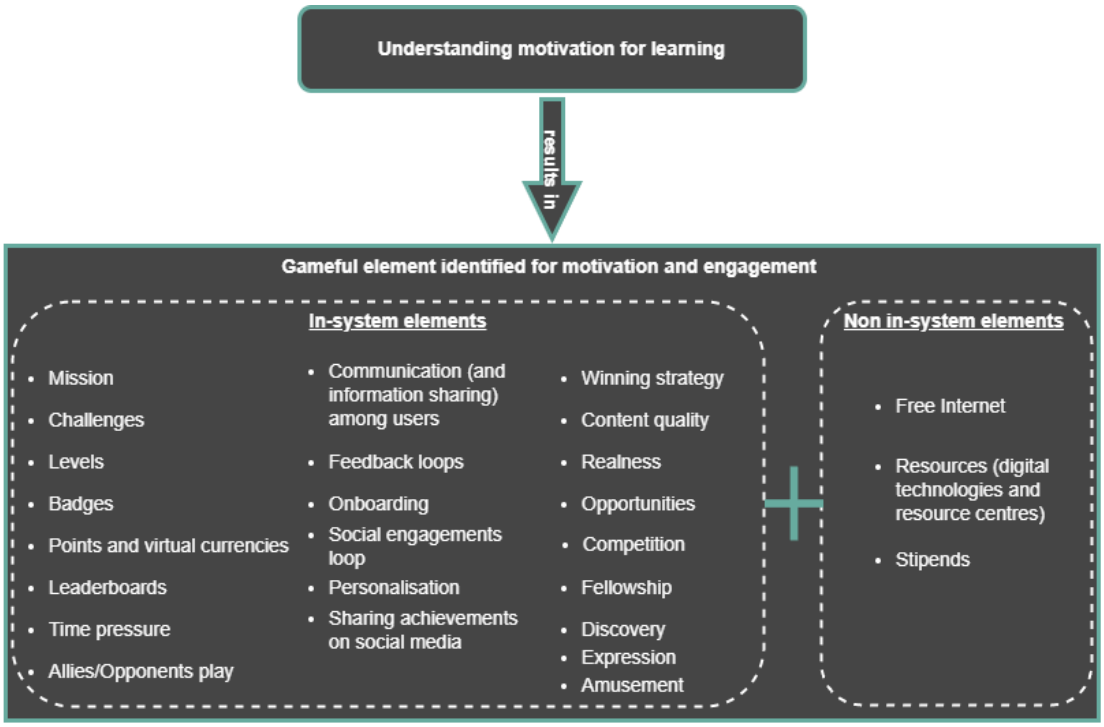


Figure 43: Derived gameful elements for the third principle of what motivates the youths (Author's construct)

I will continue the discussion from the previous chapter (please refer to the sub-section 4.3.2 *identifying the game elements*). I discuss these findings first in relation to the study's chosen MDA framework for categorising the findings (Hunicke, Leblanc & Zubek, 2004; Angelia, Suharjito & Isa, 2021; Putra & Yasin, 2021; Junior & Silva, 2021) in comparison with the grouping of gameful element suggested by Tondello and colleagues (2017). Thereafter, the findings are discussed concerning the HEXAD gameful design user types framework by Marczewski (2015).

While Tondello and colleagues' (2017) work is commendable in categorising gameful elements, their work was limited to those who have been exposed to and understand games and gameful design theories. The study used a top-down approach in which elements were identified and sent to participants through an online survey. In addition, they acknowledged their demography was more from the global north than the south (out of the 195 participants surveyed, only 2.7% was from Asia and 1.1% from Africa), thus limiting the findings.

Accordingly, using a top-down approach would be detrimental to candidates such as the youths in this study. Firstly, as noted above these youths from marginalised communities do not have access to and do not use technologies effectively, so using an approach such as DA is ideal. Secondly, this study's findings followed a bottom-up approach towards understanding the gameful elements needed from the youths' lived experiences. Instead of using a top-down approach, the methodology allowed the gameful design elements to emerge. This was because the youth had no previous experience on the topic, and therefore, enforcing gameful design elements through a top-down approach would have been a waste of time. This supports the perspective of Hassan and Hamari (2020) who suggest that researchers should examine the nuances related to inclusion in gameful design through a bottom-up approach that takes into account the perspectives of stakeholders who may support or oppose societal issues and government practices.

The emerged elements are similar elements to those of game design, as noted by Deterding and colleagues (2011) and Junior and Silver (2021). However, certain elements and aspects should be carefully designed. Previous studies have placed less emphasis on the emotional aspect of the identified elements. For example, Botha, Herselman and Ford (2014) applied the 'pleasure elements' from Costello and Edmonds (2007) to Gameful Educational User Experience but did not include elements that would create an emotional expression for users. Similarly, Tondello and colleagues' (2017) work focused on the mechanics and dynamics of gameful design

elements but did not consider the aesthetic (emotional) elements, which the findings of this study show are integral to a successfully designed gameful system. The elements that emerged include the feeling of winning, the feeling of belonging, and the feeling of being amused.

As the use of game design elements is to achieve a psychological state that is goal-oriented (gameful experience) (Landers et al., 2018), one would want this state to be a pleasurable one that is personalised. Thus, to express the findings clearly, I used the MDA (mechanics, dynamics, aesthetics) framework by Hunicke, Leblanc and Zubek (2004) to categorise these identified gameful design elements into three components. The MDA framework is preferred in this study as it streamlines and allows for a better categorisation of the found gameful design elements (Junior & Silva, 2021) when compared to the grouping of gameful elements by Tondello and colleagues (2017) which does less in considering the elements for feelings and emotions a designer should consider in a gameful system. In addition, the use of the MDA framework allows designers to first understand the aesthetics they need to evoke using the dynamics before the development of gameful systems (Angelia, Suharjito & Isa, 2021; Junior & Silva, 2021).

The MDA components and their corresponding gameful elements are shown in Table 13 and further discussed below based on the participants' collectively accepted use.

Table 14: Gameful elements identified aligned with the MDA framework

Mechanics (to control levers)	**Dynamics (interactions to create experiences)**	**Aesthetics (feelings derived)**
Mission	Onboarding	Competition
Challenges	Feedback loops	Fellowship
Levels	Social engagements loop	Discovery (the feeling of learning)
Badges	Time pressure	Expression (include Happiness of winning)
Points/virtual currencies	Allies/Opponents play	Amusement (Funny post)
Leaderboards	Personalisation	
	Communication (and information sharing) among users	
	Sharing achievements on social media	

	Winning strategy	
	Content quality	
	Realness	
	Opportunities (includes internship, job, funding)	

5.4.1 Mechanics (to control levers):

Game mechanics are the functioning components that set the rules afforded to a user by the designer (Hunicke, Leblanc, & Zubek, 2004; Sicart, 2008; Zichermann & Cunningham, 2011; Junior & Silva, 2021). These components of gamified applications allow the designer to control the 'levers' of the game to guide users' actions (Dwi Putra & Yasin, 2021; Junior & Silva, 2021). Six elements were identified from the findings as the fundamental game mechanics to consider and are discussed below.

1. Mission: The youths from the onset should know the end goal of each skill course on the system – what they will achieve (a skill they will learn) at the end of completing training. The outcome of the gamified system and that of each skill's course must be stated clearly. This mechanic helps develop the interest of the youths to want to start engaging with the gameful system. This aligns with the motivating factors youths described in deciding to join Afrika Tikkun.
2. Challenges: Each mission (i.e., each skill) should be broken into smaller achievable tasks (sections) as challenges that build up towards achieving the main goal (completing the stated mission). These challenges are sections of each course. The findings emphasised that the progress towards learning a skill should not appear too easy and boring. In essence, the challenge flow should have both the microflow and the macroflow that creates the user's enjoyment and fulfilment (Berube, 2021). Microflow is a difficulty flow that lasts for a short period for the sections but can repeat over time while a macroflow is a difficulty flow that is equal to the entire period the user takes to complete a skill (the main goal).
3. Levels: Level mechanics could be used to indicate users' progress towards completing each challenge (task) (Angelia, Suharjito & Isa, 2021) (see the levels in Figure 47). These challenges and levels (1-7) should be progressive. For instance, from beginner to professional (or expert level). Each skill will be broken into increasing difficulty levels that progressively show their mastery of the new skill. These levels must be carefully designed to achieve a *flow* that does not appear *too easy, too difficult, boring, and complicated* (Berube, 2021; Mårell-

Olsson, 2021). The level obtained can be used to gauge the youth to receive a certificate on the NQF (national qualification framework) scale through the QCTO (Quality Council for Trades and Occupations). Obtaining a certificate would mean that their skills development training could lead to a recognised degree, thereby addressing existing low qualification levels. Additionally, those who have gained skills at the top level could mentor others.

4. Badges: They should earn badges as they complete challenges (i.e., sections of a skills course) to get a sense of accomplishment and to keep them motivated. Badges are necessary to create an interaction of accomplishment with the user as they display the user's effort on the system (Strmečki, Bernik & Radošević, 2015). These badges should be linked to their progress (of levelling up).
5. Points and virtual currencies: Points are one of the most used elements in gameful design but they have to be properly implemented for their positive effect (Hassan & Hamari, 2020). As with applying these elements, each section can be grouped into chapters. They earn points and virtual currencies by completing these chapters or assessments of these chapters/sections. The youths 'spend' points earned for hints while assessing the learnt skill and for social engagements. Hints while doing assessments should give clues but not a clear answer. The virtual currency earned can be used to purchase time to book mentoring with a subject matter expert (possibly a volunteer).
6. Leaderboards: Leaderboards can be used to rank the users taking a particular skill training to create more engagement and to show how a user is doing in comparison with others taking the same skill training (Strmečki, Bernik & Radošević, 2015; Angelia, Suharjito & Isa, 2021). This ranking will be time-based (see more on time pressure below) and will be based on points accumulated. This element should be optional, as not all the participants mentioned this as an element that engages them. For instance, users may receive occasional prompts to opt in to see how they fare compared to others.

5.4.2 Dynamics (interactions to create experiences):

Game dynamics are the users' interactions with the game mechanics to complete actions (Hunicke, Leblanc & Zubek, 2004; Junior & Silva, 2021). This includes time pressure, opponents' play (Hunicke, Leblanc, & Zubek, 2004), and sharing information (Zichermann & Cunningham, 2011). From the findings, the following are added to dynamics elements of the MDA framework: onboarding, feedback loops, social engagement loops, personalisation, winning strategy, content quality, realness, and role-based play (i.e. allies/opponent play – allies' is added to opponent play).

1. Onboarding: The onboarding will help the users acclimate to the gameful designed application and influences how they would interact with the game mechanics and the output of such interactions. This affords the user a safe environment to practice and understand the game mechanics (Koivisto & Hamari, 2019). To get to understand the user journey, and how the application mechanics work, the onboarding will be done using the general soft skills training every user will have to undergo – for instance, basic digital skills, communication and presentation skills.
2. Feedback loops: Feedback on how the users progress toward obtaining a skill is crucial for engagement. The gameful system reacts to how well the youths perform by applying a feedback loop (Strmečki, Bernik & Radošević, 2015; Angelia, Suharjito & Isa, 2021). The youths are presented with rewards (points or/and virtual currencies, free assessment hints, etc.) based on the outcome of their actions. The positive or negative feedback loop can be applied to keep them more engaged to see the outcomes of their actions and dedication to learning a skill. For instance, users earn more rewards for completing more tasks quickly and frequently, and for daily login for training.
3. Social engagements loop: In addition to the feedback loop, the social engagement loop can also influence users to re-engage with the gameful application (Strmečki, Bernik & Radošević, 2015; Angelia, Suharjito & Isa, 2021). For instance, the gameful application can send reminders to users to continue their training, and opportunities available should they complete their training. In addition, the youths can make friends and chat with youths within a certain location or distance to create connections/networks. Users can send messages or mention their friends' names on the application; the receiver will then be notified even when not online. This notification can be in the form of an app notification, email, or SMS.
4. Time pressure: Time pressure can be introduced to secure engagement, encouraging users to complete training (the mission) in time (Schöbel et al., 2017). The duration will be dependent on how long it will take to complete learning a skill – subject matter experts will determine the duration. For time pressure to be effective, some form of incentive has to be in place. For instance, users could qualify for internships, jobs or funding opportunities should they complete the training by a predetermined deadline. As seen in the case of the youths at Afrika Tikkun, the possibility of getting opportunities for internships and jobs motivated them to complete their skills training during the given training period.

5. Ally/opponent play: Users can choose and interact with others depending on their perceived roles (ally or opponent). They should be able to compete with opponents or have allies when completing the same skill training. This role-based play could create more engagement and motivation to complete training sessions. The findings from the participants reveal some are competitive and others are not. This option allows the users to own their experience and how best they want to interact with others.
6. Communication (and information sharing) among users: Users should be able to communicate and share information with themselves – through chats or forums. This element is noted to keep users interactive online (Kétyi, 2016; Angelia, Suharjito & Isa, 2021). Youths around the same vicinity could also meet physically (possibly at development centres) for more engagement.
7. Sharing achievements on social media: Users should also be able to share their achievements (badges and skill completion) with friends on the application or other social media platforms.
8. Personalisation: Users should be able to personalise their experience, though personalisation goes beyond basic customisation (Tondello et al., 2019). Users should be able to personalise their avatar, change colour background and toggle light/dark mode, play background music (for concentration) or not, and determine the skills they want to learn, among other things. Personalisation would give them a sense of ownership and autonomy in their journey.
9. Winning strategy: Winning strategies can be shaped as user support to assist users to perform difficult tasks. Users may need to explore what they require to accomplish the task. They may, for example, consult guidelines, tips and other users to determine their winning strategy to complete tasks.
10. Content quality: The content quality of the training matters and should be relevant. The participants continued their training because of the standard of training they received at Africa Tikkun. Content can be structured according to scaffolding outcomes (Kétyi, 2016). For instance, Rea and Amos noted that the web development training made them gain more interest in the training programme compared to the literacy training.
11. Realness: The youths were engaged and motivated to continue their training at Afrika Tikkun when they realised the real-world applicability of the training. Similarly, the system should ensure that the training applies and is practical to the real world and workplace experience. This element is necessary for the development and mastery of the learned skill(s) (Junior & Silva, 2021).

12. Opportunities: The system should be able to allow users to obtain information about potential opportunities and apply for such opportunities, including internships, jobs, and funding (see sub-section 5.3.4).

5.4.3 Aesthetics (emotional responses):

Game aesthetics are the emotional responses (or experiences) evoked in the users through their interaction with the game dynamics (Hunicke, Leblanc, & Zubek, 2004; Zichermann & Cunningham, 2011; Baptista & Oliveira, 2019). As mentioned, this aspect of the framework allows designers to understand the emotions that need to be evoked using the dynamics before the development of gameful systems (Angelia, Suharjito & Isa, 2021; Junior & Silva, 2021). The gameful application design should ensure it evokes the following game aesthetics:

1. Competition: The feeling and experience of having to compete with other youths in completing missions (Angelia, Suharjito & Isa, 2021).
2. Fellowship: The feeling and experience of knowing they are not alone in this journey by socialising with other youths.
3. Discovery: The feeling and experience of discovering and learning new skills.
4. Expression: The feeling and experience of going through a journey of self-discovery and accomplishment. This would include the “happiness of winning”
5. Amusement: The participants mentioned the feeling of being amused as an essential emotion.

While the 23 elements discussed are system based, other elements that are not system-based are worth noting. These are free internet, resources (including digital technologies), and stipends.

Furthermore, understanding the user types is also essential. The HEXAD user types framework for gameful design from Marczewski (2015) has been validated to measure user preference (Tondello et al., 2016). Concerning the user types using the HEXAD framework, participants mainly exhibited achievers, socialisers, players, free spirits and philanthropists, and less for the disruptors user type. These were noted from observation of the findings and are yet to be validated. For instance, Rea exhibited *achievers* by noting that what motivated her to continue was the perceived sense of achievement and summarised that “*I pushed myself to be good at it… and I came first in class*”. They also exhibited *socialisers*. For instance, “*Engaging with fellow youths at Afrika Tikkun*” and “*I Love working with people*” were used. We are here reminded of Luckitz’s statement (of what motivated them to continue), summarising the participants’

thoughts. For *philanthropists* and *players*, the participant Amos stated, "*learning computer skills, driving skills towards a learner's/driver's license, and having job readiness training*" made him start the training at Afrika Tikkun. Luckitz, Rea, and Luzu also echoed this sentiment.

This finding supports the conclusions from Şenocak and colleagues (2019) in their study of user types on open and distance learning (ODL). Although their work focussed on ODL systems in education, the personalities of gameful designed systems for learning seem to be the same regardless of the learners' backgrounds.

The findings above in terms of the study's adopted theory can be summed up and illustrated in the framework below.

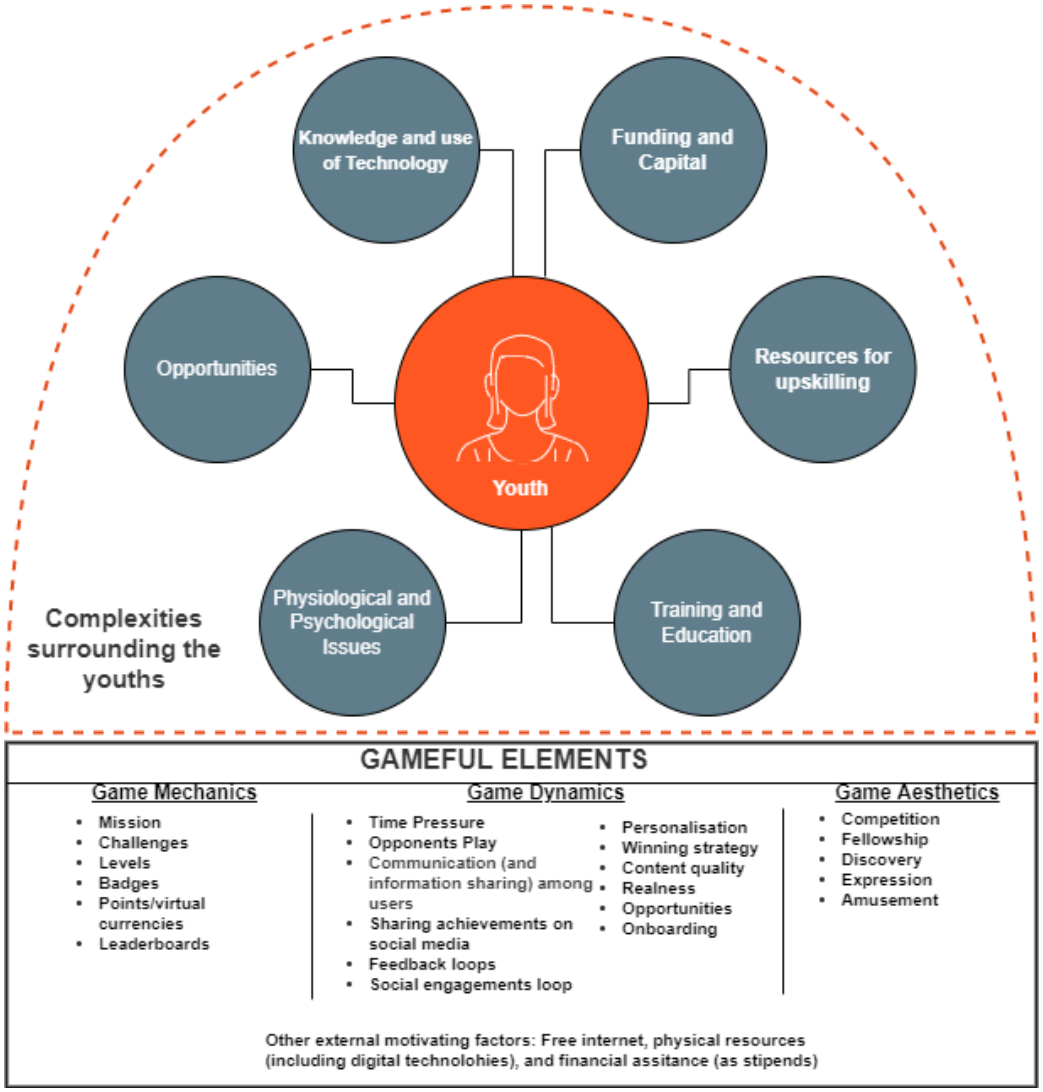


Figure 44: Complexities among the youth and gameful design elements to consider (Author's construct)

Next, I describe the user journey of the youth and how the above findings can be incorporated into a gameful system.

5.5 Incorporating the identified elements in a gameful designed system

This section explains how the fourth and fifth principles of the adopted constructivism theory – facilitating and promoting meaningful interactions and collaboration – are achieved by utilizing the methods discussed in sections 5.3 and 5.4. The adopted theory is combined with the findings related to the challenges faced by young people and the gameful design element, resulting in a conceptual representation shown in Figure 45 below. These aspects when incorporated, form the gameful system for skills development for youths in marginalised urban communities.

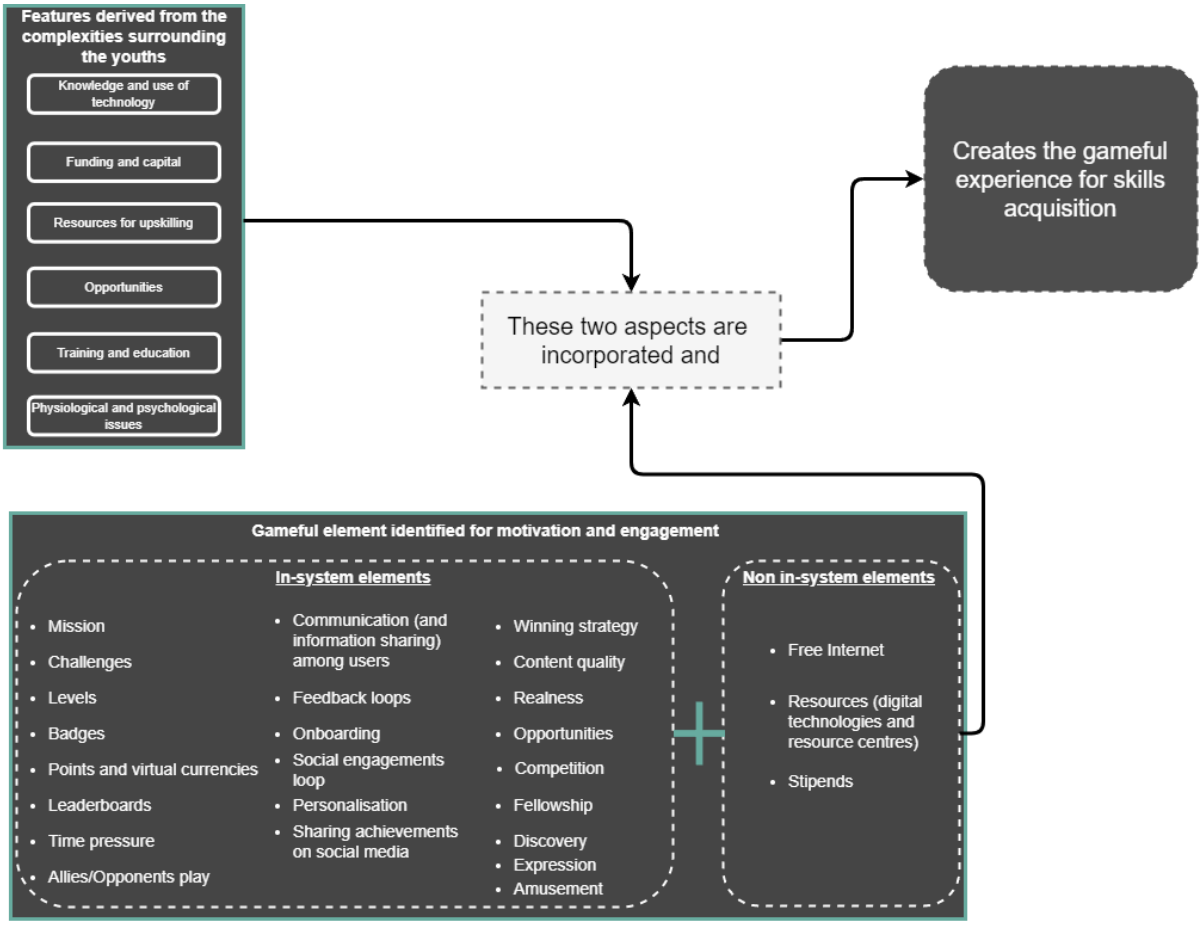


Figure 45: Conceptual framework of the adapted theory with the incorporated discussed finding (Author's construct)

In section 4.4 from the previous chapter, the outcome of the design sessions held was discussed. The youth present first validated the analysed data and the above-discussed findings and then mapped out these in an empathy map. Two storyboards were created to highlight the user journey of each learning stream (employment stream

and entrepreneurship stream). Three points of view (POVs) were framed from the empathy map and the storyboards to help spark the ideation process. To understand the process followed to incorporate the findings, kindly refer to the section *defining the problem to ideation* in the previous chapter.

The ideation process led to ideas on the features of the gameful designed system. The participants rated and validated these ideas. Here I describe how these ideas and how the gameful design element is incorporated. Keeping in mind that these in some way would reduce the pains (identified complexities) of the youth towards the gains (the goal of being skilled and employed).

I start by describing the user flow of the system, then describe how the levels work and how it would lead to mastery and purpose. The conceptual user flow (Figure 46) for the gameful designed system depicts the path and journey of a youth's experience on the system. This system also considers the features as outlined in Chapter four, Table 11 (the validated ideas as features for the gameful designed system) and Table 13. The user flow chart uses the following conventions in identifying the elements used as shown in Table 15.

Table 15: Elements used in the conceptual user flow and their description

Elements	Description
	The entry point for the user
	To indicate processes in the system
	Symbolises where the user makes a decision
	Non-directional line showing a relationship between processes
	Indicates the two types of streams the youth can select
	Provides more information on a process
	Directional lines shows the direction of a relation between two processes
	Directional lines shows the direction of a relation between two processes but with more processes in between

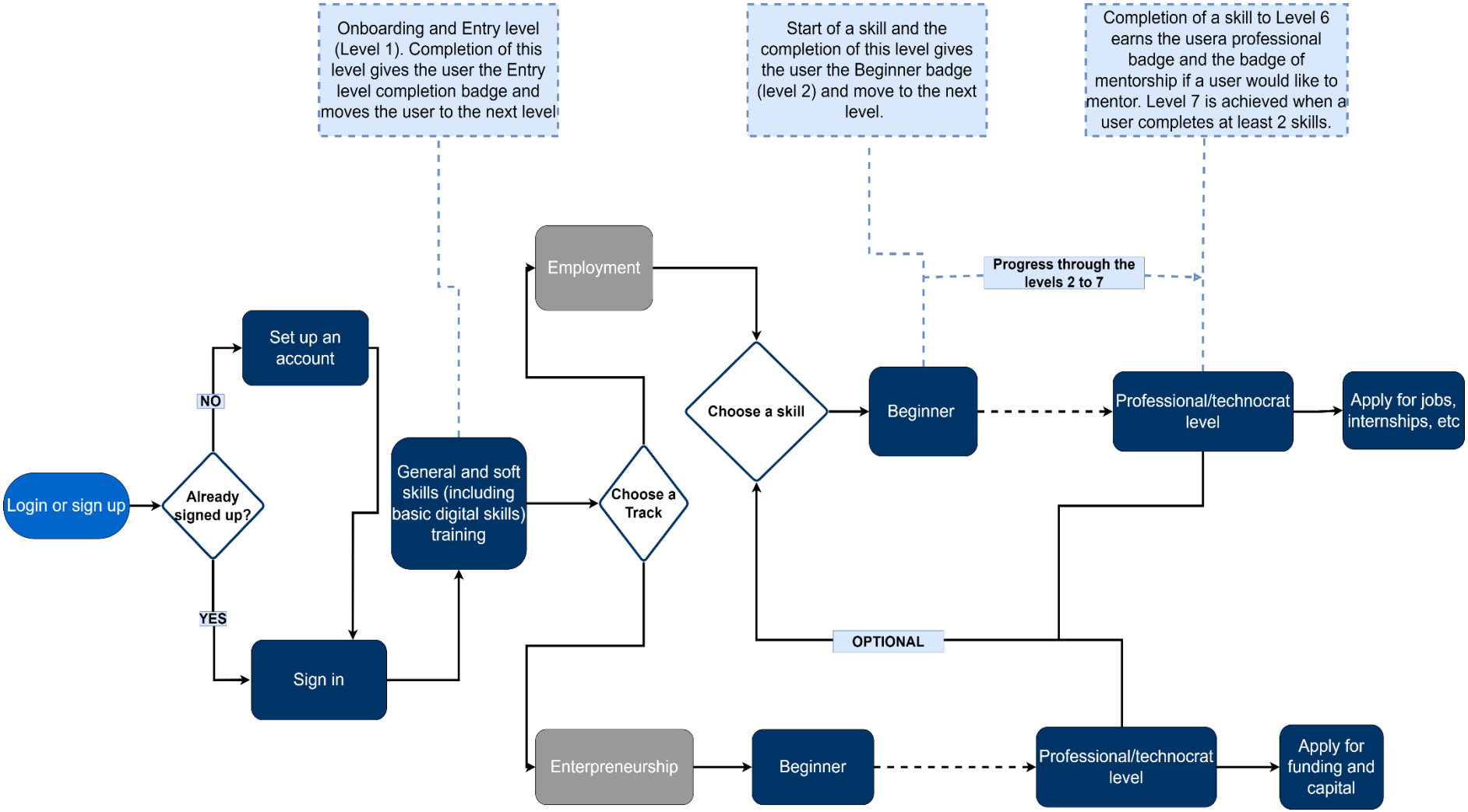


Figure 46: Conceptual user flow of the gameful design system for urban marginalised youth (Author's construct)

The journey of the youth on the platform starts by creating an account. Once they have created an account, they sign in. They can *personalise* their account including changing the background colour and toggling light/dark mode, play background music (for concentration) or not. The youth then undergoes the *onboarding* process to understand how the system works (Koivisto & Hamari, 2019). The process would be to explain the *mission* first – including the outcome of being able to apply for opportunities. This *onboarding* will be the same for everyone to learn skills on how to use digital technologies and their key functionalities effectively, including soft skills. This will also allow the users to experience all the gameful elements identified and discussed above. The completion of this training gives the youth the entry-level completion *badge* and is taken to the next level. How the levelling up works is discussed further below. Once the youth complete the onboarding process, they are prompted to personalise their learning journey even more with the choice to choose a skill-learning track – entrepreneurship or employment.

Those interested in skilling towards entrepreneurship, go through the contents as *challenges* broken into five *levels* (levels 2 to 6). These challenges are broken into sections where users can (use) each *points and virtual currencies* used for hints while accessing a skill and for booking a mentor respectively. The use of these mechanics aligns with the dynamics of *winning strategy* as the use of the points and virtue currencies ensures the users receive support while learning a skill. The *content quality* is essential for growing the interest of the users, and thus should be developed by subject matter experts that are drawn from the industry and academic space. The subject matter experts should also ensure the '*realness'* of the content – that it applies to the real world (Kétyi, 2016). There should be adequate *time pressure* for the challenges to achieving the main mission (the set goal/skill), keeping in mind to achieve the microflow and macroflow (Berube, 2021). The time pressure can also be applied to the *leaderboards* of users taking a particular skill together at a certain period.

While going through levels 2 to 6 (or 7), there should be consistent *feedback loops* to show the user their progress and ensure they see the rewards of actions towards learning a skill. In addition, the use of *social engagement loops* ensures they re-engage with the gameful system to continue their learning (Strmečki, Bernik & Radošević, 2015; Angelia, Suharjito & Isa, 2021). Others as discussed above that are good to have and optional *are Ally/opponent play Communication (and information sharing) among users,* and *Sharing achievements on social media*.

Once completed, they are prompted to apply for funding towards their business. This implies that the youth do not have to actively search for funding opportunities, as these *opportunities* are made available to them. Furthermore, obtaining a verified skill provides funders with a sense of assurance that they are investing in individuals who have the necessary skills to become successful entrepreneurs. They have the option to learn skills that will aid them in their business.

The same experience is expected for those in the employment stream but they choose the skill they want to learn towards a career. Once a skill is completed (at level 6), they are prompted with opportunities that fall within the skill category. These opportunities include internships and jobs. Like that of the entrepreneurship stream, it also means they do not need to search for opportunities from various sources and in addition, give future employers the security that the youth have the skill needed for a job. The entire experience should evoke emotional responses (Baptista & Oliveira, 2019; Junior & Silva, 2021) listed in the aesthetics list.

With regards to the levels, the learning of a skill is broken down into levels that build up in difficulty. This levelling should be linked to the contents of the skills being trained for and starting levels should be easier, followed by scaffolding to create engagement (Strmečki, Bernik & Radošević, 2015; Angelia, Suharjito & Isa, 2021). The levels are divided into three sub-levels namely lower-level, mid-level, and top-level. The lower level has three levels; Entry, Beginner, and Novice. At this sub-level, the youth should be able to have soft skills and the foundational knowledge of the skill being learnt. The mid-level has two – Knowledgeable and Proficient. At level 5 the youth should be proficient enough to apply knowledge to real-life projects. The top level has two levels; Professional and Technocrat. At the top level, the youth should have advanced knowledge of the skill and be able to apply these skills to real-life projects. They are at this stage eligible to mentor others. The seven levels are shown in the figure below.

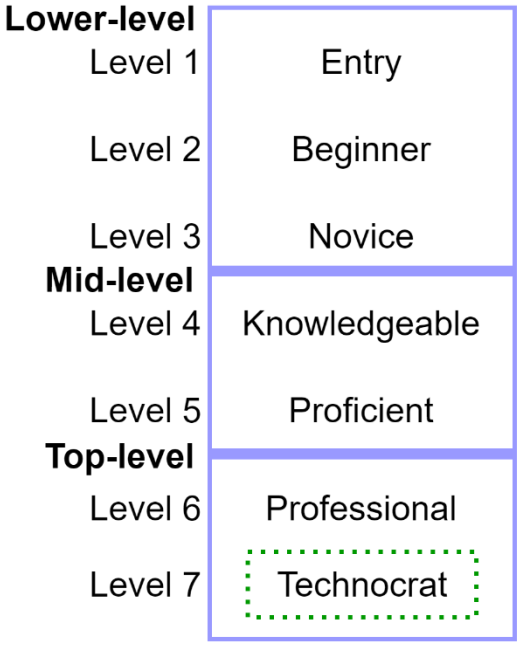


Figure 47: The gameful system levels (Author's construct)

Each skill a youth learns starts from the *Entry* level to the *Professional* level. After achieving the professional level, the youth earns the right to become a mentor for the completed skill and can decide to opt-in. Level seven (*Technocrat*) is reserved for those who complete at least two skills. In other words, those who can get through the process of completing at least two skills are recognised, which in turn should motivate and engage youth to learn more skills. For instance, a youth can start a skill to become a Web developer, after completion of level 6, and earns the right to mentor youths learning web development. This youth then decides to learn mobile development, completes it, and then moves to level 7 for being able to complete at least two skills.

As previously discussed, aligning the skills with the NQF framework will allow these youths to get a qualification while learning a skill. This will be a solution to encourage more youth to get a better qualification than a grade 9 certificate. It will reduce the number of youth without a qualification (De Lannoy et al., 2018). South Africa already has a body that regulates occupational skills and aligns these levels with the QCTO (The Quality Council for Trades and Occupations). The NQF sub-framework will make a difference in the lives of these youths. The QCTO mandate is to oversee the design, implementation, assessments and certifications of skills, occupations and trades with regard to the Skills Development Act Nr. 97 of 1998 (QCTO, 2021). The figure below depicts the alignment of the levels with the QCTO sub-framework.

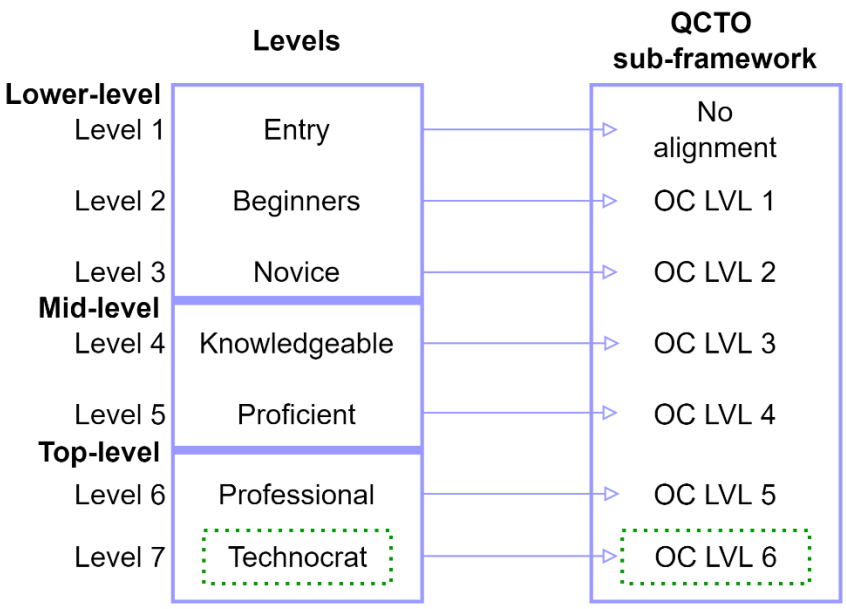


Figure 48: Levels aligned with the QCTO NQF sub-framework (Author's construct)

For the gameful system to produce youths that are capable of building the current and future economy of South Africa, stakeholders need to work collaboratively and streamline their resources (De Lannoy et al., 2018). This system allows for every stakeholder involved in the development of youth to get involved. The gameful designed system is an ecology that takes into consideration what the marginalised youths want and what they want to achieve and how the stakeholders can get involved. For instance, using the six complexities identified, the stakeholders' roles can be depicted below.

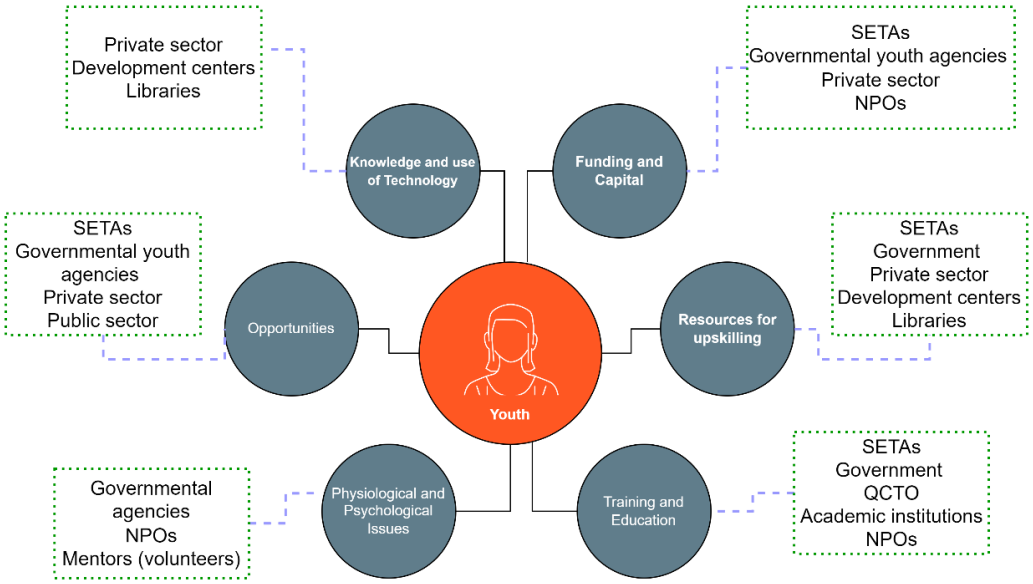


Figure 49: Complexities surrounding the youth with stakeholders for collaboration (Author's construct)

To conclude this chapter and validate the discussions on CI and D4D, I will present the findings according to the seven conditions for effectively using technology. These conditions were adapted from Clement and Shade's (2000) access rainbow and have been suggested by Gurstein (2003) and Smith (2021). The table below summarises these conditions.

Table 16: The findings aligned with the seven conditions for achieving the effective use of technology (Gurstein, 2003; Smith, 2021)

Conditions	Aligned in this study
The available *infrastructural facilities*	Currently, there is still a need for a faster Internet bandwidth /broadband speed. In addition, this has to be with a significant amount of data access amount compared to the 50MB currently assessable at the library.
The *input and output devices*	This will be mostly computers in development centres and libraries but also smartphones for youths that have one. See next condition.
The *tools, software and peripherals*	The gameful designed application should be Web-based but should be responsive enough for smartphones. As most of the youths do not possess a smartphone, the use of computers in development centres and libraries can be beneficial to give these youths access to the learning platform.

The *content*	As discussed the content is mainly English and if the training is given in local languages, it should also be made available in audio not only in written words.
The *service provisions*	Access to opportunities such as funding, internships, and jobs. Including training and development centres such as Afrika Tikkun.
Provision for *capacity development*	Peer learning and mentorship guided by the implemented gamefulness as discussed.
Finance and governance	This will be from employers, governmental agencies for youths development, academic institutions and youth organisations – on the platform.

To conclude, this thesis aimed to address the research problem through the lens of constructivism. It contributes to the body of knowledge on community innovation and digital-for-development for disadvantaged youth in urban areas, as well as gameful design in learning systems by highlighting important gameful elements and user types to consider. The research findings provide insights into the challenges faced by marginalised youth in South Africa when it comes to upskilling and employment. These findings have implications for D4D initiatives aimed at developing youth skills in similar communities. Chapter six further discusses the contributions of this research. Finally, I discussed how these elements could be incorporated and combined to help solve the challenges identified. Frameworks and conceptual user flow for the user experience were outlined, including the stakeholders' responsibilities with regard to the challenges.

CHAPTER SIX
CONCLUSION AND RECOMMENDATION

6.1 Overview

This chapter outlines the concluding thoughts on the contribution of the study, the reflection on the research problem and the process of addressing the main question of this research. The conclusions drawn here emanate from the outcomes discussed in the previous chapter and summarise how the findings contribute methodologically to the practice of design anthropology and community informatics. Secondly, they show how the findings contribute practically and scientifically to the body of knowledge within community informatics (and by extension digital-for-development) and gameful design for skills learning for youths in urban marginalised communities. This chapter includes the limitations of this thesis and recommendations towards future research are proposed.

The current literature on gameful design in learning or digital skills development has primarily focused on formal education, neglecting its potential in non-formal education contexts for marginalised communities (Mårell-Olsson, 2021). This study aims to address this gap, particularly in relation to the development of less skilled unemployed youths in urban marginalized communities of South Africa.

In chapter 1 I outlined the aim of the study which was to explore the considerations (social, economic and technical) needed to design a gameful designed system for youths in marginalised urban communities in South Africa to motivate and engage them to acquire skills with the intent of mitigating the challenges of skills acquisition for opportunities in the digital era and towards achieving the national development plan goal for 2030. This aim resonates closely with community informatics and the ICT4D 3.0 (digital-for-development) agenda. Thus, to ensure I achieved the aim of the study, I rationalised the aim into four key objectives using the components of the study's adopted theory. These objectives were first, to understand the social context and complexity of the social issue to design (for) meaningful experiences. Unemployment and skills development for youths are 'wicked' and complex problems to deal with, thus it is essential I found out to understand what these complexities are from the perspective and experiences of the youths themselves. Secondly, the objective was to identify gameful design elements that will be incorporated and utilised to promote motivation for skills acquisition and development within the social context of the community. This was necessary to understand how and what gameful design elements would motivate these youths to complete high-skill training using digital devices.

Thirdly, it was to understand how best to incorporate these elements to achieve motivation, engagement and participation of the youth in the gameful designed system and fourthly, to identify the appropriate technological platform(s) for use by the youths. The objective was to determine the most suitable devices to target for the development of the application.

In chapter two, I present the body of knowledge by surveying the literature about the challenges in the digital era. This chapter starts by introducing the notion of the digital era and how it impacts the digital skills challenges and unemployment of youths in urban marginalised communities in South Africa. Nevertheless, this notion has its limitations and constraints when it comes to effectively addressing the digital obstacles faced by communities. Consequently, digital-for-development is discussed as the pathway for community digital development, as it examines the access, skilling and effective use of digital technologies within a localised community. I discuss the youth skills crisis in South Africa (noting historical factors) and how the push towards the fourth industrial revolution (4IR) is a threat to youths in marginalised communities in finding employment if nothing is done to upskill their digital skills. To help frame the structure and direction on how to address the challenges, the theoretical perspective was discussed. Here I noted the need to consider what would motivate and engage the youths to learn digital skills from the perspective and lived experiences of the youths. This forms the basis for the use of gameful design.

Gameful design is defined from various sources and defined for the study. The gameful design elements, user types and frameworks are discussed. In addition, the application of gameful design was discussed but also shows the lack of research in gameful design in non-formal education and within marginalised communities.

To answer the research questions and sub-questions, chapter three presents the research design and methodology of this study, keeping in mind the research problem and the use of the adopted theory of the study to guide the study. I first discuss the ontological and epistemological bases of the research of which I locate this study in an interpretative philosophical paradigm. The use of design anthropology as the main methodological approach was then discussed. Since this methodological approach was founded on the philosophical understanding derived from an interpretive stance, qualitative research was employed. The process of selecting the nine participants was outlined, and I identified the necessary steps a researcher must take to carry out research from a design anthropological perspective. These steps encompass the

utilisation of observation, the biomatrix tool for brainstorming the multifaceted concerns of the study, the participants' self-reflection, and the employment of 3Ws questions. My reflection as a researcher within the research context was discussed. Furthermore, the processes, methods and tools used for data collection, data analysis and the ethical considerations of the study were noted.

The analysis and findings of the study were discussed in chapter four. The analysis of the data includes the group workshop transcripts and notes on the complexities surrounding the youths towards digital skills acquisition and unemployment. Using the biomatrix theory and affinity diagrams, these challenges were broken down into co-causing factors that led to the explored challenges. The chapter continues by presenting the emerging themes from the analysis. The chapter further presents the gameful design elements that emerged from the study based on the participants' self-reflection on what engages and motivates them in games and social media applications they use and their experiences at Afrika Tikkun. These two aspects of the findings make it clear what their challenges were towards getting skilled in digital and 21st-century skills and what should be designed for them to achieve the goal of not just upskilling but remaining motivated throughout the journey.

In chapter five, I provide a detailed discussion of the findings in chapter four. The discussion begins with the conceptual framework of the study, adopted from the constructivism theory. Here, I explained the findings in relation to the components of the theory and how these components lead to a gameful designed system that embodies community innovation for marginalised communities. It emphasises the components of these complexities that must be considered for the system to be deemed successful and in addition, the gameful design elements needed to incorporate into the system, emphasising the need to design for emotions. These depict theoretically and practically what should be considered for digital-for-development in upskilling youths for digital skills in South African marginalised communities (see Figure 45). The chapter concludes with how policymakers can incorporate these findings and how they can work together to ensure the youths are equipped (with skills and qualifications) for now and for the future of work.

The rest of this chapter reflects and concludes my thoughts on the research problem and the process of addressing the research problem.

6.2 Reflections on the research problem and process

In concluding this thesis, I have pursued a stimulating topic which is in itself a complex one to deal with. The issue of unemployment and skills development for young people living in urban communities who find themselves disadvantaged is a serious problem. In a world that is moving fast into a more digital economy, these youths will be left behind if nothing is done, therefore possibly causing more social instability than is already being experienced in South Africa. Understanding how to tackle this issue means that I needed to understand first, how complex these issues are from the youths themselves and secondly, to find ways in which the youths can be motivated to learn digital and 21st-century skills.

This led to the consideration of various theoretical, methodological, and practical ways of understanding and 'tackling' this problem. Through this process, I have derived a series of contributions to the scientific body of knowledge in community informatics, gameful-design-for-development (GD4D), digital-for-development (ICT4D 3.0), and design anthropology methodologically.

I will first summarise and reflect on the main research findings and then specifically on design anthropology as the chosen methodology of the study.

6.2.1 Summary of the research key findings

To summarise the research findings, I will be reflecting using the sub-questions (Chapter one, Section 1.4) of the study. These sub-questions provide the answer to the main research question that was posed by the study:

What are the considerations – social, environmental and technical – to design a gameful designed system for youths living in marginalised urban communities to mitigate the challenges of skills acquisition and unemployment?

The aim of asking this question was to explore the considerations (social, economic and technical) needed to design a gameful system for youths in marginalised urban communities in South Africa to motivate and engage them to acquire skills. The intent is to mitigate the challenges in acquiring high skills for opportunities in this digital era and also towards achieving the national development plan 2030 goal.

In light of the above and using the study's adopted theory, constructivism theory, the main research question was re-focused into three sub-questions for further clarity.

Answering these sub-questions ultimately answers the main research question. These sub-questions are linked to the objectives of the thesis.

The first sub-question: *what are the complexities and contributing factors (social, environmental, cultural, and technical) to consider for designing meaningful experiences for youths living in marginalised urban communities?* The objective of this question was to understand the social context and complexity of the social issue in order to design meaningful experiences for a digital skills learning platform and identify the appropriate technological platform(s) for use by the youth.

To answer this question, in section 2.2.2 (in Chapter 2) I gave a historical context of the youths' challenges and why the focus is on those living in marginalised urban communities. Here, I highlighted the unemployment and high-skills shortage challenges and what has led to these, which includes the digital divide (lack of access to digital technologies) experienced by these communities. The chapter, however, adds that to bring about digital transformation and development in these communities, studies should go beyond 'giving access' to digital 'effective use'. This section also highlighted steps taken to address these challenges – including policies, youth plans, and the creation of various organisations. However, these strategies have used a top-down approach and have not brought about the changes expected as the youths in these communities still experience a high unemployment rate and low skills levels. Thus, I explored using a bottom-up approach to clearly understand what these youths are experiencing, how complex the research problem is, and what factors should be considered for a successful implementation of community innovation that would be *effective* in skilling the youths.

The research displays a comprehensive analysis of the intricacies and elements associated with the youth, highlighting as many as 31 co-causal factors classified into six thematic clusters. See chapter four, section 4.2, for the details of these factors. The six themes of complexities highlighted are knowledge and use of technology, funding and capital, opportunities, resources for upskilling, training and education, and physiological and psychological issues. To overcome the skilling and unemployment challenge among the youth, stakeholders involved have to consider these complexities and ways to mitigate and deal with them. Thus, in chapter five (section 5.3) these complexities are discussed and key features that should be added to create meaningful experiences for the youths are summarised in Table 13. I argue these complexities should be considered as characteristics and feature any gameful designed system for

skills learning in marginalised communities need to incorporate to be successful, engaging and motivating for the youth. Furthermore, the appropriate technology would first focus on a web-based application that the youth could gain access to through the local library or a development centre in their local community. However, the ideal would also include free (or at least affordable) internet access for young people who have smartphones.

The second sub-question: ***what gameful design elements can be identified and adapted from the youths' lived experiences?*** The objective of this question was to identify gameful design elements that will be incorporated and utilised to promote motivation for skills acquisition and development within the context of the youth.

With gameful design still at the early stage, there is still much to be known about what elements work in what context. In Chapter 2, section 2.3, I discuss and highlight the current works including the definition, elements, frameworks, and user types of gameful design. However, most scholars and research conducted have focused on gameful elements within the education space while neglecting youths in non-education spaces like the study group. In light of this, this study explored and proposed 23 gameful design system-based elements for designers and stakeholders to consider to keep the youths in marginalised communities who are not in education or employed engaged and motivated to learn digital skills. Three other elements to consider that are not system-based are free internet, resources (including digital technologies), and stipends. See details in Chapter five, Section 5.4. While the gameful design elements revealed from the data were categorised using the MDA framework (Hunicke, Leblanc & Zubek, 2004; Junior & Silva, 2021), I further argued that the emotional aspects of the identified gameful elements outlined in the study should be critically considered and designed for when designing a system for learning when compared to other recent studies of gameful design that overlook this aspect. This aspect I argue allows for a pleasant gameful experience for the youths and the youths should be able to personalise the experience using the mechanics and dynamics elements.

Concerning the user types using the HEXAD framework (Marczewski, 2015; Şenocak, Büyük & Bozkurt, 2019), participants mainly exhibited achievers, socialisers, players, free spirits and philanthropists, and less so the disruptors user type.

The third sub-question: ***how can the identified elements be combined and used in a gameful designed system?*** The objective of this question was to understand how

best to incorporate these elements to achieve motivation, engagement and participation of the youth in the gameful system.

To create a gameful experience for youths in marginalised communities, the features in sub-question 1 and the gameful elements identified in sub-question 2 have to be incorporated in a way that allows the community members to achieve their goal of upskilling (see the research conceptual framework in Figure 45). The user flow framework (Figure 46) proposed was after a series of co-design workshops with the youths using the above-discussed validated findings. I described how these features and elements should be combined in section 5.5 of Chapter five. The user flow framework is followed by the discussion on how the levels in the gameful system would work as a core feature to show the youth mastery and advancement in their learning journey. I also propose how this levelling could be aligned to qualifications recognised under the QCTO NQF sub-framework (QCTO, 2021). Thus, while improving their skills, the youths' efforts are recognised towards a qualification, thereby, opening up more future opportunities for the youths. This could also increase the number of youths gaining education qualifications. See details in Chapter five, Section 5.5.

6.2.2 Reflection on the methodology - Design Anthropology

In In terms of the research methodology, implementing DA for this study was a daunting yet rewarding undertaking. Adopting DA as the primary approach enabled me to immerse myself in the social context of the youth (Tan, Wilson & Olver, 2009). This is illustrated in Chapter three, where the rationale and procedure for selecting DA as a methodology was elaborated. Through the use of DA, this study argues for designers to not only empathise with the participants but also experience their daily lives first-hand, gaining an intimate understanding of what it is like to reside in their environment. As I contemplate the journey and the selection of the methodology, I acknowledge that alternative design techniques could have been used, however, I question whether they would have yielded the same level of comprehensive information gathered throughout this research study. Admittedly, employing DA can be financially demanding, and given that this study was self-funded, it was a costly endeavour.

Based on my experience and observation of the participants compared to other design approaches, I have found that DA (Design Anthropology) can keep participants involved and engaged throughout the research process if it is well-planned. The few instances where one or two participants were not available were mostly due to transport cost issues. It could be that their involvement and engagement happened because they

were fully immersed in the process and saw themselves as part of designing solutions for themselves. It is crucial for D4D (Design for Development) to recognise the participants as "practitioners" and "designers" to facilitate community innovations. Some may argue that participants are not experts and should not be allowed such autonomy in a research process. However, if they are well-equipped with the right (easy-to-use) tools and methods, the process would be seamless. Who understands their context better than they do? The tools/methods selected by the design anthropologist should be simple but effective enough for the participants to understand and use without much effort.

Following up on the above point, design anthropologists should play the facilitator role rather than the ‘expert’ among them giving them a sense of direction and a sense of independence. For instance, during our initial encounter, after elucidating the concept of game elements to the participants, they faced some difficulty in comprehending it. I had to re-evaluate the methods and resources that could be used to explore gameful design elements more effectively. As a result, the actions outlined in section 3.3 involved the participants sharing their encounters with applications that incorporate game elements and their experiences with Afrika Tikkun. In addition, the use of group workshops ensured that they understood and viewed the whole process from a shared experience. The goal set out by the youths was more of a shared goal and driven towards a common community solution.

It is clear that DA in practice is still problematic and is open for debate (Drazin, 2021). Depending on the background of the practitioner, it may lean too much toward design or anthropology. This is bound to happen as we continue to get better at understanding what it is and how to apply it as a discipline or methodology. In my view, there should be a perfect blend that makes design anthropology unique on its own. For instance, design anthropologists should resist the urge, if possible, to collect data at a site, design fidelity (prototypes) at another site without the participants, and then return to test the designed artefact as seen in Drazin’s work. Instead of considering design fidelity as a conceptual proposition in which a design anthropologist designs artefacts and ‘bring to’ the stakeholders, the stakeholders should be involved in the design of the artefact. This will emphasise the “autonomous design” (Escobar, 2017) principle that D4D research should be aiming for. When utilising DA as an approach, an effective heuristic approach to collaboration and communication would be to engage stakeholders in the design process, even if it is conducted at another site. This approach establishes a genuine partnership between the practitioner and the stakeholders. As demonstrated in the

study, the youth were actively involved in the design of the user experience and expressed their preferences on how gameful elements and features should be incorporated. This strong partnership between practitioners and stakeholders enhances what makes DA distinct. Another aspect I find helpful in the practice of DA is the timeline of carrying out a study at a location. While traditional anthropology takes a long time, design anthropologists should try to ensure this 'placing of oneself' and the design process only takes between 3 to 6 months. And keeping each workshop within 3 hours with a clear goal ensures that the participants do not view the process as a waste of their time. This approach allows ample time for immersion without the risk of getting side-tracked from the intended outcome. Additionally, collaborating with the same group proved advantageous in maintaining continuity leading up to the subsequent workshops.

6.2.3 Research contribution

Taking Taking the above into account, as the research aim was accomplished and the research question was addressed, the study contributes to the existing knowledge by providing insights into the complexities and factors surrounding youths that impede their acquisition of digital skills for employment. The study supports the idea that understanding the nuances of inclusivity in gameful design research requires a bottom-up approach to examine and question social issues, government policies, and practices, as suggested by Hassan and Hamari (2020). In terms of theoretical contributions, this research enhances our comprehension of the social context surrounding under-skilled and unemployed youths in South Africa using the DA approach, providing insights into the intricacies of their lived experiences. The study offers researchers a framework for investigating complex societal concerns, including matters related to inclusion in gameful design studies.

It can be deduced from the findings of this study, the perception of culture for the youths can change as the human mind encounters evolution. The lived experience of individuals in urban marginalised communities in South Africa is also affected by the online environment as with their physical environment. The emphasis here is *urban*, as the case may or may not be the same for youths living in rural areas. This is noticed from the findings of the skills and the gameful elements identified. The consideration of development from a global perspective is thus necessary as the online environment becomes more and more involved in the daily lives of young people.

Although the social context of the youths in urban areas still faces some similar experiences from pre-apartheid, the influence of digital convergence and other factors has led to changes in their social context. For example, the online environment, which is mainly engineered by social media and games, guides the elements that motivate the youths, as observed among the youths in Mfuleni Additionally, external cultures derived from online interaction, their trainers during training, and from 'outsiders' doing research in the community could also play a part in cultural changes experienced in their social context.

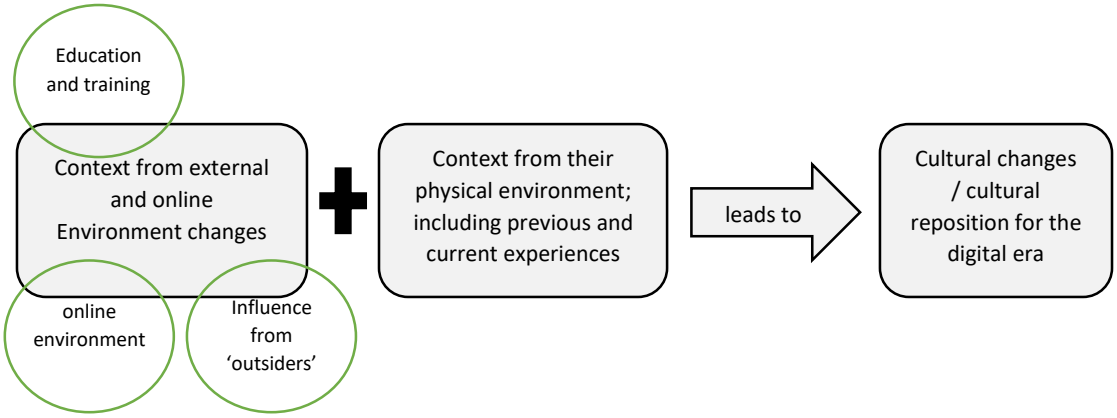


Figure 50: External influences on culture that influences gameful experiences.

Regarding gameful design, the common context of gameful design studies has remained that of health, education, business and crowdsourcing, other aspects such as this study's context have received less attention (Koivisto & Hamari 2019). Similarly, even in formal education contexts applying gameful design elements is still a developing trend (Mårell-Olsson, 2021), and there is still a lack of coherence in the discussion and theoretical foundations of gameful design research (Koivisto & Hamari, 2019). This study fills that gap and contributes to the theoretical and practical foundations of gameful design in a non-formal educational context and D4D. The discussion of the findings examines these complexities/factors that result from the experiences of the youths and the social, cultural, and environmental factors that affect them within their communities. The study thus proposes what should be considered for research in D4D that involves skills development in other types of marginalised communities, especially in developing countries (see Table 13).

These considerations should include the gameful design elements and user types identified that can trigger engagement, motivation, and pleasant experiences for the youths while learning. For a holistic experience, this study shows how to infuse gameful design into digital-for-development. This research also extends the work of which

gameful design elements and combinations could be used to engage and motivate users (extending the work of Schöbel et al. (2017)) within their context and lived experiences. Furthermore, this study contributes a conceptual framework (Figure 45) that would create a gameful experience for skills learning in marginalised communities.

Practically, it also provides a (localised) framework (and user flow) on how to incorporate game elements within the context of unemployed youths in South Africa. Using the constructivism theory (Juvova et al., 2015; Anderson, 2016; Hof, 2021), this study shows how to apply the tenets of the adopted theory in a non-formal education platform. Consequently, Table 15 and Figures 46 through 49 show how to implement the gamefully designed system for skills learning that designers and stakeholders can duplicate for employability for skilling youth in South Africa. The step-by-step process on how to incorporate these are highlighted. Moreover, the study proposes aligning the acquisition of these skills with a National Qualifications Framework (NQF) certification, which could augment the number of qualified youths in South Africa by formalizing the learning of these competencies. This includes the roles the stakeholders need to play in the gameful designed system.

Methodologically, this study contributes to the process of how to carry out research within D4D using design anthropology, especially research that concerns complex or 'wicked' problems. This adds to the body of knowledge on how to involve stakeholders in the DA research process (as seen in Drazin's (2021) work). The process outlined in Chapter three, section 3.3, gives a clear indication of DA in practice. Figure 13 and the description that follows show the process of conducting DA research that any student, scholar, and practitioner should follow. The process shows how, as a methodology, DA engages the participants to see themselves as contributors to the solution to their challenges and this needs to be encouraged by researchers. This study exemplifies how stakeholders can be involved in the design process of an artefact. This results in an iterative, heuristic, and co-design approach that is capable of identifying co-factors that constitute complex problems and generating solutions that are tailored to and capable of resolving issues within challenged communities. Furthermore, this research offers tools, methods, and theories, such as the biometric theory, that can be employed to address complex problems in marginalised communities.

6.3 Limitations of this thesis

With this study, I attempted to explore and reveal the complexities surrounding the youth group of this study (Cambra et al., 2017; Wilson-Prangley & Ngosi, 2018) and

what gameful elements are needed to design a system for skilling towards employment (Koivisto & Hamari, 2019; Mårell-Olsson, 2021). The thesis, from its findings and discussion, contributes to the scholarship of the areas of research the study is based upon. However, I need to clarify what insights the study does not provide.

While the research follows a systematic process leading to the findings, the study relied on the perspective of youths that are exposed to and lived in an urban area at that time; even though most are originally from rural areas. Thus, their perspective might differ from those who have lived all their lives in rural areas. Therefore, the generalisation of the findings to the complexities surrounding the youth in other Provinces may or may not suffice. The generalisation may be possible if the research is conducted in various Provinces (especially in rural areas) to determine similarities across the complexities of the youth. In addition, this work was a qualitative, interpretivism study. Thus, as with research of this nature, the study used a small sample size. As such, the research methods used do not allow for retrospective quantification of the findings.

Due to insufficient time and finances, the prototype development of the system was not completed. This would have allowed testing the findings and the gameful elements on an actual system for its engagement and motivation of the youth. The study, however, provides the features, conceptual framework and a user flow diagram, in addition to providing details of how to implement the gameful design elements for future considerations. Furthermore, the HEXAD gameful design user types (Marczewski, 2015) found were not tested and validated to accentuate the consistency of this finding with the scholarship. In the future, it is advisable to test for the gameful user types of the system.

6.4 Recommendation and future research

This study establishes a groundwork for further research on gameful design in the realm of digital-for-development and development, specifically in addressing intricate issues such as upskilling unemployed youth in marginalised urban communities (Heeks, 2020a, b). It is recommended that the findings from this study, including the conceptual framework and user flow framework, be prototyped, implemented, and iteratively tested with the youth. Such an approach could enhance our comprehension of how game elements and identified factors affect young people's self-determination to obtain digital skills.

The self-determination theory (SDT) can be used as a lens to examine the extent and ways in which these elements and factors influence their motivation and autonomy in

the learning process (Deci & Ryan, 2015; Ryan & Deci, 2017). In addition, designers should ensure they design for the user types revealed in this study. Further research could verify if these user types are similar in other communities especially in rural communities using the HEXAD framework (Marczewski, 2015; Şenocak, Büyük & Bozkurt, 2019).

It is recommended that gameful designers and developers should consider the emotional (aesthetics) aspects (Angelia, Suharjito & Isa, 2021; Junior & Silva, 2021) of the gameful design elements carefully first and ensure the use of the identified dynamics to evoke these emotions. This would ensure the gamefully designed system meets the expected experience of the users of the system. One way to do this is to carry out design workshops with the users and have in mind that based on the context, these aesthetic elements may be different. However, extensive research could be done to see if there are similar gameful elements in formal education and non-formal education in developing countries that can create engagement and motivation for learning. This could then bring about the standardisation of these elements.

It would be beneficial to explore whether the insights and factors identified in this study can be applied to other marginalised urban communities and rural areas within South Africa and other developing countries. Therefore, future research could investigate whether these findings are relevant to other groups and if the findings can stimulate engagement and motivation for the generalisation of the findings.

While this study focused more on the youths as the main stakeholder, the study reveals that for this system to fully achieve its goal, other stakeholders in the private and public sectors such as SETAs, NPOs, policymakers, and academic institutions have to play an active collaborative role (De Lannoy et al., 2018) (see Figure 49). I recommend that more research should be conducted to understand how the system would enable more collaboration on the side of these stakeholders. One possible way is to create a backend linked to the system that allows for this to happen. For instance, this collaborative backend can be used to post funding, jobs and other opportunities to the gameful system. To encourage these stakeholders to use this system, gameful design elements could also be explored to incentivise this process.

Some key aspects of these findings that are recommended for stakeholders to consider are:

- Ensure the training for the effective use of digital technologies. Without this, the process may be unproductive.
- Ensure that they are opportunities (including funding and capital) to apply for at the end of completing a skill.
- Ensure that the levelling and skills acquired lead to qualifications under the QCTO
- Ensure that more developmental centres are developed, and equipped with digital resources including internet connectivity.
- Mentors are readily available for the youths when they need them
- Stipends are provided during this process

In terms of research design and methodology, a design anthropologist should be well-versed in tools, methods, and theories that can aid in comprehending complex issues. The use of the biomatrix tools (Dostal, Cloete & Járos, 2005) to understand other complex problems and with other simple tools such as the practice of self-reflection by the participants, will enable deeper reflection on the challenges being investigated. It will allow them to engage their minds, be focused and find meaning in their actions. This is important as they start to see themselves as skilled practitioners working towards addressing their issues. As mentioned, it is recommended that they as stakeholders should be involved in the design process of the design artefacts. This collaboration improves trust and ensures all stakeholders are authentically involved.

REFERENCES

Aarvik, P. 2020. Blockchain as an anticorruption tool. Christian Melsen Institute. 7:1–34. Available: https://shorturl.at/gGP39

Adukaite, A., Van Zyl, I., Er, Ş. & Cantoni, L. 2017. Teacher perceptions on the use of digital gamified learning in tourism education: The case of South African secondary schools. *Computers & Education*. 111:172–190. DOI: 10.1016/j.jhlste.2016.08.003.

Ajayi, O., Bagula, A. & Maluleke, H. 2022. The fourth industrial revolution: a technological wave of change. In *Industry 4.0 - perspectives and applications*. M. Gordan, K. Ghaedi, & V. Saleh, Eds. Online: Intechopen. DOI: DOI: 10.5772/intechopen.106209.

Akama, Y., Stuedahl, D. & Van Zyl, I. 2015. Design disruptions in contested, contingent and contradictory future-making. *Interaction Design and Architecture(s) Journal - IxD&A*. 26:132–148.

Amineh, R.J. & Asl, H.D. 2015. Review of constructivism and social constructivism. *Journal of Social Sciences, Literature and Languages*. 1(1):9–16.

Anastassakis, Z. 2014. Design and Anthropology: An interdisciplinary proposition. In *Proceedings of fourth international forum of design as a process*. D. De Moraes, R.Á. Dias, & R.B.C. Sales, Eds. Minas Gerais, Brasil, 19 - 22 September 2012. EdUEMG. 240–247.

Anderson, B. 2012. Converting asset holdings into livelihood: An empirical study on the role of household agency in South Africa. *World Development*. 40(7):1394–1406.

Anderson, T. 2016. Theories for Learning with Emerging Technologies. In *Emergence and innovation in digital learning: foundations and applications*. G. Veletsianos, Ed. Alberta, Canada: AU Press. 35–50. DOI: 10.15215/aupress/9781771991490.01.

Angelia, F., Suharjito, S. & Isa, S.M. 2021. Improving English learning by gamification with MDA framework. *Journal of Games, Game Art, and Gamification*. 5(2):33–40. DOI: 10.21512/jggag.v5i2.7474.

Aziakpono, P. & Bekker, I. 2010. The attitudes of isiXhosa-speaking students toward language of learning and teaching issues at Rhodes University, South Africa: General trends. *Southern African Linguistics and Applied Language Studies*. 28(1):39–60. DOI: 10.2989/16073614.2010.488442.

Babbie, E. 2014. *The Basics of Social Research*. 6th ed. United States: Wadsworth Publishing.

Babbie, E. & Mouton, J. 2010. *The Practice of Social Research*. 10th ed. Cape Town, South Africa: Oxford University Press.

Baptista, G. & Oliveira, T. 2019. Gamification and serious games: A literature meta-analysis and integrative model. *Computers in Human Behavior*. 92:306–315. DOI: 10.1016/j.chb.2018.11.030.

Bartle, R. 1996. Hearts, clubs, diamonds, spades: Players who suit MUDs. *Journal of MUD Research*. 1(1):19. Available: https://www.hayseed.net/MOO/JOVE/bartle.html%0Ahttps://www.researchgate.net/profile/Richard_Bartle/publication/247190693_Hearts_clubs_diamonds_spades_Players_who_suit_MUDs/links/540058700cf2194bc29ac4f2.pdf.

Bartle, R. 2005. Virtual Worlds: Why People Play. *Massively Multiplayer Game Development 2*. 2(November):3–18. Available: http://www.mud.co.uk/richard/VWWPP.pdf.

Bateman, C. 2009. *BrainHex*. Available: https://blog.brainhex.com/2008/12/welcome-to-brainhex.html [2021, November 13].

Bateman, C., Lowenhaupt, R. & Nacke, L.E. 2011. Player typology in theory and practice. *Proceedings of DiGRA 2011 Conference: Think Design Play*. Hilversum, The Netherlands, September 14-17, 2011.

Bell, K. 2018. Gameful Design: A potential game changer. *EDUCAUSE Review*. 53(3):41–48.

Berube, D. 2021. *The flow theory applied to game design*. Available: https://thinkgamedesign.com/flow-theory-game-design/ [2022, October 12].

Bhattacherjee, A. 2012. Social Science Research: principles, methods, and practices. 149. Available: http://scholarcommons.usf.edu/oa_textbooks/3 [2013, July 02].

Birt, L., Scott, S., Cavers, D., Campbell, C. & Walter, F. 2016. Member Checking: A tool to enhance trustworthiness or merely a nod to validation? *Qualitative Health Research*. 26(13):1802–1811. DOI: 10.1177/1049732316654870.

Blomberg, J. & Karasti, H. 2013. Reflections on 25 years of ethnography in CSCW. *Computer Supported Cooperative Work (CSCW)*. 22:373–423.

Bon, A. & Akkermans, H. 2014. Rethinking technology , ICTs and development: why it is time to consider ICT4D 3.0. *The Network Institute VU University Amsterdam Working Papers 2014/12/15 - WP1*.

Bornman, E. 2016. Information society and digital divide in South Africa: results of longitudinal surveys,. *Information, Communication & Society*. 19(2):264–278. DOI: 10.1080/1369118X.2015.1065285.

Botha, A., Herselman, M. & Ford, M. 2014. Gamification beyond points and badges. In

Proceedings of the IST-Africa 2014 Conference 7-9 May 2014. P. Cunningham & M. Cunningham, Eds. Mauritius. 1–10.

Bottrell, D. 2007. Resistance, resilience and social identities: Reframing 'problem youth' and the problem of schooling. *Journal of Youth Studies*. 10(5):597–616.

Bozalek, V., Gachago, D., Alexander, L., Watters, K., Wood, D., Ivala, E. & Herrington, J. 2013. The use of emerging technologies for authentic learning: A South African study in higher education. *British Journal of Educational Technology*. 44(4):629–638. DOI: 10.1111/bjet.12046.

Burns, J., Edwards, L. & Pauw, K. 2010. *Wage subsidies to combat unemployment and poverty: Assessing South Africa's options*. (45). Cape Town.

Caillois, R. 2001. *Man, play and games*. Urbana and Chicago: University of Illinois Press. DOI: 10.1093/oxfordhb/9780199216437.013.0035.

Cambra, L., Costello, C., Gaarthuis, S., Jensen, J., Marhuenda, F., Ramona, R., Rosell, O., Navas Saurin, A., et al. 2017. *Wicked problems and young people. Co-creative teaching for the social professions.* Sligo: Institute of Technology, Sligo.

Cariolle, J. 2021. International connectivity and the digital divide in Sub-Saharan Africa. *Information Economics and Policy*. 55. DOI: 10.1016/j.infoecopol.2020.100901.

Carlson, A. & Isaacs, A.M. 2018. Technological capital: an alternative to the digital divide. *Journal of Applied Communication Research*. 46(2):243–265.

Carroll, J.M., Shih, P.C. & Kropczynski, J. 2015. Community informatics as innovation in sociotechnical infrastructures. *The Journal of Community Informatics*. 11(2):112.

Castells, M. 2001. *The Internet galaxy: reflections on the Internet, business, and society*. Oxford University Press.

Clement & Shade, L. 2000. *The Access Rainbow: Conceptualizing universal access to the information/communication infrastructure*. M. Gurstein, Ed. Hershey, PA: Idea Group Publishing.

Coldwell, D.A.L. 2019. Negative Influences of the 4th Industrial Revolution on the Workplace: Towards a Theoretical Model of Entropic Citizen Behavior in Toxic Organizations. *International Journal of Environmental Research and Public Health.* 16(15). DOI: 10.3390/ijerph16152670.

Costello, B. & Edmonds., E. 2007. A study in play, pleasure and interaction design. In *Proceedings of the 2007 conference on Designing pleasurable products and interfaces.* ACM.

Crandall, R. 2010. *Empathy Map*. Available: https://dschool-old.stanford.edu/groups/k12/wiki/3d994/empathy_map.html [2019, January 22].

Creswell, J.W. 2009. *Research Design Qualitative, Quantitative, and Mixed Methods Approaches*. Third ed. California: SAGE Publications Ltd.

Dam, R. & Siang, T. 2019. *Stage 2 in the Design Thinking Process: Define the Problem and Interpret the Results*. Available: https://www.interaction-design.org/literature/article/stage-2-in-the-design-thinking-process-define-the-problem-and-interpret-the-results [2019, January 22].

Day, P. 2010. A brief introduction to the history of community informatics. *AI & Society*. 25:259–263. DOI: 10.1007/s00146-010-0286-2.

DBE. 2022. *Presidential Youth Employment Initiative is progressing beyond expectations*. Available: https://www.education.gov.za/ArchivedDocuments/ArchivedArticles/PYEI-update-072022.aspx [2022, November 11].

Deci, E.L. & Ryan, R.M. 2015. Self-determination theory. In *International Encyclopedia of the Social & Behavioral Sciences*. 2nd ed. J.D. Wright, Ed. Elsevier. 486–491.

De Lannoy, A., Leibbrandt, M. & Frame, E. 2015. A focus on youth: An opportunity to interrupt the intergenerational transmission of poverty. In *The South African Child Gauge 2015*. 2015th ed. A. De Lannoy, S. Swartz, L. Lake, & C. Smith, Eds. Cape Town: Children's Institute. 22–33.

De Lannoy, A., Graham, L., Patel, L. & Leibbrandt, M. 2018. *What drives youth unemployment and what interventions help? A Systematic Overview of the Evidence and a Theory of Change.* Available: https://www.uj.ac.za/faculties/humanities/csda/Documents/Youth Unemployment report FINAL interactive.pdf.

Deterding, S. 2015. The lens of intrinsic skill atoms : A method for gameful design. *Human-Computer Interaction*. 30:294–335. DOI: 10.1080/07370024.2014.993471.

Deterding, S., Sicart, M., Nacke, L., O'Hara, K. & Dixon, D. 2011. Gamification. using game-design elements in non-gaming contexts. In *Proceedings of the 2011 annual conference extended abstracts on Human factors in computing systems - CHI EA '11*. Vancouver, BC, Canada, 7 - 12 May 2011. 2425–2428. DOI: 10.1145/1979742.1979575.

Deterding, S., Dixon, D., Khaled, R. & Nacke, L. 2011. From game design elements to gamefulness: Defining "Gamification". In *Proceedings of the 15th International Academic MindTrek Conference on Envisioning Future Media Environments - MindTrek '11*. Tampere, Finland, 28 - 30 September 2011. DOI: 10.1145/2181037.2181040.

Dicheva, D. 2017. Gamification in Education: A passing trend or a genuine potential? In *Proceedings of the 18th International Conference on Computer Systems and Technologies - CompSysTech'17*. Ruse, Bulgaria, 23 - 24 June 2017. 11–11. DOI: 10.1145/3134302.3134305.

Dicheva, D., Dichev, C., Agre, G. & Angelova, G. 2015. Gamification in Education: A Systematic Mapping Study. *Journal of Educational Technology & Society,*. 18(3):75–88.

Dicks, R. 2020. The Presidential Youth Employment Intervention: Five priority actions to accelerate youth pathways into the economy over the next five years. *CBPEP Colloquium 2020*. 100–102. Available: https://www.cbpep.org/colloquium2020/panel-7.

Dilthey, W. & Jameson, F. 1972. The rise of hermeneutics. *New Literary History*. 3(2). DOI: https://doi.org/10.2307/468313.

Dostal, E., Cloete, A. & Járos, G. 2005. *Biomatrix: a systems approach to organisational and societal change*. 3rd ed. Cape Town: BiomatrixWeb.

DPME. 2014. *Twenty year review - background paper: Youth*. Available: http://www.thepresidency-dpme.gov.za/news/Documents/20 Year Review.pdf.

Drazin, A. 2021. *Design Anthropology in Context: An Introduction to Design Materiality and Collaborative Thinking*. New York: Routledge.

Durrheim, K. 2006. Research design. In *Research in practice: applied methods for the social sciences*. 2nd ed. M.T. Blanche, K. Durrheim, & D. Painter, Eds. Cape Town: University of Cape Town Press.

Escobar, A. 2017. *Designs for the pluriverse: radical interdependence, autonomy, and the making of worlds*. Duke University Press.

Etim, E. & Iwu, C.G. 2019. A descriptive literature review of the continued marginalisation of female entrepreneurs in sub-Saharan Africa. *International Journal of Gender Studies in Developing Societies*. 3(1). DOI: 10.1504/ijgsds.2019.10017284.

Flick, U. 2009. *An Introduhction to Qualitative Research*. 4th ed. ed. London: SAGE Publications Ltd.

Forlano, L. & Smith, S. 2018. Critique as collaboration in Design Anthropology. *Journal of Business Anthropology*. 7(2):279–300. DOI: 10.22439/jba.v7i2.5607.

Gibson, J.J. 2015. *The ecological approach to visual perception*. Classic Ed ed. New York: Psychology Press: Taylor & Francis.

Glover, I. 2013. Play as you learn : gamification as a technique for motivating learners. *Proceedings of World Conference on Educational Multimedia, Hypermedia and*

Telemcommunications. 1998–2008. Available: http://shura.shu.ac.uk/7172/.

Göktürk, E. 2005. *What is " paradigm "?* Available: http://folk.uio.no/erek/essays/paradigm.pdf.

Graham, L. & De Lannoy, A. 2016. Youth unemployment: what can we do in the short run? *Econ3x3*. 2008.

Graham, L. & Mlatsheni, C. 2015. Youth unemloyment in South Africa: understanding the challenge and working on solutions. In *South African Child Gauge 2015*. 2015th ed. A. De Lannoy, S. Swartz, L. Lake, & C. Smith, Eds. Cape Town: Children's Institute. 51–58.

Gregory, S. 2018. Design anthropology as social design process. *Journal of Business Anthropology*. 7(2):210–234. Available: https://rauli.cbs.dk/index.php/jba/article/view/5604/6248.

Guba, E.A. & Lincoln, Y.S. 1994. Competing paradiqms in qualitative research. In *Handbook of qualitative research*. N.K. Denzin & Y.S. Lincoln, Eds. London: Sage Publications. 105–117.

Gunn, W. & Donovan, J. 2012. Design Anthropology: An Introduction. In *Design and Anthropology*. W. Gunn & J. Donovan, Eds. London, England: Routledge. 1–16.

Gurstein, M. 2000. Community Informatics: Enabling Community Uses of Information and Communications Technology. In *Community Informatics: Enabling Communities with Information and Communications Technologies*. M. Gurstein, Ed. Idea Group Inc.

Gurstein, M. 2003. Effective use: A community informatics strategy beyond the Digital Divide. *First Monday*.

Gurstein, M. 2007. *What is community informatics (and why does it matter)?* Milan, Italy: Polimetrica.

Gurstein, M. 2013. Community innovation and community informatics. *The Journal of Community Informatics*. 9(3).

Gwija, S.A., Eresia-Eke, C. & Iwu, C.G. 2014. Challenges and Prospects of Youth Entrepreneurship Development in a Designated Community in the Western Cape, South Africa. *Journal of Economics and Behavioral Studies*. 6(1):10–20. DOI: 10.5901/mjss.2014.v5n1p61.

Hall, L. 2015. *Do Learnerships and Apprenticeships Lead to Employment?* Available: https://keepclimbing.co.za/2015/03/01/do-learnership-and-apprenticeship-systems-lead-to-employment/ [2022, November 03].

Hassan, L. & Hamari, J. 2020. Gameful civic engagement: A review of the literature on

gamification of e-participation. *Government Information Quarterly*. 37(3):101461. DOI: 10.1016/j.giq.2020.101461.

Heeks, R. 2008. ICT4D 2.0: The next phase of applying ICT for international development. *IEEE Computer Society*. 41(6):26–31. DOI: 10.1109/MC.2008.192.

Heeks, R. 2020a. ICT4D 3.0? Part 1—The components of an emerging "digital-for-development" paradigm. *Electronic Journal of Information Systems in Developing Countries*. 86(3):0–15. DOI: 10.1002/isd2.12124.

Heeks, R. 2020b. ICT4D 3.0? Part 2—The patterns of an emerging "digital-for-development" paradigm. *Electronic Journal of Information Systems in Developing Countries*. 86(3):0–13. DOI: 10.1002/isd2.12123.

Heeks, R. 2022. Digital inequality beyond the digital divide: conceptualizing adverse digital incorporation in the global South. *Information Technology for Development*. 1–17. DOI: 10.1080/02681102.2022.2068492.

Hein, G.E. 1991. Constructivist learning theory. In *CECA Conference*. Jerusalem, Israel, 15 - 22 October 1991. 15–22.

Heugh, K. & Stroud, C. 2020. Multilingualism in South African education: A southern perspective. In *English in multilingual South Africa: The linguistics of contact and change*. R. Hickey, Ed. Cambridge University Press. 216–238. DOI: 10.1017/9781108340892.011.

Hevner, A.R. & Brocke, J. vom. 2023. A Proficiency Model for Design Science Research Education. *Journal of Information Systems Education*. 34(3):264–278.

Hof, B. 2021. The turtle and the mouse: how constructivist learning theory shaped artificial intelligence and educational technology in the 1960s. *History of Education*. 50(1):93–111. DOI: 10.1080/0046760X.2020.1826053.

Hootsuite. 2022. *DIGITAL 2022. The essential guide to the world's connected behaviours.* Available at: https://wearesocial.com/cn/wp-content/uploads/sites/8/2022/01/DataReportal-GDR002-20220126-Digital-2022-Global-Overview-Report-Essentials-v02.pdf (22 November 2022)

Horner, R. & Hulme, D. 2019. From international to global development: new geographies of 21st century development. *Development and Change*. 50(2):347–378. DOI: 10.1111/dech.12379.

Howes, D. 2022. The misperception of the environment: A critical evaluation of the work of Tim Ingold and an alternative guide to the use of the senses in anthropological theory. *Anthropological Theory*. 22(4):443–466. DOI: 10.1177/14634996211067307

Huang, X. 2018. The typical practice, main characteristics and useful reference of Community Informatics in the US. In *2nd International Conference on e-Education, e-Business and Information Management*. 210–215. DOI: 10.23977/eeim.2018.036.

Hunicke, R., Leblanc, M. & Zubek, R. 2004. MDA : A formal approach to game design and game research. In *Proceedings of the AAAI Workshop on Challenges in Game AI*. SanJose,CA.

Huotari, K. & Hamari, J. 2012. Defining gamification - a service marketing perspective. In *Proceeding of the 16th International Academic MindTrek Conference on - MindTrek '12*. Tampere, Finland. 17–22. DOI: 10.1145/2393132.2393137.

Inglehart, R.F. 2008. Changing values among western publics from 1970 to 2006. *West European Politics*. 31(1–2):130–146.

Ingold, T. 2000. *The perception of the environment: essays on livelihood, dwelling and skill*. London: Routledge.

Ingold, T. 2001. Beyond art and technology: the anthropology of skill. In *Anthropological perspectives on technology*. M.B. Schiffer, Ed. Albuquerque: University of New Mexico Press. 17–31.

Ismail, Z. & Kollamparambil, U. 2015. Youth Unemployment Duration and Competing Exit States: What Hides Behind Long Spells of Black Youth Unemployment in South Africa? *African Development Review*. 27(3):301–314. DOI: 10.1111/1467-8268.12150.

Junior, R. & Silva, F. 2021. Redefining the MDA framework—the pursuit of a game design ontology. *Information (Switzerland)*. 12(10):1–19. DOI: 10.3390/info12100395.

Juvova, A., Chudy, S., Neumeister, P., Plischke, J. & Kvintova, J. 2015. Reflection of Constructivist Theories in Current Educational Practice. *Universal Journal of Educational Research*. 3(5):345–349. DOI: 10.13189/ujer.2015.030506.

Kagermann, H., Lukas, W.-D. & Wahlster, W. 2011. Industrie 4.0: Mit dem Internet der Dinge auf dem Weg zur 4. industriellen Revolution. *VDI Nachrichten*. (13):3–4. Available: http://www.vdi-nachrichten.com/Technik-Gesellschaft/Industrie-40-Mit-Internet-Dinge-Weg-4-industriellen-Revolution.

Kaminski, J. 2011. Diffusion of Innovation Theory. *Canadian Journal of Nursing Informatics*. 6(2).

Kaplan, B. & Maxwell, J.A. 2005. Qualitative Research Methods for Evaluating Computer Information Systems. In *Evaluating the Organisational Impact of Health Care Information Systems*. 2nd ed. J.G. Anderson & C. Aydin, Eds. New York: Springer. 30–55.

Kemp, S. 2022. *Digital 2022: South Africa*. Available: https://datareportal.com/reports/digital-2022-south-africa.

Kétyi, A. 2016. From mobile language learning to gamification: an overlook of research results with business management students over a five-year period. *Monográfico*. 1(September). DOI: 10.30827/digibug.54087.

Kilbourn, K. 2006. Design for enskilment: Anthropological insights for interaction design. In *The 5th Nordcode Seminar and Workshop, May 10-12, 2006*. Oslo. 1–3.

Kim, A.J. 2014. *Beyond player types: Kim's social action matrix*. Available: https://amyjokim.com/blog/2014/02/28/beyond-player-types-kims-social-action-matrix/ [2021, November 11].

Koivisto, J. & Hamari, J. 2019. The rise of motivational information systems: A review of gamification research. *International Journal of Information Management*. 45(June 2017):191–210. DOI: 10.1016/j.ijinfomgt.2018.10.013.

Kothari, C. 2004. *Research methodology: methods and techniques*. 2nd ed. New Delhi, India: New Age International Publishers.

Krönke, M. 2020. Africa's digital divide and the promise of e-learning. *AFRO Barometer*. (66):1–20.

Kruss, G., Wildschut, A., Janse Van Rensburg, D., Visser, M., Haupt, G. & Roodt, J. 2014. Learnerships and apprenticeships: Key mechanisms for skills development and capability building in South Africa. *HSRC*. 1–8.

Lam, D., Leibbrandt, M. & Mlatsheni, C. 2008. *Education and youth unemployment in South Africa*. (22). Cape Town.

LaMorte, W.W. 2019. *Diffusion of Innovation Theory*. Available: https://sphweb.bumc.bu.edu/otlt/mph-modules/sb/behavioralchangetheories/behavioralchangetheories4.html [2022, August 19].

Landers, R.N., Tondello, G.F., Kappen, D.L., Collmus, A.B., Mekler, E.D. & Nacke, L.E. 2018. Defining gameful experience as a psychological state caused by gameplay: Replacing the term 'Gamefulness' with three distinct constructs. *International Journal of Human Computer Studies*. 127:81–94. DOI: 10.1016/j.ijhcs.2018.08.003.

Lederman, D. 2019. *Why MOOCs didn't work, in 3 data points*. Available: https://www.insidehighered.com/digital-learning/article/2019/01/16/study-offers-data-show-moocs-didnt-achieve-their-goals [2021, September 13].

Lediga, M.M. & Fombad, M.C. 2018. The use of information and communication

technologies in public libraries in South Africa as tools for bridging the digital divide: the case of the Kempton Park public library. *Public Library Quarterly*. 37(3):296–305.

Lee, J.J. & Hammer, J. 2011. Gamification in education: What, how, why bother? *Academic Exchange Quarterly*. 15(2).

Leibbrandt, M., Woolard, I., Finn, A. & Argent, J. 2010. Trends in South African Income Distribution and Poverty since the Fall of Apartheid. *OECD Social, Employment and Migration Working Papers*. (101):1–91. DOI: 10.1787/5kmms0t7p1ms-en.

Liamputtong, P. 2011. *Focus Group Methodology : Principle and Practice*. La Trope University, Australia: SAGE Publications Ltd.

Magwentshu, N., Rajagopaul, A., Chui, M. & Singh, A. 2019. *The future of work in South Africa: Digitisation, productivity and job creation*. Available: https://www.mckinsey.com/.

Mangiron, C. 2018. Game on! Burning issues in game localisation. *Journal of Audiovisual Translation*. 1(1):122–138. DOI: 10.47476/jat.v1i1.48.

Manheim, H.L. 1977. *Sociological Research: Philosophy and Methods*. Illinois, USA: Dorsey Press.

Marczewski, A. 2013. *The Intrinsic Motivation RAMP*. Available: https://www.gamified.uk/gamification-framework/the-intrinsic-motivation-ramp/ [2021, November 21].

Marczewski, A. 2015. User Types HEXAD. In *Even ninja monkeys like to play: Gamification, game thinking and motivational design*. V. 1st Ed. D. Driver, Ed. Gamified UK. 65–80. Available: https://www.gamified.uk/wp-content/uploads/2016/01/Loyalty.pdf.

Mårell-Olsson, E. 2021. Using gamification as an online teaching strategy to develop students' 21st century skills. *Interaction Design and Architecture(s)*. 47:69–93.

Maule, W. 2019. The 4TH Industrial Revolution (4IR) – Potential risks and benefits for South Africa? *The Journal of Medical Laboratory Science & Technology South Africa*. 1(4).

May, J. 2010. Poverty eradication: The South African experience. In *Paper presented at the Department of Economic and Social Affairs, Division for Social Policy and Development and Economic Commission for Africa, Economic Development and NEPAD Division Expert Group Meeting on Poverty Eradication.* United Nations Conference Centre, Addis Ababa, Ethiopia.

Mayombe, C. & Lombard, A. 2016. The importance of material resources and qualified trainers in adult non-formal education and training centres in South Africa. *International Review of Education*. 62(2):187–204. DOI: 10.1007/s11159-016-9548-7.

Messiou, K. 2012. Collaborating with children in exploring marginalisation: An approach to inclusive education. *International Journal of Inclusive Education*. 16(12):1311–1322.

Mlaba, K. 2021. *How is South Africa's Digital Divide making inequality worse in the country?* Available: https://www.globalcitizen.org/en/content/south-africa-digital-divide-makes-inequality-worse/ [2022, June 12].

Mlambo, D.N. 2019. Governance and service delivery in the public sector: The case of South Africa under Jacob Zuma (2009 – 2018). *African Renaissance*. 16(3):207–224. DOI: 10.31920/2516-5305/2019/v16n3a0.

Mlatsheni, C. & Ranchhod, V. 2017. Youth labour market dynamics in South Africa: evidence from NIDS 1-2-3. *Redi3x3*. (Working Paper 39):1–28. Available: http://www.redi3x3.org/sites/default/files/Mlatsheni %26 Ranchhod 2017 REDI3x3 Working Paper 39 Youth labour market dynamics.pdf.

Mlatsheni, C. & Rospabe, S. 2002. *Why is Youth Unemployment so High and Unequally spread in South Africa ?*

Monette, D.R., Sullivan, T.J., DeJone, C.R. & Hilton, T.P. 2014. *Applied social research: A tool for the human services*. 9th Editio ed. USA: Brooks/Cole Cengage Learning.

Mowat, J.G. 2015. Towards a new conceptualisation of marginalisation. *European Educational Research Journal*. 14(5):454–476. DOI: 10.1177/1474904115589864.

Myers, M.D. 1997. Qualitative Research in Information Systems. *MIS quarterly*. 21(June).

Nacke, L.E. & Deterding, S. 2017. The maturing of gamification research. *Computers in Human Behavior*. 71:450–454. DOI: 10.1016/j.chb.2016.11.062.

National Planning Commission. 2012. *National Development Plan 2030: Our future-make it work*. DOI: ISBN: 978-0-621-41180-5.

Neuman, L.W. 2011. *Social Research Methods: Qualitative and Quantitative Approaches*. 6th ed. Pearson.

Nishiyama, C. 2021. *Online classes don't work*. Available: https://might-could.com/essays/online-classes-dont-work/ [2021, September 02].

NYC. 1996. *NO. 19 OF 1996: NATIONAL YOUTH COMMISSION ACT, 1996*. Available: https://www.gov.za/sites/default/files/gcis_document/201409/a19-96.pdf.

NYP. 2020. *National youth policy 2020-2030: A decade to accelerate positive youth development outcomes*. DOI: 10.1111/j.1949-8594.1943.tb05897.x.

Obeng-Odoom, F. 2019. The intellectual marginalisation of Africa. *African Identities*. 17(3–4):211–224. DOI: 10.1080/14725843.2019.1667223.

OECD. 2019. *Getting Skills Right: Engaging low-skilled adults in learning*. Available: www.oecd.org/employment/emp/ engaging-low-skilled-adults-2019.pdf [2022, June 15].

Orji, R., Tondello, G.F. & Nacke, L.E. 2018. Personalizing persuasive strategies in gameful systems to gamification user types. In *Conference on Human Factors in Computing Systems - Proceedings*. V. 2018-April. Montreal, QC, Canada. DOI: 10.1145/3173574.3174009.

Otto, T. & Smith, R.C. 2013. Design anthropology : A distinct style of knowing. In *Design anthropology: theory and practice*. W. Gunn, T. Otto, & R.C. Smith, Eds. London: Bloomsbury Academic. 1–32.

Parra, C., Nemer, D., Hakken, D. & D'Andrea, V. 2015. Deep Trust in the future of Community Informatics. *Journal of community informatics*. 11(2):1–14. Available: http://ci-journal.net/index.php/ciej/article/view/1203.

Pellikka, H. 2014. Gamification in Social Media. University of Oulu.

Philbeck, T. & Davis, N. 2019. The fourth industrial revolution: shaping a new era. *Journal of International Affairs*. 72(1):17–22. Available: https://www.jstor.org/stable/26588339.

Pigg, K.E. 2005. Introduction: Community Informatics and Community Development. *Journal of the Community Development Society*. 36(1):1–8.

Pink, D.H. 2009. *Drive: The surprising truth about what motivates us*. Riverhead Hardcover.

Preece, J., Rogers, Y. & Sharp, H. 2015. *Interaction Design: Beyomd Human-Computer Interaction*. 4th ed. West Sussex, UK: John Wiley & Sons Ltd.

Prendiville, A. 2015. A Design Anthropology of place in Service Design : A methodological reflection. *The Design Journal*. 18(2):193–208. DOI: 10.2752/175630615X14212498964231.

Putra, S. & Yasin, V. 2021. MDA framework approach for gamification-based elementary mathematics learning design. *International Journal of Engineering, Science and Information Technology*. 1(3):35–39. DOI: 10.52088/ijesty.v1i3.83.

QCTO. 2021. *Our mandate*. Available: https://www.qcto.org.za/mandate.html [2021, December 11].

Rankin, N., Roberts, G. & Schöer, V. 2014. *The success of learnerships? Lessons from South Africa's training and education programme*. DOI: 10.35188/UNU-WIDER/2014/789-9.

Robertson, T. & Simonsen, J. 2012. Challenges and opportunities in contemporary participatory design. *Design Issues*. 28(3):3–9. DOI: https://doi.org/10.1162/DESI_a_00157.

Rogers, E.M. 2003. *Diffusion of Innovations*. 5th ed. New York: The Free Press. DOI: 10.1093/oxfordhb/9780198845973.013.23.

Ryan, R.M. & Deci, E.L. 2000. Self-determination theory and the facilitation of intrinsic

motivation, social development, and well-being. *American Psychologist*. 55(1):68–78.

Ryan, R.M. & Deci, E.L. 2017. *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*. New York, USA: Guilford Press.

Saad-Sulonen, J.C. & Horelli, L. 2010. The value of Community Informatics to participatory urban planning and design: a case-study in Helsinki. *The Journal of Community Informatics*. 6(2):1–22. Available: http://ci-journal.net/index.php/ciej/article/view/579/603.

Sahin, I. 2006. Detailed review of Rogers' diffusion of innovations theory and educational technology-related studies based on Rogers' theory. *The Turkish Online Journal of Educational Technology – TOJET*. 5(2).

Saunders, M., Lewis, P. & Thornhill, A. 2009. *Research methods for business students*. 5th ed. London, England: Pearson Education Limited. Available: http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Research+methods+for+business+students#0 [2014, April 07].

Schöbel, S., Ernst, S., Söllner, M. & Leimeister, J.M. 2017. More than the sum of its arts – towards identifying preferred game design element combinations in learning management systems. In *Thirty Eighth International International Conference on Information Systems (ICIS)*. Seoul, South Korea.

Schwab, K. 2018. The Fourth industrial revolution. *Journal of International Affairs*. 72(1):13–16. Available: https://www.jstor.org/stable/10.2307/26588338.

Şenocak, D., Büyük, K. & Bozkurt, A. 2019. Distribution of Hexad gamification user types and their association with intrinsic motivation in open and distance learning systems. In *ICERI2019 Proceedings*. V. 1. Seville, Spain. 1011–1017. DOI: 10.21125/iceri.2019.0312.

Sicart, M. 2008. Defining Game Mechanics. *The International Journal of Computer Game Research*. 8(2).

Simões, J., Redondo, R., Vilas, A. & Aguiar, A. 2013. A gamification framework to improve participation. *eLearning Papers*. (35):1–11.

Sitorus, M.B., Ferdiana, R. & Adji, T.B. 2017. Designing gamification framework to support social media application based on game elements and cutting-edge technology. In *ICECOS 2017 - Proceeding of 2017 International Conference on Electrical Engineering and Computer Science: Sustaining the Cultural Heritage Toward the Smart Environment for Better Future*. 125–130. DOI: 10.1109/ICECOS.2017.8167118.

Smith, K.L. 2021. iPads, Free Data and Young Peoples' Rights: Refractions from a Universal Access Model During the Pandemic. *Studies in Social Justice*. 15(3):414–441. DOI: 10.26522/SSJ.V15I3.2509.

Smith, N.D. 2011. *Locating Design Anthropology in research and practice: PhD workshops provoke expansion of cross-disciplinary horizons*. Available: https://www.academia.edu/895695/Locating_Design_Anthropology_in_research_and_practice [2018, December 01].

Smithson, J. 2008. Focus Groups. In *Tha SAGE Handbook of Social Research Methods*. P. Alasuutari, L. Bickman, & J. Brannen, Eds. London: SAGE Publications Ltd. 356–371. DOI: http://dx.doi.org/10.4135/9781446212165.n21.

South African Government. 2022. *Basic Education on official ending of Phase III of The Presidential Youth Employment Initiative (PYEI)*. Available: https://www.gov.za/speeches/basic-education-official-ending-phase-iii-presidential-youth-employment-initiative-pyei-2 [2022, November 11].

Stats SA. 2018. *Statistical release quarterly labour force survey: quarter 3*. Available: http://www.statssa.gov.za/publications/P0211/P02113rdQuarter2018.pdf.

Stats SA. 2021. *Quarterly Labour Force Survey (QLFS) Q3:2021*. Available: http://www.statssa.gov.za/publications/P0211/P02111stQuarter2019.pdf.

Stavropoulos, V., Motti-Stefanidi, F. & Griffiths, M.D. 2021. Risks and opportunities for youth in the digital era: a cyber-developmental approach to mental health. *European Psychologist*. 27(2). DOI: https://doi.org/10.1027/1016-9040/a000451.

Strmečki, D., Bernik, A. & Radošević, D. 2015. Gamification in e-learning: Introducing gamified design elements into e-learning systems. *Journal of Computer Science*. 11(12):1108–1117. DOI: 10.3844/jcssp.2015.1108.1117.

Tague, N.R. 2005. *The Quality Toolbox*. Wisconsin, USA: ASQ Quality Press.

Tan, H., Wilson, A. & Olver, I. 2009. Ricoeur's theory of interpretation: An instrument for data interpretation in hermeneutic phenomenology. *International Journal of Qualitative Methods*. 8(4):1–15.

Thom, J., Millen, D. & DiMicco, J. 2012. Removing gamification from an enterprise SNS. In *Proceedings of the ACM Conference on Computer Supported Cooperative Work, CSCW*. New York. 1067–1070. DOI: 10.1145/2145204.2145362.

Thomas, N.J., Hamari, J., Baral, R. & Sukumar, H. 2021. What is gameful experience? towards a conceptual definition. *Academy of Management*.

Tondello, G. 2017. *Gamification vs gameful design: why does it matter?* Available: https://www.gamefulbits.com/2017/01/26/gamification-vs-gameful-design-matter/ [2019, April 23].

Tondello, G.F., Wehbe, R.R., Diamond, L., Busch, M., Marczewski, A. & Nacke, L.E. 2016. The gamification user types Hexad scale. *CHI PLAY 2016 - Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play*. (October):229–243. DOI: 10.1145/2967934.2968082.

Tondello, G.F., Mora, A. & Nacke, L.E. 2017. Elements of gameful design emerging from user preferences. In *CHI PLAY 2017 - Proceedings of the Annual Symposium on Computer-Human Interaction in Play*. Amsterdam, Netherlands. 129–140. DOI: 10.1145/3116595.3116627.

Tondello, G.F., Arrambide, K., Ribeiro, G., Cen, A.J. lan & Nacke, L.E. 2019. "I don't fit into a single type": A trait model and scale of game playing preferences. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*. 11747 LNCS:375–395. DOI: 10.1007/978-3-030-29384-0_23.

Tshabalala, N.G. 2014. Crime and unemployment in South Africa; revisiting an established causality: Evidence from the Kwazulu Natal Province. *Mediterranean Journal of Social Sciences*. 5(15):519–528. DOI: 10.5901/mjss.2014.v5n15p519.

Ventura, J. & Bichard, J. 2016. Design anthropology or anthropological design? Towards ' Social Design '. *International Journal of Design Creativity and Innovation*. 0349(October):1–13. DOI: 10.1080/21650349.2016.1246205.

VPUU. 2019. *Bridging the new digital divide*. Available: http://vpuu.org.za/programmes/ict4d/digital-divide-south-africa/ [2022, June 19].

Wasson, C. 2016. Design anthropology. *General Anthropology*. 23(2):1–11.

Wei, C. 2017. Integrating gamification to modern web fitness services. University of Tampere Faculty. Available: http://tampub.uta.fi/bitstream/handle/10024/101828/GRADU-1502776795.pdf?sequence=1.

WEF. 2023. *Fourth industrial revolution*. Available: https://www.weforum.org/focus/fourth-industrial-revolution [2023, July 18].

Welman, C., Kruger, F. & Mitchell, B. 2005. *Research Methodology*. Cape Town: Oxford University Press.

Williams, K. & Durrance, J.C. 2018. Community Informatics. In *Encyclopedia of Library and Information Sciences*. 4th ed. CRC Press. 1027–1033. DOI: 10.1081/e-elis3-120043669.

Wilson-Prangley, A. & Ngosi, B. 2018. *Urban Youth Unemployment - The case of Harambee, a Youth Employment Accelerator.* Available: https://csp.treasury.gov.za/Resource _Centre/Conferences/Documents/Executive Leadership Programme Leading Future Cities/Day 2/Case1-Urban Youth Unemployment.pdf [2020, August 01].

Wilson, E.J. 2006. *The information revolution and developing countries*. The MIT Press.

Woo, Y. & Reeves, T.C. 2007. Meaningful interaction in web-based learning: A social constructivist interpretation. *The Internet and Higher Education*. 10(1):15–25.

World Bank. 2022. *The World Bank in South Africa*. Available: https://www.worldbank.org/en/country/southafrica/overview [2022, June 12].

Wu, Y., Kankanhalli, A. & Huang, K. 2015. Gamification in Fitness Apps : How do Leaderboards influence Exercise? In *Thirty Sixth International Conference on Information Systems, Fort Worth*. Fort Worth. 1–12.

Yee, N. 2006. Motivations for play in online games. *Cyberpsychology and Behavior*. 9(6):772–775. DOI: 10.1089/cpb.2006.9.772.

Yee, N. 2015. Gamer Motivation Model Overview and Descriptions. *Quantic Foundry*. Available: http://quanticfoundry.com/2015/12/15/handy-reference/.

Yu, D. 2013. *Youth unemployment in South Africa since 2000 revisited*. Available: www.ekon.sun.ac.za/wpapers/2013/wp042013/wp-04-2013.pdf?

Zichermann, G. & Cunningham, C. 2011. *Gamification by design*. Sebastopol, CA: O'Reilly Media Inc.

Van Dijk, J. & Hacker, K. 2003. The digital divide as a complex and dynamic phenomenon. *The Information Society*. 19(4):315–326.

Van Zyl, I. & Sabiescu, A. 2020. Toward intersubjective ethics in community-based research. *Community Development*. 51(4):303–322. DOI: 10.1080/15575330.2020.1777178.

APPENDICES

APPENDIX A: RESEARCH ACTIVITY GUIDE AND PLAN

Research activity guide and plan

Friday 30 August 2019 – Placing oneself to understand

1. Let's get to know each other (introducing myself to the youths and them to me)
2. What I am there for (summarising the research and deciding dates and times best for everyone)

Saturday 14 September 2019 – Placing oneself to understand (Cont.)

1. Arrivals and registration
2. Ice-breaker (for collaboration and rapport)
3. Explaining the tools for the activity
4. Understanding the complexity (1st session of group activity)
5. A short break
6. Understanding the complexity (1st session of group activity continued)
7. Reflective and awareness task
8. A big thank you!

Saturday 5 October 2019 – Placing oneself to understand (Cont.)

1. Review of their findings from the task given (2nd session of group activity)
2. Further dissolving the research problem (3rd session of group activity)
3. Probing their journey at Afrika Tikkun (4th session of group activity)
4. A big thank you!

23 and 28 November 2019 – Defining and Ideating

1. Empathy and needs mapping
2. Storyboarding
3. Framing the point of view (POV)
4. 'How might we' (HMW)
5. Brainstorming ideas for the solution using the HMW
6. Rating and validating the ideas

APPENDIX B: INDIVIDUAL CONSENT FORM

FACULTY OF INFORMATICS AND DESIGN

Individual Consent for Research Participation

Title of the study: Gameful design for skills development among urban youths in South Africa

Name of researcher: Mr Chinonye Leuna Obioha

Contact details: Email: obiohaleuna@gmail.com Phone: 0736535276

Name of supervisors: Prof Izak van Zyl

Contact details: Email: VanZyllz@cput.ac.za; Phone: 0214691115

Purpose of the study: The central aim of this research is to explore the social, economic and technical considerations to design a gamified application to motivate, engage and create satisfying user experience for skills development of youths in urban poor communities.

Participation: My participation will consist essentially of interviewee and participant of the design workshops.

Confidentiality: I have received assurance from the researcher that the information I will share will remain strictly confidential unless noted below. I understand that the contents will be used for a PhD Thesis, research conferences, and research publications, and that my confidentiality will be protected by the use of personas and pseudonyms.

Anonymity will be protected in the following manner: coded names of interviewee will be taken or used.

Conservation of data: The data collected will be kept in a secure manner.

Voluntary participation: I am under no obligation to participate and if I choose to participate, I can withdraw from the study at any time and/or refuse to answer any questions, without suffering any negative consequences. If I choose to withdraw, all data gathered until the time of withdrawal will destroyed.

Additional consent: I make the following stipulations (please tick as appropriate):

	In thesis	**In research publications**	**Both**	**Neither**
My image may be used:				
My name may be used:				
My exact words may be used:				
Any other (stipulate):				

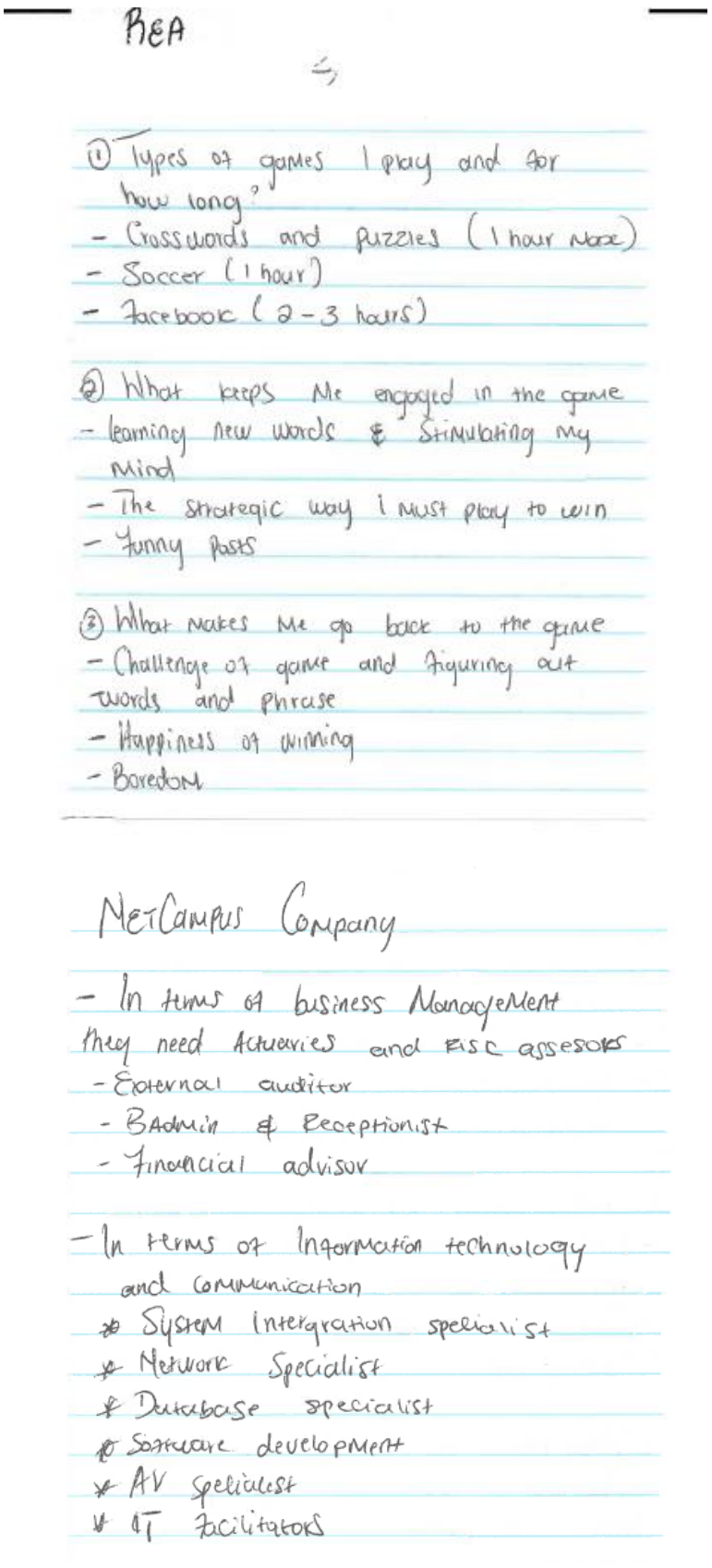
Acceptance: I, (print name) _____ agree to participate in the above research study conducted by Mr. Chinonye Leuna Obioha of the Faculty of Informatics and Design, Department of Information Technology, at the Cape Peninsula University of Technology, which research is under the supervision of Prof Izak van Zyl.

If I have any questions about the study, I may contact the researcher or the supervisor. If I have any questions regarding the ethical conduct of this study, I may contact the secretary of the Faculty Research Ethics Committee at 021 469 1012, or email naidoove@cput.ac.za.

Participant's signature: _____ **Date:** _____

Researcher's signature: _____ **Date:** _____

APPENDIX C: SAMPLES OF THE PERSONAL NOTES



REA

① Types of games I play and for how long?
- Crosswords and puzzles (1 hour Max)
- Soccer (1 hour)
- Facebook (2-3 hours)

② What keeps Me engaged in the game
- learning new words & Stimulating my mind
- The strategic way I must play to win
- funny posts

③ What makes Me go back to the game
- Challenge of game and figuring out words and phrase
- Happiness of winning
- Boredom

NetCampus Company

- In terms of business Management they need Actuaries and Risc assesors
- External auditor
- BAdmin & Receptionist
- financial advisor

- In terms of Information technology and Communication
- System Integration specialist
- Network Specialist
- Database specialist
- Software development
- AV Speliclest
- IT facilitators

- puzzles, crosswords, soccer, facebook
- engangin learning new words, funny post
- 1 hour an 3 days a week
- facebook 3 hours

on facebook different Groups funny
on soccer playing FIFA 2010 because you want to win.
plays agianst the Computer
challenges of the game
happiness of winning
Getting next level
A Trophy (soccer)
crosswords (points) for Hint.
when you bored go to facebook for funny post.

Jobs around you
momentum

Student
People are unemployed
(skills) degree in Education
Open own Business

Games
Similation → Driver truk euro truck diver.
Soccer
Change colour, play music.
farming simulator (seeder, plougher, tracktor)
harvest & sell.
Apeal: it feels Reality

Chess
Sims
Candy crush

LUCK1+2 [redacted] (1) three questions asked — (1) What made them start the skills development at Afrika Tikkun, (2) What motivated them to continue, (3) What were some of the challenge they faced?

What made me start at Afrika Tikkun was the fact th I saw that place as an opportunity to improve my self-confidence, Improve my presentation skills

- What made me come back was the relationship that I had with the my other fellow students.... It was amazing how people faced their problems & situations that occured in their lives at the time and how their trusted me with that information, also learning from other people that are were there.

RELATIONSHIPS

It was also a challenge for me as to can I keep on coming back, even though I was not getting much, I had to travel a very long way to actually be in time of the session, hang on facebook. ☺

* Monet

NOTE:

Opportunity to build and improve himself including Self-confidence and presentation skills.

* Motivated by the relationship he had with other fellow students. Shared experiences, learning from each other.

* Had Monetary and traveling distance challenges

APPENDIX D: TRANSCRIPED DATA

Responses
Researcher: OK, so biomatrix is what you see here. It's called biomatrix, system thinking. The whole idea is summarised as – to solve problems, you need to first dissolve the problem. That's the summary. So using the analogy of the car, does it make sense now? So, for us to dissolve it we need to not just look at you as an individual (youth) and we don't just need to look at the family. We don't just need to look at the government, because most of the time these are what we always look at. As an individual who is from a deprived family or a family member or an institution – government must give us jobs. You know what I mean? Toyi-toyi. OK but, could there be more? That's what we're asking. And, if you're looking all these parts, what part of this fits into this. So if I give an instance, I'm just giving an example as an individual, physically where are the challenges you might face. Psychological, biological also, what are the kind of challenges you would face. Psychological, sometimes people talk about the depression etc. whatever it is. Is it an individual factor, or is it a family factor or an institution factor and all that. If we look at political, how does it affect the individual, how does the political affect the family, how does political issues affect the organisation, political factors on institution, society and the planet. So that's why it's called the matrix, does that make sense? OK. And cultural, sometimes our culture is what holds us back in learning some certain things. Sometimes it's our culture that holds us back from actually doing some certain things. And we also look at Cultural factors, and physiological is mostly your ability to walk or do some other physiological stuff. So is there anything you need to know before we get started? Are you OK? If it's clear then everyone say aye. **All:** Aye. **Researcher:** If it is not clear to everyone say nay. All right let's start. So let's start from the individual. As an individual. Should I allow you guys to discuss amongst yourselves first of all before we kick start with this? **Yola:** Can we do one together and then we will catch on(?)? **Researcher:** OK let's start with this, the individual. It's the first one so on the individual side, what are the challenges we can see with the physical aspects? Remember we are looking at the context of unemployment and the context of skills development. **Alonzo:** What about like, housing . Would that be the physical? **Researcher:** OK, We need to do here that is if you see that there is a relation to it, mark an x there or a tick. But if you don't see any (relationship), we move to the next. Is there a correlation between the individual and the physical when it comes to two things – skills development and youths' unemployment? **Luzu:** Yes there is. **Researcher:** Can you explain it? **Luzu:** I'm not sure I got it or not but, in terms of physical and individual, there is a collaboration in the form of, if you are unfit, if you are seen unfit, in terms of sickness, so

you will not be fit enough to perform certain jobs because of the condition of your health. It's what you could see.

For example if your energy is very low, see that your mouth is very dry we could assume that you are very hungry, or you're thirsty so, you cannot perform certain jobs. 1You cannot be creative [think of finding ways to upskill or perform at best] while you are hungry so, I think there is a collaboration between the two because your skills will not be 100 percent accurate and then, people may not want to employ you because you are unfit.

Researcher: In essence, critical illness or critical conditions, is what you're saying?

Luzu: Yeah.

Researcher: Okay. Any other person opinion on that? Do you agree with him?

All: Yes

Yola: Also, I think general mobility. Like your ease to get from where you live to where you work.

Researcher: Mobility?

Luzu: We didn't get that.

Yola: I was saying as in, for people it's hard for them to get from where they live to where they work. It may cost them too much money.

All: Yeah.

Researcher: From where they stay?

All: Yeah.

Alonzo: So that's more like transportation?

All: Yeah.

Luzu: That's the other thing. That's the other thing that I once discovered. That sometimes people on interviews, that's why they ask where you stay because, they're trying to find out the amount they're going to pay you will not be allocated to the whole transportation from one place to another. They cannot employ you if you use maybe, let's say maybe pay you R2000 and you use R1500 round for transportation. So, it's more like you're working for transport so they decide to say "no, we cannot employ you". But, we as humans neglect to see why did we not get employed there. We'll just say "no, I was unfit" or something like "they don't like me. So, that's one thing I discovered. That transportation is [highly] considered during an interview for a job.

Tee: Also, I think, for instance, let's say you stay in a rural area. There are no places that you can go for skills development, it's hard to find places like those. I think that's also another physical factor.

Researcher: OK. So, in essence if I get you clearly, if we are using where we are right now, they are no jobs around?

Tee: Yes. That what I meant.

Researcher: So where you learn skills, they are no jobs around where you live to learn skills?

Tee: Yeah, Or there are no places to even learn those skills. 5And there are also no jobs.

Researcher: All right. Any other opinion on this part of physical on the individual? Alright, any other opinion on the physical before we move to biological? Anything?

Andy: What I want to say is kind of similar to what Luzu was saying. Like physical disabilities.

Researcher: OK so now we go to physiological. There is a correlation here. So that's physical disability. We can have that over there. So why do you think physical disability would be an issue?

Andy: People tend to judge you on the way you look, let's say it's a little bit difficult for someone with one arm. And then they someone else with two arms and they tend to think "no you can't do the job because you only have one arm", and then you lack somewhere.

Researcher: So in essence, we have a huge challenge in South Africa with disability? OK. That I will take notes off. That's a good one. So can we move on? So biological looks more on like environments and animals and how does that affect you as an individual. And that is totally different from ecological. Biological if there is no part that really affects us that we can move to the next. But ecological we can also look at I biological In the sense of animals and plants and those kind of things. Ecological is more on the environment, OK? More on water, the earth and the destruction of the land and all that and how these affects us. So I just wanted to make those two (clear) distinctions. Do we find any relation between biological and the individual?

Luzu: Can you please restate biological?

Researcher: Biological is more on plants and animals, OK. How does that affect us in skills development and unemployment?

Luzu: It's more like in terms of minerals, as in one country is rich in terms of minerals, and where is one is rich in terms of more what-what?

Researcher: We can put it in that way. You can even put it and is this or this for minerals if we want. OK, let's discuss it on the biological.

Luzu: Like it affects in the form of if… Like here in South Africa, we all know that we are rich in minerals, but we lack the resources (skills and machinery) to manufacture them. So we lack the skills to make [use of] these machines so most times we take people from the other countries and machines from other countries to manufacture these products. Or we export them from here to there because we do not have the necessary skills to manufacture them. And then people get unemployed because they don't know how to. They need to be taught. So that's how I see it affects us.

Researcher: Psychological, but in a way also affects this. Psychological in a way we can also look at the other aspect of the mind. OK, mental development and all that. So we can look at it there, and also here, because natural resources, let me just make note of that on natural resources, okay, and ecological. So ecological is more on the environment, okay? The air, water and things like that. Yeah?

Rea: I just want to ask in terms of biological and ecological, where does the weather fall? Under ecological or biological?

Researcher: Ecological.

Rea: In terms of weather, we are the ones who pollute the atmosphere so we tend to pollute the atmosphere but in return, that causes global warming. Hence, we have a higher rate of unemployment. So I think we are the ones responsible for the unemployment.

Researcher: How does it affect employment?

Rea: Okay so there's uhm...okay, we pollute the atmosphere right? Using cars, fossil fuels and all that. So the ozone layer get affected. When the ozone layer gets affected it releases more, uh what it called?

Alonzo: Carbon?

Rea: Uh yes but, I want this other word. What's this other word that I forgot but...

Alonzo: Carbon dioxide? No, not carbon dioxide? Greenhouse gasses?

Rea: Yes, those greenhouse gasses. They tend to have a high tendency of heat which causes global warming in the country. Global warming means that temperatures are rising. And when temperatures are rising we have uhm...okay rain tends not to fall regularly in particular. Yeah. So yeah, it affects the farmers. And when it affects the farmers sometimes they experience floods and all that. When the floods happen what happened to the farmers? Their yield gets destroyed or the infrastructure let's say like, here in Afrika Tikkun their infrastructure gets destroyed, so which means there will be unemployment. Uhm, let's say The whole apartment was not insured. If it was not insured which means people will not be able to come back to work. The unemployment rate will go high.

Researcher: That's interesting.

Researcher: So any other person's opinion on that? And that's really true because if we have ecological issues like the rain fall and flood, and we have destruction of buildings, it affects the business. And businesses also want to cut losses and they cut, and who do they first layoff? The workers. And then they go back to being unemployed.

Luzu: And it goes back to the whole economy.

Researcher: Yeah, and it goes back to the whole economy like you said and etc. So it leads to poverty, which leads to people being frustrated and so on and so forth. So you see how these things connect to themselves? I really like that, thanks for bringing that up. We see that connection, ecological. Technological? There are quite a lot of things to do here hey? So we need to maybe speed up and quickly talk what we have in mind. There is something else I would also ask from you guys after this. So the very first 15 minutes that we have together, in the next meeting, we will go through this again if there's any other thing we need to add to it that we forgot based on what you've thought over at home. So I would love us to really go fast. If not we will be here until like five. I don't want that to happen, alright? So, uhm technological? Is there any correlation in that?

Andy: There are other functions of the technology in our phones, right? And then you can just go out on the streets, just for an example, take any body, any random person

and ask them which apps do they actually use on their phones. It will only be WhatsApp, Facebook and their gallery and then they don't use the other apps, they don't know what they are for. They find them useless and stuff because they don't know what they are for. So people are not informed of it.

Researcher: That's technological. So how do we put that now? Guys help me out here. There's lack of efficient use of technology. How do we put that?

Alonzo: What about inefficient flow? can't we like…

Yola: People don't know...like...people[don't] know what it is used for

Alonzo: What if we take like the value dissipation. What if we like try to link it with one of the five nodes. Maybe like inefficient flow?

Researcher: Inefficient use of technology.

Researcher: OK, so political? I know this is where many things will come out. I actually don't need to ask. I will put a tick there because I know... it's okay but, anyway... are we in agreement with that one? I can cancel that.

All: (Laughing aloud) in agreement. Yeah.

Researcher: So let's talk about the political aspect and how it affects an individual.

Alonzo: Shyo! Where do we start?

Researcher: Anywhere.

Alonzo: There's so much! (Others agrees, with same words in the background).

Researcher: Well that's why we recording so maybe I won't write so let's just get it all. I'll analyse all those later on. So what...what are those political issues that affect the individual. And we can also look at family and other parts, okay? Now you understand what it is so, we can bridge all of them at once. So, we'll come back later to these ones but, let's start with political for the rest. So think about this, what are the things, politically, that affect an individual, family, organisation, government itself, or institutions of government uhm, and non-profit organisations also on this part (organisations), companies, society – I will put this as South Africa as a country, okay? Rather than a society. So let's look at this as a country and then, to the planet, okay? So from the individual, the individual is within a family and the family...okay I think we should have had the society, because uhm, uhm, okay let's have them together, that's fine. The organisations, okay? Companies and all that. Then government and within the government, there is a society or there is a country, so we look at the two of them here and the planet, global. So, political, how does that affect an individual?

Luzu: I think we should just start with the word corruption or greediness. Like uhhh, in most cases, problems that are done by people that are linked to other political parties, we get informed by the opposition party most times so, we are aware that this person has failed to do this and that and that in this form. So this affects us in this form, if one party fails to produce more jobs or, if one party fails to, to use the money that is, is, is meant to be used to create jobs, that will lead me not to be employed. And if one, uhhh, says that in the whole country that there was one billion that was allocated to create jobs like, we are meant to build a mall. So one would say I would not invest my funds in this country in terms of the whole planet as a whole. So the economy will not be in a, in a, in a better position because people will not want to invest in us. And then the

businesses will not be able to make funds because the money is used by the same company each and every day. The same company gets the tenders, the same company, so the other companies are suffering. Whereas many, many of them should have been employed in terms of constructing the what? The mall. So they fail to come up with more funds and employ other people. And then in terms of the whole society it is hard for them to buy things for themselves, to employ securities for around the community, around the community so that they could be safe. And then it leads to crime because people are hungry they need something to eat. It's just a lot, a lot, a lot.

Researcher: Can I ask your opinion on that?

Amos: Ya, I think it's the same.

Researcher: No other additions?

Amos: My addition, I think our leaders, they are corrupt. And that goes back to not getting enough ways to do our jobs. And we don't have skills enough based on that.

Researcher: If we also look at politics, how does that really affect the society or the country itself?

Tee: I think uhm, sigh... I think that there's so many political parties in South Africa. Like I feel like it would have been simpler if there maybe was two. Then maybe they would know either vote for this one or vote for this one. But now there's more so, a political party will favour it's people obviously. So, and we know that uhm, there's a political party, here in South Africa that doesn't favour its people but, they still continue to vote for it. Like they don't deliver the resources. So I think in that way, that's how it affects the country.

Researcher: Anyway, uh, this..okay, uhm, so, it does affect this, uhm...but what if, in a political state, there isn't...I think one of the things South African really enjoys is, the freedom of expression. Okay, that's why you've got the numbers (of political parties). I'm not saying you're right or you're wrong, I'm just saying one of the reasons why, I believe, we have those numbers is because we want everyone to express themselves. With that, I'm trying to see how that really affects us as youths. Because if we still have two parties and it's ANC and DA, people will still vote in ANC, for instance. So how does that fix the problem? I don't know if you get my question? It's just a follow up question to what you talked about.

Luzu: I think they, like I said they, they see the problems, and they know what we need, so one breaks from this party and forms his own party and then says "I know you want this. Vote for me, I will do it." Because he knows the exact thing. He knows our minds. What we want in order for us to survive. So they give us the right words and then we vote for them. So that's how it, it's under, they study us most times. They know the role...

Researcher: So in essence, they are playing with the minds of the people.

Luzu: They call it, I don't know, if it's propaganda...

Alonzo: So that link with psychological?

Researcher: Yeah. So, institution, psychological. Okay. Uhm, okay any other thing on political on any of those three? And if we are looking at the planet (global entities), we

are looking more on organisations like World Health Organisations. We are looking at things like, what other world organisations can you name?

The UN. We looking at things like... SADEC.

EU, BRICS. We can talk about BRICS also but...but more of how each and everything affects us on a skills level and unemployment, okay? And uhm, yeah one other thing would be the Commonwealth because South Africa belongs to the Commonwealth. You know the Commonwealth, right? Okay so Commonwealth is countries that have been colonized by the UK. Okay, you have South Africa, I think you also have Namibia?

Yola: And India at some point.

Researcher: Nigeria... Canada…Australia. So, all these countries that have been colonized by the UK, actually have a body called the Commonwealth. Okay, and that's why you have what's called the Commonwealth games. If you've heard about that. Looking at the family also let's… I think let's be fast with this. We've looked at it from the political aspect (dimension). Is there any other thing political aspect and individual?

Yola: Uhm, I wanted to talk about the redistribution of wealth within our country. Cause, we know like the Scandinavian countries are very much firm with taxing like everyone like about the same. And, everything that you get from the tax money, everyone enjoys that like as a whole together, in terms of resources. But like I don't know how things happen here. Like, other countries that aren't so tax friendly, it's very much, rich people pay very little in tax, medium income people pay probably the most, and then like low income people pay a little bit, but then it's a lot to them. So it's just, when that tax money is taken, it's not really invested back into the community properly. Into the right areas, so to say. So then, it does affect like, an individuals, like chances when it comes to like, gaining employment rather.

Researcher: So we could say, uhm, the government use of public funds or, the government use of the sovereign wealth, or the country's wealth.

Yola: In essence, yeah.

Researcher: Okay, and that could go more into country and economic. And how do we also streamline this down to the individual, okay. The economic part. So, okay let's leave this quickly and go to economic which is another thing I think might be, an economy is about money, okay. That's just the sum of it. Uhm, in individual having money, how does that affect skills development and how does that affect unemployment. A family, uhm, economic, how does that affect that? Organisation, government, country also. How does that affect, uhm, and the global aspect.

Alonzo: Uh for individual and family it could be the cost of living like inflation. So if inflation is high it's difficult for families, you know, to get their basic needs.

Researcher: Yeah go on.

Alonzo: Yeah, that's all I have.

Researcher: Any other person?

Amos: I also think on the family, the support grant that they get, they don't want to work because they're lazy.

Researcher: Who doesn't want to work because of the support grant.

Amos: Like some other peoples they...

Researcher: Youths?

Amos: Yeah.

Researcher: What's a support grant again?

Alonzo: SASSA, like when the government gives like a certain amount.

Researcher: Do they give it to you? I thought it was only pensioners and, kids.

(Inaudible group rambling 33:16) because of their kids… people with kids

Researcher: Yeah, yeah, yeah , yeah, yeah, yeah, yeah, yeah, yeah. Yeah that's why people give birth to more children so they can get benefits. That's true. I remember that. Oh, that's, that's... what did you call that again?

Amos: Support grants.

Researcher: Support grants. So you think that affects...

Luzu: Yeah! because that leads to a lot of births. A lot of money is allocated to that

Alonzo: Mmm, that's true.

Researcher: So you're suggesting that they scrap it?

All: Yes.

Researcher: You say yes?

Not Clear Who: They keep giving birth each and every year, each and every year….

Researcher: Okay, Andy?

Andy: I kind of feel like that grant money is more like a reward for having a baby.

All: Exactly!!!

Tee: Why don't the government give a stipend for you maybe if you pass matric and they promise you maybe R2000. They give you R2000 so that you can be able to find your feet after matric because we know how difficult life is after matric especially in South Africa. So I feel like maybe if there was that money (rechannelled) so that you can maybe find your feet and see where you going. Instead of giving out R490 per child every month.

Alonzo: Re-channelling wealth.

Luzu: Or maybe because in terms of the government... Like, like what she just said, like, in terms of like the money is allocated the child like the basic needs of the child. Like the child needs A, B and C. If the government could stop providing funds and providing the items for that person, maybe that could work because, they say two childs (sic), that's close to R1000 but, if ever their clothes, if you're saying we need uh, one bottle of milk we're going to buy for you and then give it to you so that it would decrease the demand of this money....

Researcher: Hmmm, okay. If I go back, sorry, I'm coming back to this because, yes we want understanding but we also might work this into IT, OK sorry I'm bringing you guys

back to technological. How can we make technology more efficient, for skills development?

Tee: By making it available.

Researcher: In what sense?

Tee: Most youths, especially in townships, they're not, they don't have access to technology, to technological resources.

Researcher: But they have their phones.

Ria: It's not that, we don't have data.

Researcher: You don't have data?

(All laughing)

Tee: Because we don't have money.

Researcher: You see how it goes. Okay so we are looking at… how's the.. OK, OK, data. OK, OK I get the complexity. OK so data, you don't have money to buy data...

Amos: You can make those apps free.

Researcher: Sorry?

Amos: You can make these apps free.

Researcher: OK.

Tee: And educate people about technology. Because I feel like people don't know about the technology. So if they would be more educated, and tell them about it, introduce technology to people, then maybe...

Alonzo: So they can understand like the basics.

All in agreement: Exactly!!!.

Tee: So that they can understand.

Amos: They need to introduce, technological stuff from primary and stuff.

Researcher: So on the level of organisation how does, uhm, okay are we done with individual? Cultural, so how does that affect in the cultural aspect and while you are thinking of that look at other aspects also. On the cultural aspect. Zulu, Xhosa, Twsana, Sotho… from your culture, how does that affect skills development. Is there anything that the culture will tell you like "don't use this, don't use that because...". On the technological part on getting skills and employment how does that… is there any cultural barrier to an individual getting skills or learning certain skills?

Alonzo: Uhhh, in a way I think it is, like im not sure like, okay maybe back in the days. Maybe woman like in a way, they were not allowed to like go to school, you know what I mean like they would be like, OK be in the kitchen and such stuff, you know like yeah like something like that. But nowadays I feel like it's more free yeah anyone can actually... It's freer than what it used to be.

Researcher: OK. Or the kind of skills you have to learn as a woman or as a man. Is there anything on that?

Luzu: I'm thinking in terms of fashion. Like when your wife, in many cultures, you're not allowed to wear certain clothes. So if ever you're interested in fashion designing, most people believe that if you make something you gotta show it by yourself. If you are creating a certain thing, a certain brand of a trouser or of a T-shirt you gotta wear it. So sometimes it's difficult for black, for us black people wives who are special to design a top. Maybe a top wrap and end up not wearing it. And if ever you introducing her back in the village and know I have designed these for these people and I know you are making our children look as prostitutes. You know? Because this is not normal to us you know? So it, it, it blocks us somehow.

Researcher: So you're kind of saying mostly in the creative Industry, there's a lot of cultural barriers to that.

All: Yeah. Yeah.

Researcher: OK, and if I may ask, uhm, how does your parents… I want to just ask a question, because I know my own parents, well not my parents but from the background, I'm coming from, how do they feel when it comes to you being a dancer or a musician. Or an actor?

(Deep sigh from the youths)

Luzu: That's not useful to your life.

Researcher: It's not useful?

All: Yes, there's no money there.

Researcher: But there's actually a lot of money in it.

Tee: There is a lot of money!

Amos: They don't understand that.

Researcher: They don't see it.

All: Yeah they don't.

Luzu: We gotta make them see it. How it works.

Researcher: Mmmm. So that's the question, how do you make them see it? So individual, then also cultural from the family and then and also cultural from society, right? Am I missing something else? So especially on this part , it's more on the creative, creative skills. That's interesting. Uhm, in the next fifteen minutes I want us to run through this so we can take a break after 15 minutes and then come back. Uhm, okay so on the family level, remember it's not everything that must be, but you just need to really, they just be sure that we really really looked at them, okay we don't need to tick on every one. On the family, is there anything on the physical? And physical also could mean also where you stay. Where your family stays, where your family is from, does that really have any correlation to unemployment, poverty and skills development?

Luzu: Yeah it does. If you, if you want to get a job maybe… like me, I have no one living in Cape Town, so all of my family were living in the Eastern Cape. But more chances are where? Are in Cape Town and in the Western Cape. In the Eastern Cape, they are limited. So one member decided to move from one province to another. And then when I came here I found out there are many more opportunities here than back

home. So If ever your have family members are in different locations it allows you to explore and learn new things.

Researcher: Can I ask you a follow-up question if you don't mind?

Luzu: Yeah.

Researcher: Okay, when you came down to Cape Town did you find more opportunities for yourself, not for your family members or you, yourself as an individual.

Luzu: Yeah.

Researcher: And what do you currently do if I may ask?

Luzu: Currently do? I just got an internship or a learnership.

All Laughing

Researcher: Why are you all laughing?

Ria: It's an internship.

Luzu: I got an internship of a business administrator.

Researcher: Okay. When did you come in to Cape Town?

Luzu: At the beginning of the year.

Researcher: This year?

Luzu: Yeah.

Researcher: Okay. And when you came to Cape Town, you came to Mfuleni?

Luzu: Yeah, straight to Mfuleni.

Researcher: And that's when you started this?

Luzu: Yeah.

Andy: In terms of the employment, uhhh, your background does play a role. OK I'll give you a job whereby you have to Handle a lot of money, and then when I look into your background I find OK, Amos is used to, like he comes from a family that has money, so he's used to handling money. And then in the other hand Ori let's say he comes from a poor family, they're not used to handling money. So I prefer having Amos, because Amos is used to handling money as compared to Ori.

Researcher: Have you experienced that before? Or have you had anyone not you, but had someone...

Andy: Yeah I've had someone.

Researcher: That's interesting. yes I get your point on that, yeah. Yeah. I get your point on that and it's noted. So where you come from actually affects....

Rea: I disagree.

Researcher: You disagree?

Rea: Because uhm, based on what he said, he said he's from the Eastern Cape and then he came here and found opportunities. I'm from Johannesburg, there are so many

opportunities in Johannesburg. I didn't find any opportunity. I came here and found those opportunities so, backgrounds doesn't matter. I think this thing goes with luck. I don't know.

Amos: With Eastern Cape, it is a different story.

Researcher: It's, it's okay, alright. That's her opinion, that's your opinion, okay and that's the beauty about it. Alright? So you're saying, "background doesn't matter from your family"?

Rea: Yes.

Researcher: And your opinion is, where you're also from, doesn't really matter? (*Rea nodded in affirmation*) And you're saying otherwise? And you. Any other person's opinion?

Amos: I agree with Luzu because I'm come also from the Eastern Cape and opportunities (shook in head in meaning no opportunities).

Researcher: Okay. Is, is your family, okay, maybe I should get personal on you and you have the right not to answer, as you have signed. Uhm, is your family from a poor family also, are you from a poor family...?

Amos: Yes.

Luzu: Both of us.

All at once: All of us.

Researcher: I know why I am asking this question for record purposes, okay. In essence you're saying, you're from a place of opportunity but from a poor family, but you didn't get any opportunity.

Rea: Not poor poor poor.

All laughing

Researcher: Not a poor one but a disadvantaged.

Rea: Yes.

Researcher: You're also from a disadvantaged...

Luzu: Very disadvantaged.

Researcher: Okay. And, there was no opportunity. You found opportunity here?

Luzu: Yeah.

Researcher: So are you saying Cape Town has more opportunities than those places? Because I'm trying to understand...

Alonzo: Yes because I'm also from the Eastern Cape.
Tee: Eastern Cape does not have opportunities.

Researcher: But she's got opportunities.

Tee: She's from Johannesburg.

Luzu: Johannesburg and Eastern Cape are totally different places.

Researcher: Yes I understand but why I'm trying understand the complexity is...I don't know if you understand the complexity or what I'm trying to wrap my head around. She is from?

All: Joburg.

Researcher: Joburg, with opportunities, okay. You are from Eastern Cape with no opportunities. But she left a place of opportunities and got an opportunity here in Cape Town. You left a place of little/no opportunity and got a place… So what are those factors that have created that in the Western Cape? That's, I think that's the question...

Andy: Can I just quickly say something?

Researcher: Yes.

Andy: Between like Johannesburg and Cape Town, there is a big difference I would say... In Joburg, you need a lot of networks right? You need to know people in high places in order to get those opportunities. Yes there are a lot of opportunities but, it depends on who you know as compared to Cape Town.

Researcher: Okay, okay I think that has given me an insight. And is that true? You want to disagree again. I really like that. Well so what's your opinion on that?

Rea: Okay uhm, based on my experience, uh, there were learnerships at Joburg, I applied for them and some other learnerships they said they'll respond after two months and all that. And I was, okay also I applied at Regenisis business school in Sandton uh, and I went there only to find out that their college is a private college so they don't consider NSFAS, so I applied for uhm, for the scholarship in, what's this bank? Standard Bank. But then because my mom wasn't, was not working by that time the scholarship didn't approve. So I had to look for other opportunities, uhm. I looked uh online to find free online courses but then I couldn't find anything. That's when my aunt told me that there's Afrika Tikkun, that they offer 3 months course. That's when I came. I didn't know that Afrika Tikkun was also in Johannesburg. I found out that when I was here they said they have, they have five centres. And I was like "what?" Four centres are in Johannesburg and I came here.

Researcher: That was the next question I was about to ask.

Andy: It depends on who you know. Yebo?

Rea: It also depends on the information that you have.

Researcher: I think that's another addition that we have. I think I'll take that also, uhm. All what you all said, there is no right or wrong, it's your experience and that's the whole idea. And one thing I'm picking up from here is the information that the youths have is really critical.

Alonzo: Yeah. There's no information.

Researcher: You say no?

Amos: I agree.

Researcher: Okay, one thing I picked up is the information you have also because she's from Joburg, not knowing Afrika Tikkun is there. Information I think that is key. How many of you know about SEDA?

All: SEDA?

Researcher: S, E, D, A. So if you're asking, you don't know.

All laughing: Yeah we don't know.

Alonzo: I know from school.

Researcher: Okay, You know from school? TIA. Technology, innovation, uhhh, agency I think? Yeah.

Alonzo: I don't know.

Andy: I thought you said like in the movies, CIA.

Researcher: Okay, so that gives me my answer I'm looking for anyway.

Alonzo: Mr. Leuna...Can I ask like, she said, she's from Joburg a neh, and I feel like people that are from like, not from backgrounds like that are like very like privileged you know. Sometimes the information in terms of they don't know what they're searching for, like using technology. It's hard for someone that doesn't actually know "okay, what am I gonna type on Google" you know for scholarship or types of schools. Would that also be a link to technological in a way? Like there's no information.

Researcher: So that's the, this also. Well it's noted on how the information is dispersed.

Alonzo: Yeah. Because like, for people that are coming from disadvantageous background... like backgrounds that are not technological, like it's very hard to disperse technology in a way.

Researcher: Let me ask you guys, so who's responsibility is this?

All: Who? For what?

Researcher: The information.

All: It's ours.

Researcher: Yeah, so how do we get to letting you know.

Luzu: It's, I think it starts, it's start at high school. Because it starts, it, and let it everything, each and every level, primary school, secondary school and high school because us as youth we get to see the extent of life when we enter grade 11. And the you see you start asking yourself the questions, "where am I going?".

Researcher: So what you're say in essence is that the curriculum actually has issues?....

All: Should be changed

Tee: Overhaul the whole education system.

Researcher: So where do we put that now that in, is it individual, family or...

All: Organisation or government.

Researcher: So, the two okay?

All: Yeah it goes to the two.

Researcher: On psychological right? Yes.

All: Yeah.

Researcher: So let me just make notes. On this. Uhm, the education, education. I want to get your right words. Uhm, say that again. Uhm okay maybe I'll look at the recording again. Okay so education, organisation, education, policy and education curriculum. So they are linked. That's cool. Okay guys, I'll give you guys, 15 minutes break. Leg stretch and...

Researcher: Technological, is there any aspects of it that it affects skills development and unemployment with any of these aspects. I know we've look at the individual, but as a country, institution, or organisations. It does?

Rea: I don't know whether it falls under. So uh with technology improving all that uh, it tends to happen that more people are being retrenched for [instance] Standard Bank. Standard Bank just retrenched so many people. What if uh the person that was like…

Nonzie: Breadwinner

Rea: Okay, no we started from being a breadwinner. Let's say my dream job was to be a Standard Bank consultant, and now I'm being retrenched, I do have the qualifications and all that, technology is taking over. I have to go back and study something else. You see, so technology, it does have advantages and disadvantages at the same time.

Researcher: Hmm, maybe we'll make a note on that. Institutions, organisations, technology. How do we summarise what you've said? Put it in summary.

Rea: I would say technology tends to... people become unemployed because of (companies adoption of) technology. You have to find new skills and you have to learn new skills in order to survive out there, cause of technology, yah.

Luzu: It's a threat

Luzu: Uh, I think technology is there, there are a lot of things that technology provides and there are new things that are coming out that are helping. So for people like us who know nothing for the first thing that were invented. When the new things come up, it's too much for us, it is hard for us to catch up because we have to learn a lot. Because there's Word, there's Word 2010, there's Word 2013, there's Word 2016. And if you, if you don't know the Word 2010, how will you know 2016? It will be hard for you to use 2016. So I think we should slowly, easily, adapt into these things. Tell people you, like, because these things are a great deal.

Yola: I think it's about implementing it from a young age. Cause like, like the simplest thing for me, like with my phone, right? I had to go like, or I didn't have to go like, my dad had to get a new phone, he didn't know how to use the phone. So now it's like me, I'm frustrated teaching him how to use the new phone because it's so easy to me. But to him it's something completely new. So it's like if you were able to like implement it from a young age where it's like, okay, as things develop we are developing with the products rather than I have to play catch up now.

Researcher: So introduction of technology, early introduction, early adoption or introduction. And that should affect, um, the curriculum, right?

Alonzo: Yah so like there is a correlation between institutes and, uh, technology yeah.

Researcher: And so back and forth. So I've taken note of what you said that, uh, that you've talked about. Is there any other thing? Um, organisation, family, cultural, psychological, economy, political, um.

Yola: Well with family, you can introduce both material and cultural deprivation, cause uh, like with cultural deprivation talk about like what they were saying before about opportunity. So it's like, I don't it's like the more you know from outside of school, the more you're able to do in essence, like the more you know about like, I don't know, other people's cultures, it's easier for you to adapt in certain situations and circumstances. Like, um, was it my cousin finished studying at Rhodes University. But then through cultural, what, well cause he didn't have cultural deprivation, he had the other, the opposite of it rather. Um, he, well his friend's dad, law firm connections were made, now he has a job. Do you know what I mean? Some people don't have that kind of access within cultural deprivation. And then material, material deprivation is a lack of resources to then grow yourself. It's like if you don't have access to what it is that you need to then gain skills, or your parents can't afford, or like your living situation doesn't accommodate for your like a good learning environment. It just doesn't help in any way.

Researcher: Okay noted. I'll take that in. And family psychological and possibly family physical, cause we've talked about that already in economic part, okay, and we've talked about that on the cultural. So where you're from as a family really plays a huge role. That's what you guys are saying.

Luzu: Yeah it does.

Researcher: Okay, so is there anything missing? I see we still have the planet very empty.

Researcher: Let me just, rather than saying the planet, let's say the world. Maybe that will give you a different context.

Yola: With the world, in terms of economical people think giving aid to countries is a better way than teaching them.

Alonzo: Oh, like okay I get where she's coming from. In terms of like, let's say there's like a natural disaster in a way. With the resources that the first world countries give to poor [developing] countries, more like how can they help them maybe implement technologies to avoid disasters. I don't know but like bringing technology in a way that can prepare you, you know, to have an awareness. Like for example in USA they have thing's to track tornadoes and the likes.

Researcher: And that informs them before the time.

Alonzo: Yes. I feel like if us, like those poor countries, if they can have something similar in a way, you know, like a tropical cyclone, something that can be an aware, so at least a country's able to like I dunno, like I don't know, improve in a way.

Researcher: Should it go to economy? Technological. So technology is information, right?

Group: Yeah information, yeah that's what he's saying yeah.

Researcher: Okay that's what you're saying, information. And biological?

Yola: I think because they're linked together, they combine together.

Researcher: Okay, okay, all right, I get you in that. And also ecological.

Yola: But what I am saying on the economical side is just people think giving people aid is solving the problem, but you're just putting a bandage on the problem. Rather teach people how to do, than give them. Like you know the whole saying of, you know, if you teach a man how to fish, he'll have fish for the rest of his life, but if you just give them the fish, he won't. You know what I mean?

Luzu: Take much time to rest. Like they're given the chance to do nothing and then let the other person do everything for you, so they lose interest.

Alonzo: But it's also the same in terms of some schools, you know. Like some schools when they're studying, it's all about what is in the book, you know. They don't really have something practical in a way, you know, like how to experience it, like similar in the industry in a way. Like what are the first world countries are doing in a way, I don't know.

Researcher: I get you in that. I will go more with the video, because it is now becoming overwhelming to write them. Um, I really liked that point in this way because how do you. Well, if we also think about this guys, if we say we want to stop giving people the fish, but rather teach them to fish. The question is what if they die hungry before they learn how to fish.

Yola: But that's the thing you have to teach them how to, instead of just giving them the fish.

Researcher: You giving them the fish, and also teaching them?

Alonzo: Yeah implementing the skills.

Researcher: Okay. So two of them, giving and teaching. Okay. Any other thing we're missing? Let's look. So I see individual actually affects everything. Uhm, family, we've looked at physical, psychological, economical, um, yeah ecological okay, and cultural. Organisation, more on psychological and technological. And um, institutions the same way as government, especially more on the economic. Organisations, don't they actually affect economy?

Alonzo: Organisations is businesses hey?

Yola: What is organisations?

Researcher: Companies.

Alonzo: Oh. Yah they do. Like most businesses do contribute to the economy. Like through taxes and yeah.

Researcher: You're employed in some other companies, right? Yeah. So they definitely then should uhm. What extra role do you think they can play on the economical side.

Luzu: They are also contributing to politics, politically.

Alonzo: Political influence.

Researcher: Political influence. Well, how does that affect you as youth, on unemployment and skills development? How does that affect you as youth on unemployment? I mean this.

Luzu: Uh, in terms of the [companies influencing politicians], like let's stick to that strictly. Like for you as an individual it's like spoon-feeding one person instead of distributing the wealth amongst the whole. Just putting the, spoon-feeding the same company and then the, the company employs the same people, not the whole of the country, so in terms of poverty and hunger kills it. That's how I see it in my way.

Researcher: Okay. Noted. Any other person?

Alonzo: For me in terms of businesses, there's something called corporate social responsibilities. Yeah. I feel like more like the major players in terms of like the big businesses, they are encouraged to like take care of the environment, like more like the physical and the biological aspects, you know. So if we can find a way like CSR like, how can that help like with skill development, because for me, I don't think it really helps, you know, long term, it's more like a short term type of thing, you know? Yeah. It's not really long term.

Luzu: Both of those them, the CSR and the CSI (corporate social investment). They work hand-in-hand. Because they can enter in terms of CSI in terms of technological, they are like… they have to give back, right? So they have to provide things, like we have in Afrika Tikkun because of these businesses, they giving back to the economy, so the increasing their BEE, triple BEE scores, which was introduced it by what? By the politics. So they much cooperate with the individuals who are on the political side.

Yola: In a way, I feel like if you dismantle the system, the three pieces like that you've created right. If you dismantled it and like, you can dismantle it to like then go to make it better. Cause I feel like everything is just, you syphoned into a system, the system may not work for you as an individual. And then in terms of like education, if you have like one type of education, it doesn't suit all. Like you need to diversify the manner in which you want to teach people cause people don't all learn the same. Does that make sense?

Alonzo: Oh like I get what you mean. Like there are slow learners, people that slow learn, then there's the fast learners. Is that what you're trying to say?

Yola: Ya, like there's people that learn through doing, through hearing, through seeing.

Alonzo: Oh and via like practicals, oh okay I get you. Like type of learner.

Researcher: So how people learn actually affects skills development, if that is not taken into consideration. Okay so, well we've also ticked that.

Yola: And then for family, I would put also physiological because if now people are meant to be in education and they have to take care of individuals in their family, it's very restrictive. So if you had institutions that could do that at cheaper rates then that

would allow for people to then develop themselves into where they need to be, or what they want to be. And then also, when I put world or society in terms of culture cause there's some things that you look at and you're like, Oh that's a good job to do. And other things that are not so good to do.

Researcher: In society? Culture?

Yola: Yeah. So as in like, I don't know, like I don't know. I'm in between society and world.

Cause it's like in general the view of like said positions and roles within society.

Alonzo: Oh like the types of jobs. Oh you mean like some people don't like wanna clean or.

Luzu: Yah. I was going there because I heard someone saying that she visited in the United States and then there on the other side it is totally different from this side because there, most men stay at home and then look after the children and then women are the ones who go to work. Most anyway. And this side, in this side, we tend to go and work in women stay at home.

Researcher: So is that true though?

Luzu: It is changing now but, but mentality we believe both. Like me, in my home, I believe that if I get a wife, no wife of mine can work, I will supply. I will supply.

Researcher: Okay. Okay.

Luzu: So that, I think that, that cultural, not in terms of how you grow like the culture, how this place do things like the other, how things are operated.

Amos: It is our society.

Researcher: And that's why, yeah, that's why we need to understand our society and study our society and find solutions for our society, the way we reason. Okay because um, that's why we're doing this, don't just go get what is from Europe or from anywhere and try to implement it here. So let's find solutions for ourselves, right here in South Africa. So it's three on the dot and I don't want to exeed that. So we didn't do the other part. You said?

Group: I didn't feel that. Yah I also didn't feel that.

Researcher: That's the fun about design thinking. When you're doing things with design, it has to be fun. But the main part of it is the brainstorming that everyone brings into the room, bringing your energy. And that's a whole idea about collaboration. If it's an individual thing, if I'm interviewing you, you will start looking at your time. Well, it's one hour, it's two hours, and this guy is still talking, or three hours. Okay so, and that's the whole idea that collaboration brings in. Okay, and that's where we are going to end.

APPENDIX E: ANALYSED DATA WITH ATLAS.TI

Project: PHD Thesis

Code Report

All (25) codes

○ Automation of jobs (Fear of technology taking over jobs)

4 Quotations:

2:83 I would say technology tends to... people become unemployed because of…… (38903:39127) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I would say technology tends to... people become unemployed because of (companies adoption of) technology. You have to find new skills and you have to learn new skills in order to survive out there, cause of technology, yah.

2:84 It's a threat (39136:39150) - D 2: Responses Analysis and Chp 5 for Atlas Ti

It's a threat

2:85 So uh with technology improving all that uh, it tends to happen that m…… (38168:38344) - D 2: Responses Analysis and Chp 5 for Atlas Ti

So uh with technology improving all that uh, it tends to happen that more people are being retrenched for [instance] [Bank's name withheld]. [Bank's name withheld] just retrenched so many people.

2:86 Let's say my dream job was to be a [Bank's name withheld] consultant, and now I…… (38457:38746) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Let's say my dream job was to be a [Bank's name withheld] consultant, and now I'm being retrenched, I do have the qualifications and all that, technology is taking over. I have to go back and study something else. You see, so technology, it does have advantages and disadvantages at the same time.

○ Corruption and greed

6 Quotations:

2:26 , I think our leaders, they are corrupt. And that goes back to not get…… (15971:16120) - D 2: Responses Analysis and Chp 5 for Atlas Ti

, I think our leaders, they are corrupt. And that goes back to not getting enough ways to do our jobs. And we don’t have skills enough based on that.

2:27 I think we should just start with the word corruption or greediness (14294:14361) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I think we should just start with the word corruption or greediness

2:28 The same company gets the tenders, the same company, so the other comp…… (15285:15374) - D 2: Responses Analysis and Chp 5 for Atlas Ti

The same company gets the tenders, the same company, so the other companies are suffering.

2:105 They are also contributing to politics, politically. (49163:49214) - D 2: Responses Analysis and Chp 5 for Atlas Ti

They are also contributing to politics, politically.

2:106 Political influence. (49226:49245) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Political influence.

2:107 Like for you as an individual it's like spoon-feeding one person inste…… (49527:49849) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Like for you as an individual it's like spoon-feeding one person instead of distributing the wealth amongst the whole. Just putting the, spoon-feeding the same company and then the, the company employs the same people, not the whole of the country, so in terms of poverty and hunger kills it. That's how I see it in my way.

○ Cost of living

1 Quotations:

2:33 for individual and family it could be the cost of living like inflatio…… (20964:21126) - D 2: Responses Analysis and Chp 5 for Atlas Ti

for individual and family it could be the cost of living like inflation. So if inflation is high it's difficult for families, you know, to get their basic needs.

○ Cost of transportation (to areas where there are possible job opportunities e.g. to Cape Town CBD)

3 Quotations:

2:4 I think general mobility. Like your ease to get from where you live to…… (4013:4099) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I think general mobility. Like your ease to get from where you live to where you work.

2:5 It may cost them too much money. (4260:4293) - D 2: Responses Analysis and Chp 5 for Atlas Ti

It may cost them too much money.

2:6 that's why they ask where you stay because, they're trying to find out…… (4533:4929) - D 2: Responses Analysis and Chp 5 for Atlas Ti

that's why they ask where you stay because, they're trying to find out the amount they're going to pay you will not be allocated to the whole transportation from one place to another. They cannot employ you if you use maybe, let's say maybe pay you R2000 and you use R1500 round for transportation. So, it's more like you're working for transport so they decide to say "no, we cannot employ you".

○ Cultural influences

11 Quotations:

2:53 maybe back in the days. Maybe woman like in a way, they were not allow…… (25508:25834) - D 2: Responses Analysis and Chp 5 for Atlas Ti

maybe back in the days. Maybe woman like in a way, they were not allowed to like go to school, you know what I mean like they would be like, OK be in the kitchen and such stuff, you know like yeah like something like that. But nowadays I feel like it's more free yeah anyone can actually... It's freer than what it used to be.

2:54 in terms of fashion. Like when your wife, in many cultures, you're no…… (25966:26689) - D 2: Responses Analysis and Chp 5 for Atlas Ti

in terms of fashion. Like when your wife, in many cultures, you're not allowed to wear certain clothes. So if ever you're interested in fashion designing, most people believe that if you make something you gotta show it by yourself. If you are creating a certain thing, a certain brand of a trouser or of a T-shirt you gotta wear it. So sometimes it's difficult for black, for us black people wives who are special to design a top. Maybe a top wrap and end up not wearing it. And if ever you introducing her back in the village and know I have designed these for these people and I know you are making our children look as prostitutes. You know? Because this is not normal to us you know? So it, it, it blocks us somehow.

2:55 That's not useful to your life. (27140:27170) - D 2: Responses Analysis and Chp 5 for Atlas Ti

That's not useful to your life.

2:56 There is a lot of money! (27305:27328) - D 2: Responses Analysis and Chp 5 for Atlas Ti

There is a lot of money!

2:57 Yes, there's no money there. (27211:27239) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Yes, there's no money there.

2:58 They don't understand that. (27338:27364) - D 2: Responses Analysis and Chp 5 for Atlas Ti

They don't understand that.

2:59 We gotta make them see it. How it works. (27432:27473) - D 2: Responses Analysis and Chp 5 for Atlas Ti

We gotta make them see it. How it works.

2:117 . I was going there because I heard someone saying that she visited in…… (53060:53421) - D 2: Responses Analysis and Chp 5 for Atlas Ti

. I was going there because I heard someone saying that she visited in the United States and then there on the other side it is totally different from this side because there, most men stay at home and then look after the children and then women are the ones who go to work. Most anyway. And this side, in this side, we tend to go and work in women stay at home.

2:118 It is changing now but, but mentality we believe both. Like me, in my h…… (53470:53632) - D 2: Responses Analysis and Chp 5 for Atlas Ti

It is changing now but, but mentality we believe both. Like me, in my home, I believe that if I get a wife, no wife of mine can work, I will supply. I will supply.

2:119 how this place do things like the other, how things are operated. (53752:53817) - D 2: Responses Analysis and Chp 5 for Atlas Ti

how this place do things like the other, how things are operated.

2:120 It is our society. (53825:53843) - D 2: Responses Analysis and Chp 5 for Atlas Ti

It is our society.

○ Demotivation/discouraged to do anything including applying for jobs

2 Quotations:

2:7 We'll just say "no, I was unfit" or something like "they don't like me…… (4999:5105) - D 2: Responses Analysis and Chp 5 for Atlas Ti

We'll just say "no, I was unfit" or something like "they don't like me. So, that's one thing I discovered.

2:103 they're given the chance to do nothing and then let the other person d…… (47278:47391) - D 2: Responses Analysis and Chp 5 for Atlas Ti

they're given the chance to do nothing and then let the other person do everything for you, so they lose interest.

○ Educational system and curriculum challenges

7 Quotations:

2:80 I think it starts, it's start at high school. Because it starts, it, a…… (36804:37122) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I think it starts, it's start at high school. Because it starts, it, and let it everything, each and every level, primary school, secondary school and high school because us as youth we get to see the extent of life when we enter grade 11. And the you see you start asking yourself the questions, "where am I going?".

2:81 at you’re say in essence is that the curriculum actually has issues?..…… (37143:37239) - D 2: Responses Analysis and Chp 5 for Atlas Ti

What you’re saying in essence is that the curriculum actually has issues?....

All: Should be changed

2:82 Overhaul the whole education system. (37247:37284) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Overhaul the whole education system.

2:108 And then in terms of like education, if you have like one type of educ…… (51468:51676) - D 2: Responses Analysis and Chp 5 for Atlas Ti

And then in terms of like education, if you have like one type of education, it doesn't suit all. Like you need to diversify the manner in which you want to teach people cause people don't all learn the same.

2:111 Like there are slow learners, people that slow learn, then there's the…… (51738:51821) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Like there are slow learners, people that slow learn, then there's the fast learners

2:112 like there's people that learn through doing, through hearing, through…… (51871:51949) - D 2: Responses Analysis and Chp 5 for Atlas Ti

like there's people that learn through doing, through hearing, through seeing.

2:113 nd via like practicals, oh okay I get you. Like type of learner. (51964:52028) - D 2: Responses Analysis and Chp 5 for Atlas Ti

and via like practicals, oh okay I get you. Like type of learner.

○ Effects of global warming and natural disasters

1 Quotations:

2:13 Yes, those greenhouse gasses. They tend to have a high tendency of hea…… (9540:10314) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Yes, those greenhouse gasses. They tend to have a high tendency of heat which causes global warming in the country. Global warming means that temperatures are rising. And when temperatures are rising we have uhm...okay rain tends not to fall regularly in particular. Yeah. So yeah, it affects the farmers. And when it affects the farmers sometimes they

experience floods and all that. When the floods happen what happened to the farmers? Their yield gets destroyed or the infrastructure let's say like, here in Afrika Tikkun their infrastructure gets destroyed, so which means there will be unemployment. Uhm, let's say The whole apartment was not insured. If it was not insured which means people will not be able to come back to work. The unemployment rate will go high.

○ Financial challenges

3 Quotations:

2:70 also I applied at Regenisis business school in Sandton uh, and I went…… (33869:34108) - D 2: Responses Analysis and Chp 5 for Atlas Ti

also I applied at [institution's name withheld] business school in Sandton uh, and I went there only to find out that their college is a private college so they don't consider NSFAS, so I applied for uhm, for the scholarship in, what's this bank? [Bank's name withheld]

2:114 if now people are meant to be in education and they have to take of in…… (52248:52367) - D 2: Responses Analysis and Chp 5 for Atlas Ti

if now people are meant to be in education and they have to take care of individuals in their family, it's very restrictive.

2:115 So if you had institutions that could do that at cheaper rates then th…… (52368:52541) - D 2: Responses Analysis and Chp 5 for Atlas Ti

So if you had institutions that could do that at cheaper rates then that would allow for people to then develop themselves into where they need to be, or what they want to be

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○ Government and organisations funding community developmental centres

2 Quotations:

2:109 o if we can find a way like CSR like, how can that help like with skil…… (50205:50408) - D 2: Responses Analysis and Chp 5 for Atlas Ti

o if we can find a way like CSR like, how can that help like with skill development, because for me, I don't think it really helps, you know, long term, it's more like a short term type of thing, you know

2:110 they have to give back, right? So they have to provide things, like we…… (50629:50851) - D 2: Responses Analysis and Chp 5 for Atlas Ti

they have to give back, right? So they have to provide things, like we have in Afrika Tikkun because of these businesses, they giving back to the economy, so the increasing their BEE, triple BEE scores, which was introduced

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○ Insufficient knowledge on the use of technology e.g. information search, use of internet and the web, etc smart phones

12 Quotations:

2:14 There are other functions of the technology in our phones, right? And…… (11632:12095) - D 2: Responses Analysis and Chp 5 for Atlas Ti

There are other functions of the technology in our phones, right? And then you can just go out on the streets, just for an example, take any body, any random person and ask them which apps do they actually use on their phones. It will only be WhatsApp, Facebook and their gallery and then they don't use the other apps, they don't know what they are for. They find them useless and stuff because they don't know what they are for. So people are not informed of it.

2:15 People don't know...like...people[don't] know what it is used for (12313:12379) - D 2: Responses Analysis and Chp 5 for Atlas Ti

People don't know...like...people[don't] know what it is used for

2:48 educate people about technology. Because I feel like people don't know…… (24452:24544) - D 2: Responses Analysis and Chp 5 for Atlas Ti

And educate people about technology. Because I feel like people don't know about the technology.

2:49 So if they would be more educated, and tell them about it, introduce t…… (24546:24646) - D 2: Responses Analysis and Chp 5 for Atlas Ti

So if they would be more educated, and tell them about it, introduce technology to people, then maybe

2:50 So they can understand like the basics. (24661:24700) - D 2: Responses Analysis and Chp 5 for Atlas Ti

So they can understand like the basics.

2:51 So that they can understand. (24742:24770) - D 2: Responses Analysis and Chp 5 for Atlas Ti

So that they can understand.

2:52 They need to introduce, technological stuff from primary and stuff. (24779:24846) - D 2: Responses Analysis and Chp 5 for Atlas Ti

They need to introduce, technological stuff from primary and stuff.

2:77 I feel like people that are from like, not from backgrounds like that…… (35871:36219) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I feel like people that are from like, not from backgrounds like that are like very like privileged you know. Sometimes the information in terms of they don't know what they're searching for, like using technology. It's hard for someone that doesn't actually know "okay, what am I gonna type on Google" you know for scholarship or types of schools.

2:79 Because like, for people that are coming from disadvantageous backgrou…… (36414:36588) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Because like, for people that are coming from disadvantageous background... like backgrounds that are not technological, like it's very hard to disperse technology in a way.

2:87 I think technology is there, there are a lot of things that technology…… (39828:40348) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I think technology is there, there are a lot of things that technology provides and there are new things that are coming out that are helping. So for people like us who know nothing for the first thing that were invented. When the new things come up, it's too much for us, it is hard for us to catch up because we have to learn a lot. Because there's Word, there's Word 2010, there's Word 2013, there's Word 2016. And if you, if you don't know the Word 2010, how will you know 2016? It will be hard for you to use 2016.

2:88 I think it's about implementing it from a young age. Cause like, like…… (42862:43100) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I think it's about implementing it from a young age. Cause like, like the simplest thing for me, like with my phone, right? I had to go like, or I didn't have to go like, my dad had to get a new phone, he didn't know how to use the phone.

2:89 So it's like if you were able to like implement it from a young age wh…… (43245:43430) - D 2: Responses Analysis and Chp 5 for Atlas Ti

So it's like if you were able to like implement it from a young age where it's like, okay, as things develop we are developing with the products rather than I have to play catch up now.

○ Jobs seen as demeaning

1 Quotations:

2:116 there's some things that you look at and you're like, Oh that's a good…… (52612:52739) - D 2: Responses Analysis and Chp 5 for Atlas Ti

there's some things that you look at and you're like, Oh that's a good job to do. And other things that are not so good to do.

○ Lack of information on funding and opportunities

6 Quotations:

2:71 I had to look for other opportunities, uhm. I looked uh online to find…… (34206:34330) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I had to look for other opportunities, uhm. I looked uh online to find free online courses but then I couldn't find anything

2:72 my aunt told me that there's Afrika Tikkun, that they offer 3 months c…… (34345:34652) - D 2: Responses Analysis and Chp 5 for Atlas Ti

my aunt told me that there's Afrika Tikkun, that they offer 3 months course. That's when I came. I didn't know that Afrika Tikkun was also in Johannesburg. I found out that when I was here they said they have, they have five centres. And I was like "what?" Four centres are in Johannesburg and I came here.

2:74 It also depends on the information that you have. (34765:34815) - D 2: Responses Analysis and Chp 5 for Atlas Ti

It also depends on the information that you have.

2:75 Yeah. There's no information. (35120:35149) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Yeah. There's no information.

2:76 I agree. (35184:35192) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I agree.

2:78 Like there’s no information. (36273:36303) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Like there’s no information.

○ Lack of practical learning

5 Quotations:

2:94 people think giving aid to countries is a better way than teaching the…… (45608:45678) - D 2: Responses Analysis and Chp 5 for Atlas Ti

people think giving aid to countries is a better way than teaching them

2:96 so at least a country's able to like I dunno, like I don't know, impro…… (46381:46463) - D 2: Responses Analysis and Chp 5 for Atlas Ti

so at least a country's able to like I dunno, like I don't know, improve in a way.

2:97 people think giving people aid is solving the problem, but you're just…… (46901:47240) - D 2: Responses Analysis and Chp 5 for Atlas Ti

people think giving people aid is solving the problem, but you're just putting a bandage on the problem. Rather teach people how to do, than give them. Like you know the whole saying of, you know, if you teach a man how to fish, he'll have fish for the rest of his life, but if you just give them the fish, he won't. You know what I mean?

2:98 let's say there's like a natural disaster in a way. With the resources…… (45754:46077) - D 2: Responses Analysis and Chp 5 for Atlas Ti

let's say there's like a natural disaster in a way. With the resources that the first world countries give to poor [developing] countries, more like how can they help them maybe implement technologies to avoid disasters. I don't know but like bringing technology in a way that can prepare you, you know, to have an awareness

2:104 it's also the same in terms of some schools, you know. Like some schoo…… (47406:47676) - D 2: Responses Analysis and Chp 5 for Atlas Ti

it's also the same in terms of some schools, you know. Like some schools when they're studying, it's all about what is in the book, you know. They don't really have something practical in a way, you know, like how to experience it, like similar in the industry in a way.

○ Lack of resources – access to a platform to gain skills, internet and computers

5 Quotations:

2:46 Because we don’t have money. (24132:24161) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Because we don’t have money.

2:47 You can make those apps free. (24335:24363) - D 2: Responses Analysis and Chp 5 for Atlas Ti

You can make those apps free.

2:100 Most youths, especially in townships, they’re not, they don’t have acc…… (23871:23987) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Most youths, especially in townships, they’re not, they don’t have access to technology, to technological resources.

2:101 By making it available. (23810:23833) - D 2: Responses Analysis and Chp 5 for Atlas Ti

By making it available.

2:102 It’s not that, we don’t have data. (24038:24072) - D 2: Responses Analysis and Chp 5 for Atlas Ti

It’s not that, we don’t have data.

○ Lack of skills development facilities around rural areas

2 Quotations:

2:8 Also, I think, for instance, let’s say you stay in a rural area. There…… (5187:5348) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Also, I think, for instance, let’s say you stay in a rural area. There are no places that you can go for skills development, it’s hard to find places like those.

2:9 there are no places to even learn those skills. (5662:5709) - D 2: Responses Analysis and Chp 5 for Atlas Ti

there are no places to even learn those skills.

○ Lacking suitable skills and industrial technologies leading to employment (employing expatriates and exporting the raw materials to other countries)

1 Quotations:

2:12 Like here in South Africa, we all know that we are rich in minerals, b…… (7739:8276) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Like here in South Africa, we all know that we are rich in minerals, but we lack the resources (skills and machinery) to manufacture them. So we lack the skills to make [use of] these machines so most times we take people from the other countries and machines from other countries to manufacture these products. Or we export them from here to there because we do not have the necessary skills to manufacture them. And then people get unemployed because they don't know how to. They need to be taught. So that's how I see it affects us.

○ Material and cultural deprivation (Coming from low income households)

3 Quotations:

2:90 , I don't it's like the more you know from outside of school, the more…… (44080:44597) - D 2: Responses Analysis and Chp 5 for Atlas Ti

, I don't it's like the more you know from outside of school, the more you're able to do in essence, like the more you know about like, I don't know, other people's cultures, it's easier for you to adapt in certain situations and circumstances. Like, um, was it my cousin finished studying at Rhodes University. But then through cultural, what, well cause he didn't have cultural deprivation, he had the other, the opposite of it rather. Um, he, well his friend's dad, law firm connections were made, now he has a job.

2:91 It's like if you don't have access to what it is that you need to then…… (44782:45021) - D 2: Responses Analysis and Chp 5 for Atlas Ti

It's like if you don't have access to what it is that you need to then gain skills, or your parents can't afford, or like your living situation doesn't accommodate for your like a good learning environment. It just doesn't help in any way.

2:92 Yeah it does. (45328:45341) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Yeah it does.

○ Misuse of public funds (through corruption and greed)

6 Quotations:

2:17 if one party fails to produce more jobs or, if one party fails to, to…… (14639:14808) - D 2: Responses Analysis and Chp 5 for Atlas Ti

if one party fails to produce more jobs or, if one party fails to, to use the money that is, is, is meant to be used to create jobs, that will lead me not to be employed.

2:18 that in the whole country that there was one billion that was allocate…… (14833:15162) - D 2: Responses Analysis and Chp 5 for Atlas Ti

that in the whole country that there was one billion that was allocated to create jobs like, we are meant to build a mall. So one would say I would not invest my funds in this country in terms of the whole planet as a whole. So the economy will not be in a, in a, in a better position because people will not want to invest in us.

2:19 businesses will not be able to make funds because the money is used by…… (15177:15374) - D 2: Responses Analysis and Chp 5 for Atlas Ti

businesses will not be able to make funds because the money is used by the same company each and every day. The same company gets the tenders, the same company, so the other companies are suffering.

2:20 So they fail to come up with more funds and employ other people. (15474:15538) - D 2: Responses Analysis and Chp 5 for Atlas Ti

So they fail to come up with more funds and employ other people.

2:25 Like they don’t deliver the resources (16686:16723) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Like they don’t deliver the resources

2:31 So it’s just, when that tax money is taken, it’s not really invested b…… (19970:20213) - D 2: Responses Analysis and Chp 5 for Atlas Ti

So it’s just, when that tax money is taken, it’s not really invested back into the community properly. Into the right areas, so to say. So then, it does affect like, an individuals, like chances when it comes to like, gaining employment rather.

○ Misuse of support grant

9 Quotations:

2:34 I also think on the family, the support grant that they get, they don'…… (21230:21337) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I also think on the family, the support grant that they get, they don't want to work because they're lazy.

2:35 Like some other peoples they.. (21417:21446) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Like some other peoples they..

2:36 because that leads to a lot of births. A lot of money is allocated to…… (22088:22164) - D 2: Responses Analysis and Chp 5 for Atlas Ti

because that leads to a lot of births. A lot of money is allocated to that

2:37 They keep giving birth each and every year, each and every year…. (22307:22373) - D 2: Responses Analysis and Chp 5 for Atlas Ti

They keep giving birth each and every year, each and every year….

2:38 I kind of feel like that grant money is more like a reward for having…… (22408:22486) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I kind of feel like that grant money is more like a reward for having a baby.

2:39 Exactly!!! (22495:22505) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Exactly!!!

2:40 Yes. (22256:22261) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Yes.

2:41 like what she just said, like, in terms of like the money is allocated…… (23042:23538) - D 2: Responses Analysis and Chp 5 for Atlas Ti

like what she just said, like, in terms of like the money is allocated the child like the basic needs of the child. Like the child needs A, B and C. If the government could stop providing funds and providing the items for that person, maybe that could work because, they say two childs (sic), that's close to R1000 but, if ever their clothes, if you're saying we need uh, one

bottle of milk we're going to buy for you and then give it to you so that it would decrease the demand of this money....

2:42 Why don't the government give a stipend for you maybe if you pass matr…… (22512:22944) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Why don't the government give a stipend for you maybe if you pass matric and they promise you maybe R2000? They give you R2000 so that you can be able to find your feet after matric because we know how difficult life is after matric especially in South Africa. So I feel like maybe if there was that money (is rechannelled) so that you can maybe find your feet and see where you going. Instead of giving out R490 per child every month.

○ Nepotism in getting a job

5 Quotations:

2:24 Like I feel like it would have been simpler if there maybe was two. Th…… (16320:16685) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Like I feel like it would have been simpler if there maybe was two. Then maybe they would know either vote for this one or vote for this one. But now there's more so, a political party will favour it's people obviously. So, and we know that uhm, there's a political party, here in South Africa that doesn't favour its people but, they still continue to vote for it.

2:67 Between like Johannesburg and Cape Town, there is a big difference I w…… (33201:33499) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Between like Johannesburg and Cape Town, there is a big difference I would say... In Joburg, you need a lot of networks right? You need to know people in high places in order to get those opportunities. Yes there are a lot of opportunities but, it depends on who you know as compared to Cape Town.

2:68 based on my experience, uh, there were learnerships at Joburg, I appli…… (33685:33850) - D 2: Responses Analysis and Chp 5 for Atlas Ti

based on my experience, uh, there were learnerships at Joburg, I applied for them and some other learnerships they said they'll respond after two months and all that

2:73 It depends on who you know. (34724:34750) - D 2: Responses Analysis and Chp 5 for Atlas Ti

It depends on who you know.

2:107 Like for you as an individual it's like spoon-feeding one person inste…… (49527:49849) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Like for you as an individual it's like spoon-feeding one person instead of distributing the wealth amongst the whole. Just putting the, spoon-feeding the same company and then the, the company employs the same people, not the whole of the country, so in terms of poverty and hunger kills it. That's how I see it in my way.

○ Not earning [stable] income

2 Quotations:

2:46 Because we don’t have money. (24132:24161) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Because we don’t have money.

2:69 But then because my mom wasn’t, was not working by that time the schol…… (34111:34201) - D 2: Responses Analysis and Chp 5 for Atlas Ti

But then because my mom wasn’t, was not working by that time the scholarship didn’t approve

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○ Physiological challenges and needs

4 Quotations:

2:3 You cannot be creative [think of finding ways to upskill or perform at…… (3532:3801) - D 2: Responses Analysis and Chp 5 for Atlas Ti

You cannot be creative [think of finding ways to upskill or perform at best] while you are hungry so, I think there is a collaboration between the two because your skills will not be 100 percent accurate and then, people may not want to employ you because you are unfit.

2:11 People tend to judge you on the way you look, let’s say it’s a little…… (6212:6471) - D 2: Responses Analysis and Chp 5 for Atlas Ti

People tend to judge you on the way you look, let’s say it’s a little bit difficult for someone with one arm. And then they someone else with two arms and they tend to think “no you can’t do the job because you only have one arm”, and then you lack somewhere.

2:21 it is hard for them to buy things for themselves, to employ securities…… (15577:15722) - D 2: Responses Analysis and Chp 5 for Atlas Ti

it is hard for them to buy things for themselves, to employ securities for around the community, around the community so that they could be safe.

2:22 it leads to crime because people are hungry they need something to eat…… (15733:15804) - D 2: Responses Analysis and Chp 5 for Atlas Ti

it leads to crime because people are hungry they need something to eat.

○ Psychological manipulation through propaganda

1 Quotations:

2:30 they see the problems, and they know what we need, so one breaks from…… (17565:17887) - D 2: Responses Analysis and Chp 5 for Atlas Ti

they see the problems, and they know what we need, so one breaks from this party and forms his own party and then says “I know you want this. Vote for me, I will do it.” Because he knows the exact thing. He knows our minds. What we want in order for us to survive. So they give us the right words and then we vote for them.

○ Shortage of opportunities in rural/township areas

8 Quotations:

2:10 And there are also no jobs (5711:5736) - D 2: Responses Analysis and Chp 5 for Atlas Ti

And there are also no jobs

2:60 I have no one living in Cape Town, so all of my family were living in…… (28405:28754) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I have no one living in Cape Town, so all of my family were living in the Eastern Cape. But more chances are where? Are in Cape Town and in the Western Cape. In the Eastern Cape, they are limited. So one member decided to move from one province to another. And then when I came here I found out there are many more opportunities here than back home.

2:61 So If ever your have family members are in different locations it allo…… (28756:28866) - D 2: Responses Analysis and Chp 5 for Atlas Ti

So If ever your have family members are in different locations it allows you to explore and learn new things.

2:62 I disagree. (30489:30501) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I disagree.

2:63 based on what he said, he said he's from the Eastern Cape and then he…… (30551:30865) - D 2: Responses Analysis and Chp 5 for Atlas Ti

based on what he said, he said he's from the Eastern Cape and then he came here and found opportunities. I'm from Johannesburg, there are so many opportunities in Johannesburg. I didn't find any opportunity. I came here and found those opportunities so, backgrounds doesn't matter. I think this thing goes with luck

2:64 With Eastern Cape, it is a different story. (30892:30935) - D 2: Responses Analysis and Chp 5 for Atlas Ti

With Eastern Cape, it is a different story.

2:65 I agree with Luzu because I'm come also from the Eastern Cape and oppo…… (31325:31451) - D 2: Responses Analysis and Chp 5 for Atlas Ti

I agree with Luzu because I'm come also from the Eastern Cape and opportunities (shook in head in meaning no opportunities).

2:66 Eastern Cape does not have opportunities. (32390:32431) - D 2: Responses Analysis and Chp 5 for Atlas Ti

Eastern Cape does not have opportunities.