The identification of contextually relevant health and well-being information needs for the youth through Human-Centered Co-Design.

by

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DECLARATION

I, Janet Ellen Rademan, 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.

Signed **Date**

ABSTRACT

Available health and well-being information is limited in communities with insufficient health care resources. This affects the community negatively on multiple levels in which the health and well-being needs of individuals are not satisfied. This research project explored the impact of human centred co-design, using tools such as health and well-being needs questionnaires including a health needs assessment as well as a quality of life scale. The aim was making accurate health and well-being information more accessible to the youth. The target group was Durbanville youth aged between 14 and 18 years. The sample included different ages ($\bar{x}$ = 15), races (79% White, 21% Coloured) and near equal gender distribution (55% female, 45% male). The sample (N = 33) was comprised of three groups: Group A, B, and C. A Human-Centered Design (HCD) framework was used during the project referring to the following three steps: *Hear, Create*, and *Deliver.*

During the *Hear* phase, stories and inspiration from the participants were gathered. Group A (n = 10) completed a health and well-being information needs questionnaire. Group B (n = 15) discussed the topic, and created affinity diagrams. This was how the health and well-being status and information needs were established.

During the *Create* phase; frameworks, opportunities, solutions, and prototypes were developed by the participants. Group B co-designed the concept prototype: a possible mobile application solution for practical access to health and well-being information. Group C (n = 8) provided feedback and input on the concept prototype and created storyboards to visually display scenarios in which they would use the mobile application. This step produced a youth-friendly health and well-being information service concept prototype.

During the *Deliver* phase, the relevant health and well-being information solution was established as a youth-friendly health and well-being mobile application: **WeHelp**. Also, group A, B, and C were introduced to a similar existing resource named MobieG. Thus, the present study contributed directly to the participants' health and well-being awareness.

The research provided significant health and well-being insights. For example, the youth of Durbanville revealed extremely low scores on the emotional well-being domain. The data collected makes it possible for future researchers to create a practical, youth-friendly, health and well-being information service.

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PREFACE

Chapter 1 introduces the thesis, its aims and structure. This chapter provides the rationale for the current research project. The introduction contains a clear statement of the research questions, objectives and the aims of the research. It also briefly reviews the literature of the topic. The introduction also indicates how the current research contributes to the theoretical understanding of the topic.

In Chapter 2 the literature provides the basis for a background understanding into health and well-being challenges in resource-restricted settings. An overview of current initiatives aiming to resolve these issues are identified. Here too, a South African perspective on the health and well-being of the youth is identified. Lastly, a view of the risk factors affecting the population in need is recognised. The literature review demonstrates a broad understanding of previous research, including its limitations. The main viewpoints and important facts encountered during the research as it relates to the topic. The literature review justifies the value of doing research on the topic by showing what is already known, what is not yet known, and how it is relevant.

Chapter 3 focuses on the research methodology that was employed for this study. The quantitative and qualitative research methods used are discussed, as well as issues of rigour and relevance and how to ensure better quality in research.

The research design followed a Human-Centered Design (HCD) for social innovation approach. HCD is a process and a set of techniques used to create new solutions for communities (IDEO, 2015: 11). HCD is powerful for analysing and mapping the relational dynamics between individuals, settings, objects, and institutions. Co-design research (Bryman, 2012: 397) can broadly be defined as a process in which the action researcher and members of a community collaborate in the identification of a problem and in the development of a possible solution based on the diagnosis. Thus, the researcher becomes a part of the study.

In Chapter 4 the co-design research process and results are discussed. The outcome of the quantitative and qualitative questionnaire is explained, and how it led to focus group workshops, iterative development and feedback. By using questionnaires and multiple focus group workshops to collect data in the field, an explanatory research study of this establishes an understanding of the problem context. Here too, the methods of HCD is used to blueprint the youths' experience and journey so that an understanding of the users, environment and applicable technology can be identified. Co-design with the end-users will form the basis for technical and systemic innovation.

A sample in Durbanville (Western Cape) is the subject of the study. The motivation in this case is to be able to identify the health and well-being needs of the youth residing in Durbanville. The study consisted of three independent youth groups in Durbanville.

The levels of analysis span over some key areas, but mainly focuses on the youths' health and well-being needs. Units with which to analyse this level will be mixed; relying on questionnaires, personal accounts and experiences. Other key areas of analysis includes statistical analysis and thematic analysis.

Also, in Chapter 4, the results are interpreted through tabulating findings and seeking to establish relationships, similarities and differences. Here, meaning is extracted from the data which is used to answer the research questions.

Chapter 5 is a personal reflection on the lessons learnt.

Chapter 6 concludes the research with several elements including a brief summary, the conclusions which can be drawn from the research, why the research is important for researchers and practitioners, and recommendations for future research.

GLOSSARY

Terms	Definition
Youth:	14-18 years of age (for the purpose of the current study)
Health Information:	*"… all resources, organisations and actors that are involved in the regulation, financing, and provision of actions whose primary intent is to protect, promote or improve health"* (WHO, 2000: 1).
Health Needs Assessment:	Health needs assessment is an approach that helps researchers to provide services that tackle needs rather than just reacting to demands (WHO, 2011: 44).
Health Risk Factor:	Youth exposed to danger, harm, or loss. *"..an aspect of personal behaviour or lifestyle, an environmental exposure, or an inborn or inherited characteristic which on the basis of epidemiological evidence is known to be associated with health-related condition(s) considered important to prevent"* (Burt, 2001: 1007).
Reliability:	"*The degree to which a measure of a concept is stable*" (Bryman, 2012: 715).
Validity:	"*A concern with the integrity of the conclusions that are generated from research*" (Bryman, 2012: 717).

Acronyms	**Explanation**
GER:	Gross Enrolment
HCD:	Human Centered Design
NYP:	National Youth Policy
NYDA:	National Youth Development Agency
WHO:	World Health Organisation
WYR:	World Youth Report
NGO:	Non-governmental organization

Abbreviations	Explanation
eHealth/eHealth:	Electronic Health
mHealth/m-health:	Mobile Health

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CHAPTER ONE
INTRODUCTION

1.1 Introduction

Poor access to quality healthcare is one of the greatest barriers to the realization of basic health and well-being rights in South Africa (MiET, 2011: 4). As a big part of the population, young individuals are at the heart of the future of South Africa (NYDA, 2011). Insufficient health quality impacts negatively on educational access, retention and achievement of the youth in the country. Of particular concern is the access of youth to health and well-being information and services (Oxfam, 2007: 3). Therefore, it is important to consider how health and well-being services can be designed in a youth-friendly manner and to consider new models that may be successful in the South African context (Wegelin-Schuringa et al., 2014: 5). In present-day communities, the youth is asking for serviceable products without having difficulties in the whole process of delivery. Consequently it is essential to set the focus on the youth as end users during the complete design process (Hirschberger, 2011: 3).

As a wide array of health and well-being innovations enter the marketplace, a more proactive and empowered individual is emerging. An individual who can be more in control of their health and well-being (Rose, 2009: 4). These individuals have access to more information about their lifestyle choices and conditions, and a desire to share it with the broader community (PSFK, 2014: 3).

At the same time, the healthcare system is adopting better tools to ensure streamlined communications and a more efficient use of resources (Rose, 2009: 7). Information silos are moving to the cloud for universal access and sophisticated algorithms are making sense of this data to enable an individualised level of health and well-being care (Ryan-Nicholls & Racher, 2004: 244). The result is a new paradigm that views health care as an ongoing conversation between individuals and their extended network (Scales, 1999: 115).

It is important to design and promote contextually relevant health and well-being technology specific to the South African youth with the collaboration of communities in need of health and well-being assistance. A design method that works particularly well to achieve this collaboration is Human-centered Design (HCD). It relies on the ability to be intuitive and to recognize patterns, to construct ideas that are emotionally meaningful as well as functional, and to be expressive through means beyond words or symbols. HCD is a valued process used across industries and sectors (Jones, 1991).

HCD is a creative approach to problem solving and the backbone of the current project. It is a process that starts with the individuals the researcher is designing for and ends with new possible solutions that are tailor made to suit their needs (Abras et al., 2004: 447). These individuals are thus active participants throughout the whole design process. Participants (putative, potential or future) are invited to cooperate with designers, researchers and developers during the innovation process (Kurosu, 2011: 282). Potentially, they participate during several stages of an innovation process: they participate during the initial exploration and problem definition both to help define the problem and to focus ideas for solution, and during development, they help evaluate proposed solutions (Garrett, 2010).

1.2 Background to the research problem

Youths are at risk from an extremely broad range of health and well-being problems. The primary causes of death, disability, and disease among young South Africans is similar to young individuals in many other developing countries (Dickson-Tetteh & Ladha, 2000: 396).

To mention some distinct risks; the youth are at risk of physical and psychological trauma resulting from multiple problems such as sexual abuse, gender-based violence, and other forms of physical violence and accidents (Cho & Wilke, 2010: 395). Other important health and well-being risks include sexual and reproductive health disorders. Among these are sexually transmitted diseases (STDs), HIV/AIDS, unwanted pregnancies, and pregnancy related complications (Sprague et al., 2011: 1). South Africa has a number of characteristics that place the youth at risk for mental health and well-being problems, such as widespread poverty and familial disruptions (Smith, 2012: 3). Historically, alcoholism and substance abuse also poses as one of the most critical risks concerning the youth of South Africa (Kandal, 1980: 238).

Within the South African context, the research of Grootboom (2007: 130) highlights the perspective of South African youth and their future in South Africa, stating that they experience high levels of emotional stress as a result of crime, health issues, poverty and discrimination, and he adds that attention is needed in the area of mental and emotional health. Psychological health has many benefits that can add to the positive functioning of the disadvantaged youth in South Africa (Ungar, 2008: 220).

It is evident that there persists an urgent need for accessible health and well-being information conforming specifically to the youth of South Africa’s communities. The community identified as a focus area in this research project, is the youth community in Durbanville, Western Cape, South Africa. The reason for focusing on the Durbanville youth community can be linked to the lack of research available on the health and well-being of this group residing on farms, informal settlements and squatter camps.

The Durbanville census (2011) revealed the following information about the community: Durbanville is a town in the Western Cape province of South Africa, part of the greater City of Cape Town metropolitan area. Durbanville is a rural residential suburb on the northern outskirts of the metropolis and is surrounded by farms producing wine and wheat.

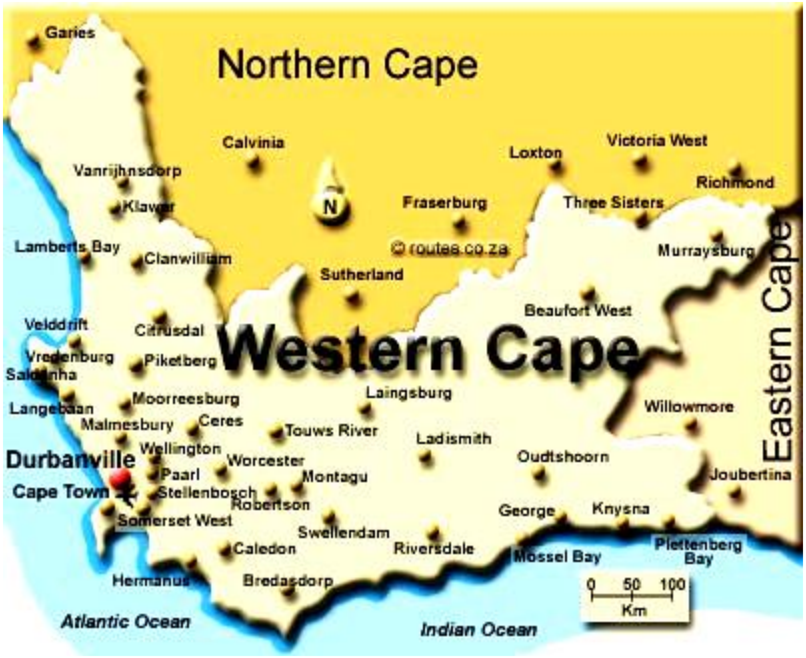

Fig 1.1. Durbanville geography
(SA Routes, 2005)

Afrikaans and English are the main languages spoken in Durbanville. In the past Afrikaans predominated culturally, but this has changed with the rapid development of the town. However, the majority of the town (58.94 %) still speak Afrikaans as a first language. The principal religion of the population is Christianity with a wide variety of churches in the community. The town has the following public high schools: Durbanville High (an Afrikaans medium school), Fairmont High (an English medium school), and Stellenberg High (an Afrikaans and English medium school). There are also numerous primary schools including: Durbanville Preparatory, Durbanville Primary, Eversdal Primary, Gene Louw Primary, and Kenridge Primary. Durbanville also has a number of private schools: Curro, Chesterhouse, and El Shaddai Christian School (Census, 2011).

According to the 2011 Census, the population of Durbanville was 54,286. The following tables show various demographic data about Durbanville:

Table 1.1: Gender

Gender	Population	%
Female	28 615	52.71%
Male	25 671	47.29%

Table 1.2: Ethnic Group

Group	Population	%
White	44 607	82.17%
Coloured	5 491	10.11%
Black African	2 995	5.52%
Indian/Asian	560	1.03%

Table 1.3: Home Language

Language	Population	%
Afrikaans	31 346	58.94%
English	19 803	37.24%
Xhosa	491	0.92%
Other African languages	752	1.39%
Other languages	732	1.38%

Durbanville is a community that can be targeted for HCD research, since health and well-being issues are highly prevalent among the youth (WYR, 2003: 6). The lack of medical resources and available health and well-being information may be a contributing factor to the vulnerability of this community's youth.

1.2.1 Delineation of the research

The present research will only investigate the health and well-being information needs of an age-specific youth group residing within Durbanville, including 33 participants. The study will focus on this one community; however further research may explore the findings of this study, in relation to those of other youth communities.

1.3 Statement of the research problem

It is essential to provide the youth with relevant health and well-being information. Health and well-being information is currently scarce in communities, such as Durbanville, where insufficient medical resources impact on the quality and distribution of contextually relevant health and well-being information. The apparent lack of health needs assessments and establishment of quality of life impact on the identification of the youth's health and well-being information needs. However, this could be addressed by designing or implementing alternative methods through participatory, co-design practice.

1.4 Aim, research questions and objectives

1.4.1. Aim

The aim is to design an intervention that will improve the youth's access to contextually relevant health and well-being information.

1.4.2. Main Research Question

What are the characteristics of a health and well-being information solution to address the health and well-being information needs of youth residing in resource-restricted settings?

1.4.3. Subsidiary Research Questions

a) How does Human Centered Co-design activities influence social research aimed at understanding the health and well-being needs of the youth?
b) What are the health and well-being information needs of age-specific youth groups residing in Durbanville?
c) How can design contribute to the development of an accessible, youth-friendly health and well-being information service?

1.4.4. Objective

The main objective is to determine the youth's health and well-being information needs.

1.4.5. Subsidiary objectives

a) Identifying suitable social research activities for working with the youth.
b) Developing an accessible health and well-being information service concept.
c) Establishing trust and forming a relationship with the participants through providing full dedication to the project.
d) Empowering the participants through a workshop on how to use existing technology relevant to them.
e) Establishing how the youth wants to receive health and well-being information.
f) Designing a suitable solution to increase access to relevant health and well-being information.

1.5 Current status of the research area

There are multiple researchers and initiatives attending to the health and well-being needs of the youth. However, little community-specific research has been conducted to cater for a relevant context (Cuthill, 2015: 2).

One of the most important current initiatives is the National Youth Policy (NYP) for 2015–2020 (NYP, 2015: 2). It was developed for all young people in South Africa, with a focus on redressing the wrongs of the past and addressing the specific challenges and immediate needs of the country's youth. The NYP 2020 improves upon and updates the previous policy by speaking to the new challenges that South Africa's youth face.

The NYP 2020 (2015: 6) seeks to create an environment that enables the youth of South Africa to reach their potential. The policies, mindful of the global economic challenges that affect South Africa, identifies the mechanisms and interventions that will act as catalysts to help clear critical blockages and achieve this positive environment (Butz, 2009: 779).

The policy outlines interventions to enable the optimal development of the youth, both as individuals and as members of South African society, enhancing their capabilities to transform the economy and the country. For the goals of the policy to be realised, the government will need to partner with all sections of society, including the private sector (Richter et al., 2003).

Durbanville has a service in place attending to the community’s health and well-being. For example, Durbanville Mobile Clinic is a government/public organisation free of charge. It is a primary health care facility providing HIV, AIDS and TB-related treatment. Durbanville Mobile Clinic has a community oriented primary health care programme that monitors and proactively works towards the improved health and well-being of families in the area (info4africa, 2014). They provide HIV counselling and testing and if necessary do a further test to determine the CD4 (cluster of differentiation 4) count. A CD4 count is a test that measures the number of CD4 T lymphocytes (CD4 cells) in a sample of blood. In individuals with HIV, it is the most important indicator of how well their immune system is working and it is the strongest predictor of HIV progression. Durbanville Mobile Clinic distributes fortified porridge to TB, HIV and AIDS patients. They also run a monthly support group for HIV-positive people and provide home-based care services for sick people and support for their vulnerable family members. Durbanville Mobile Clinic offers treatment for opportunistic infections and provide assessments and referrals for people with mental health issues.

Still, Durbanville does not have a health and well-being information resource in place. Thus, a health and well-being information service catering specifically to the youth may be greatly beneficial for the young individuals of Durbanville.

1.6 Research design

The research project followed inductive reasoning. This can be defined as premises that seek to supply strong evidence for (not absolute proof of) the truth of the conclusion (Arthur, 1994: 407). Inductive reasoning moves from specific observations to broader generalizations and theories (Creswell, 2012: 11). Informally, it is sometimes called a ‘bottom-up’ approach and begins with specific observations and measures, to detect patterns and regularities, formulate some tentative hypotheses that can be explored, and finally develop some general conclusions (Copi et al., 2007: 29). Inductive reasoning, by its very nature, is more open-ended and exploratory, especially at the beginning of the research process.

The current research model is explanatory in nature and seeks to explain the initial phase of quantitative findings (questionnaires) in more depth by facilitating focus group workshops (co-design sessions) with a sample from the population (Creswell & Clark, 2007: 388). The findings from the co-design phase explain in greater depth the results from the initial quantitative phase of the study. This topic will be further explored in Chapter 3.

The current study used a mixed methods research design. The emergence of mixed methods as a third methodological movement in the social and behavioural sciences began during the 1980's (Tashakkori & Teddlie, 2003: 697). A mixed methods research design is a procedure for collecting, analysing, and 'mixing' both quantitative and qualitative research and methods in a single study to understand a research problem (Teddlie, 2005: 193).

The strength of mixed research methods lies in the use of multiple mediums to explore a phenomenon. The method allows the use of words, pictures, and narrative to add meaning to the study. Also, numbers is used to add meaning to the above mentioned mediums (Johnson & Christensen, 2004: 29). The researcher can answer a broader and more complete range of research questions. Mixed methods add strengths that overcome the weaknesses of a single method. Creswell (2012: 513) states that mixed methods can provide stronger evidence for the conclusion through convergence and corroboration of findings. It can add additional insight and understanding to the research, and can be used to increase generalizability of the results. Thus, qualitative and quantitative research combined produces more complete knowledge necessary to inform theory and practice.

1.7 Ethics

The research was primarily non-threatening, however some ethical considerations were acknowledged in working with a vulnerable population group. The carefully planned research design ensured high quality research (Bryman, 2012: 146). Context, language and literacy levels were taken into consideration throughout the study. Participants were fully informed about the purpose, methods, and intended uses of the research; what their participation would entail and what risks were involved (Kellehear, 1989).

Confidentiality of the information was maintained and the anonymity of participants was respected (Drew et al., 2008: 66). Informed consent[1] was obtained from required authorities as well as every individual participant. The voluntary and confidential nature of participation in the research was made known (Bryman, 2012: 140). Each participant is represented by a unique code throughout the study to ensure anonymity. The identity of each participant was kept confidential during the writing-up of the research.

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[1] **See Appendix D**

The research did not intend to cause any harm to the participants and participation was entirely voluntary (Ali & Kelly, 2004: 118). However, the questionnaire included questions about health, well-being and negative experiences. It was possible that participants may have felt upset thinking about these health-related issues. If a participant found the study too upsetting, he/she could discontinue participation at any time. The participants' were made aware of their right to privacy (Neuman & Robson, 2004: 292); they did not have to answer any questions that they felt uncomfortable with. An existing source of support was made available to each participant in a detailed document. The project did not represent a referral service. The data collected through the questionnaire was stored on a password protected computer, and is only available for researchers (by request) interested in developing a youth-friendly health and well-being information service. The questionnaire transcripts did not include participants' identities, and was stored in a locked cabinet for no longer than necessary (Bryman, 2012: 137).

It is also possible that the co-designed health and well-being information service cannot be actualised in the near future and may lead to disappointment for the participants' raised expectations. However, no deception was present during the project (Kellehear, 1989: 71). There were no other known disadvantages or risks to taking part in this study.

Ethical clearance was obtained through the CPUT Research Ethics Committee.

CHAPTER TWO
LITERATURE REVIEW

2.1 Health and well-being of the youth in South Africa

The youth are the future of society, but they are also very much it's present. The youth who are healthy and happy are better equipped to contribute to their communities as young citizens, despite the major shifts occurring in the world they are about to inherit (WHO, 2009: 11). Evidence presented by Hair, Ling and Cochran (2003: 33) reveals that interventions can improve the outcomes related to social and emotional well-being of youth. Thus, young people are a major human resource for development, often acting as key agents for social change, economic expansion and innovation. Their imagination, ideals, energy and vision are essential for the continuous development of society.

The NYP 2020, in recognition of the vital role young individuals' play in building South Africa, seeks to ensure that there are processes and opportunities that allow the youth to develop and realise their potential. The policy avoids 'quick fixes' that divert attention from the complex institutional and systematic issues that need to be addressed. Instead, the NYP 2020 (2015: 16) seeks to develop capabilities as part of a long-term solution, which will open opportunities for the youth to participate in and take advantage of what South Africa has to offer.

The living conditions of South African youth in certain aspects have improved during the last decade; including access to formal housing, potable water and proper sanitation, electricity, and communication platforms such as access to some information and communication technologies (Pradeilles, 2014: 175). The South African youth are highly technological with 88.1 percent of those aged 15-34 living in dwellings with access to a landline, cellular phone or the internet (UNFPA, 2014). Taking note of these improvements, young South Africans still face significant challenges (Kingdon & Knight, 2004: 404).

2.1.1. Situation Analysis

a) Unemployment

In South Africa secondary school Gross Enrolment (GER) is high at over 90 percent. However, 2 million young people aged between 19 and 24 years are neither employed nor in an educational institution. This is significant, because completing secondary schooling is shown to have a protective effect against health and well-being issues (for example HIV), especially for young girls (NYDA, 2015: 22). In addition, males and females with tertiary education are significantly less likely to be HIV-positive than those without tertiary education. Unemployment has been named as one of the biggest problems in South Africa, since 45.4 percent of males and 55 percent of females in the 15-24 year age group are unemployed (UNFPA, 2014).

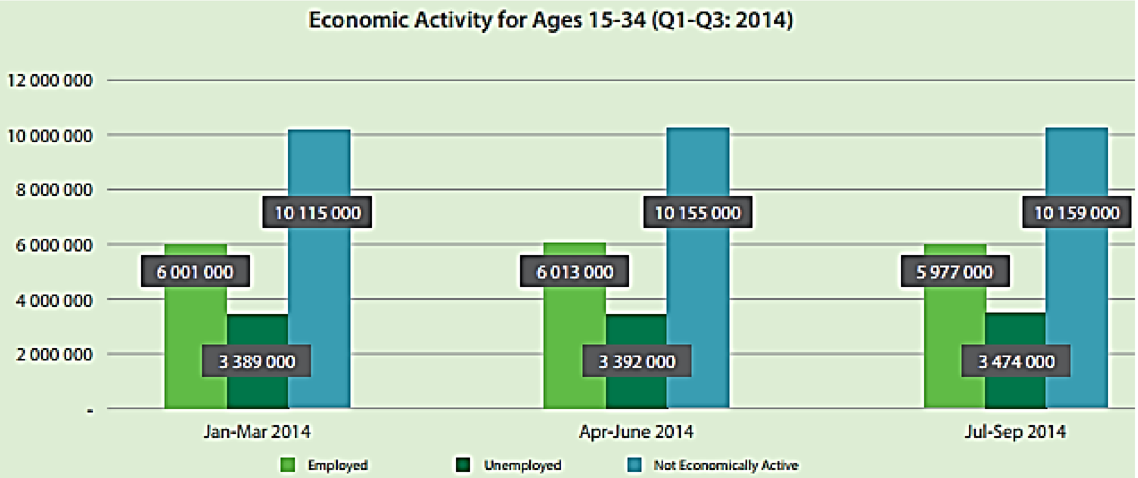

Figure 2.1: Employed, unemployed, not economically active (NYDA, 2015: 10)

b) Poor health, high HIV/AIDS prevalence, and high rates of violence and substance abuse

The World Youth Report (2003: 99) states that unhealthy habits and poor hygiene, persistent behavioural risks, poor basic sanitation, and new and emerging diseases are contributing to a deadly mix that is changing the classic picture of healthy youth.

Thus, South Africa’s health and well-being challenges are more than medical; risky behaviour and unhealthy lifestyles also play an important role in ill health and well-being. The consequences of risky behaviour are serious. These include: assaults; traffic accidents; suicides; teenage pregnancies; and infectious diseases such as sexually transmitted infections, including HIV and AIDS. In addition, the long-term effects of unhealthy lifestyle choices like smoking, the use of alcohol and other substances, the consumption of foods, and particularly fast foods, that contain high quantities of fat and sugar, and inactive lifestyles, often initiated during the youthful years, eventually translate into a range of chronic diseases. Although chronic diseases, especially those associated with an unhealthy lifestyle, are relatively uncommon in young individuals, many of the behaviours that place individuals at increased risk of developing these conditions in the future are adopted during adolescence (Dickson-Tetteh, & Ladha, 2000: 393). Many risk behaviours also lead to psycho-social problems including depression and anxiety (Reddy et al., 2003: 8).

One of the biggest challenges for the youth in South Africa is the issue of sexual and reproductive health. HIV prevalence is twice as high amongst young women as amongst young men between the ages of 15 and 24 years and females are four times more likely to have HIV than males of the same age (Department of Health, 2014). This age group has therefore been identified as a key population for health and well-being interventions. The lack of access to quality health and well-being resources and facilities results in high maternal death rates, high fertility rates (particularly teenage pregnancies) and a high prevalence of HIV (Tanser et al., 2013: 967).

The youth in South Africa also encounter high levels of gender-based violence (UNFPA, 2014). They also face barriers in accessing HIV prevention, treatment, care and support services due to limited decision-making power, lack of control over financial resources, restricted mobility, and care responsibilities (NYDA, 2015: 23).

Teenage fertility is reported to be on the decline although these estimates are still high. Stats SA Community Survey (2007) reflects that teenage fertility has declined by 10 percent. The South African Youth Context report (2011) asserts that 9.5 percent male and 6 percent female high school learners reported ever having had an abortion or a partner who had had an abortion. Only 48 percent of these learners reported using legal health services (Statistics South Africa, 2007).

Reliable data on youth with disabilities remains a challenge to locate. Based on the available data, persons with disabilities comprise 3 percent of the population aged between 10 and 19 (NYDA, 2015: 13).

Substance abuse has become a serious health problem in South Africa. Alcohol abuse in particular is directly linked to high levels of violence and motor vehicle accidents. The Western Cape has the highest percentage of alcohol consumers at 46.15 percent

(Jewkes et al., 2010: 834). Young people in particular are increasingly experimenting with drugs and alcohol.

All of these health and well-being issues causes human pain and suffering and places a significant financial burden on the public health system. And yet, as stated by Melde, Gavazzi, McGarrell and Bynum (2011: 291) it is known that interventions aimed at prevention could yield great benefits for the youth concerned, as well as for the public health system and the country in general.

Youth-targeted interventions are needed to enable young South Africans to actively participate and engage in society and the economy. The importance of access to health information lies in the promotion of health and well-being awareness. For successful implementation and better results to be realised, any policy requires strategies and programmes that are carefully designed, taking into consideration all factors in the environment (Sishana et al., 2005: 2).

c) Key Challenges

Tanser, Bärnighausen, Grapsa, Zaidi and Newell (2013: 966) established a decline in health and well-being knowledge levels across all age groups, within the youth category only 30 per cent of male youth (aged 15-24 years) and 27 per cent of females of the same age group could correctly identify ways to prevent sexual transmission of HIV and reject major misconceptions about HIV transmission.

The South African Youth Context report (2011) shows that 10 percent of female learners reported being forced to have sex; and reported slightly higher rates of being victims of partner violence and sexually-coercive behaviour than male learners (Youth Risk Behaviour Survey, 2008).

Over 45 thousand female learners fell pregnant in 2009, with teenage pregnancy representing one of the leading causes of early school drop outs (NYDA, 2015: 13). Despite the progressive legislation in South Africa allowing young women to return to school post-pregnancy, only around a third seem to re-enter the schooling system (UNFPA, 2014).

Youth unemployment in South Africa is extremely high. Nearly 70 per cent of youth in South Africa are unemployed and the percentage of youth owned businesses remains low at 33 per cent (NYDA, 2015: 2).

There is a clear need to strengthen the development of strategic information to effectively address educational and health and well-being developmental outcomes of the youth including access to comprehensive health and well-being information services.

d) Key Opportunities

South Africa has an enabling environment through national health and related policy guidelines to promote youth health and well-being (UNFPA, 2014). These are conducive and attempts that the youth of South Africa have access to comprehensive affordable health services (NYDA, 2015: 24).

South Africa can capitalise on the youth's high access to social media platforms and scale up evidence-informed combination prevention efforts utilising social media platform to increase reach of out-of-school youth who are increasingly vulnerable to new infections (West, 2015: 1).

Research by Tylee, Haller, Graham, Churchill and Sanci (2007: 1565) states that the implementation of multiple initiatives has created a collaborative platform between the education and health sectors to increase provision of accessible youth friendly health and well-being services directly and through linkages to appropriate community services.

Various programmes, often reaching across the boundaries of health and education, serve the youth and lead to further initiatives (NYDA, 2011: 75-76). These strategies have been conceptualized, experimented with and implemented in order to advance youth development in South Africa (Baloyi, 2006: 13).

Yet, a compact look at youth development indicators display that only some progress has been made, since various developmental confrontations still prevent South African youth empowerment and development (Campbell & MacPhail, 2002: 331).

2.2. Determinants of health and well-being

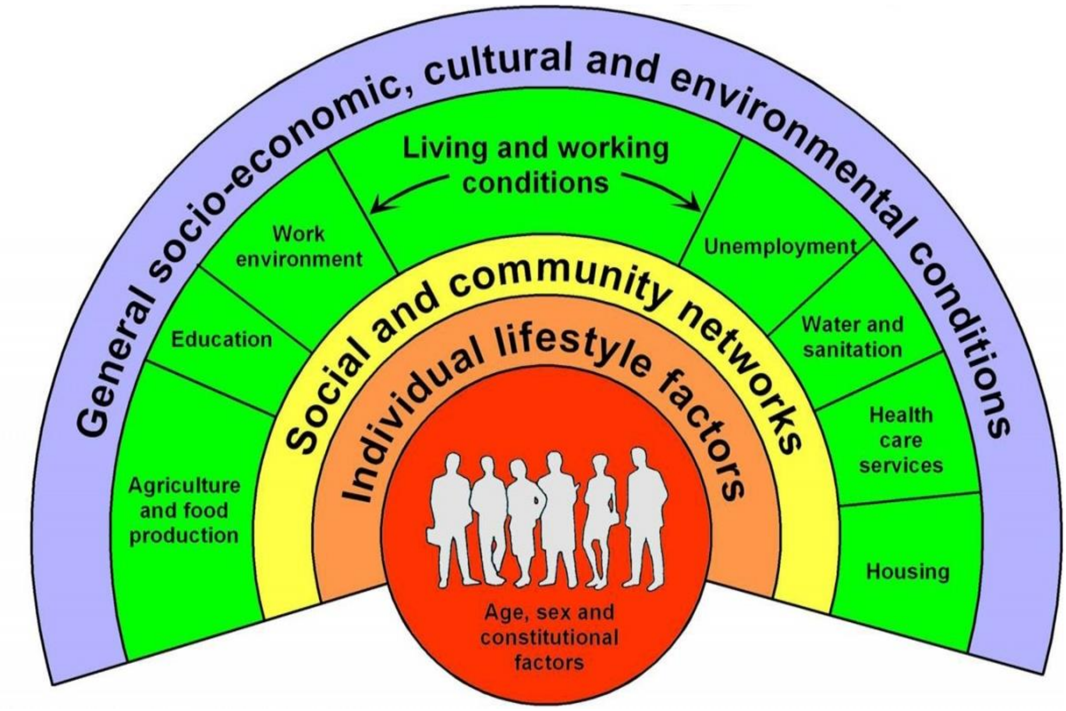

Figure 2.2: Influences on health
(Dahlgren & Whitehead, 2007: 20)

This is a concept based on the model of Dahlgren and Whitehead (1991) (see Figure above), which suggests that there are complex, multi-layered influencing factors with an impact on the health and well-being of individuals. At the centre are factors including age, gender and genetic inheritance. In the second layer are behavioural patterns such as smoking, diet and physical activity. In a third layer are social position, economic resources and the material environment. The fourth layer includes the wider or underlying determinants, consisting of social and community networks, work environment, housing and living conditions, education and transport. In the outer layer are the economic, political, cultural and environmental conditions present in society as a whole (Dahlgren, & Whitehead, 2007: 22).

Tackling health and well-being inequalities requires action within all these layers of influence, and HCD can be used to identify, assess and prioritise where effective action should be targeted. Researchers should therefore involve a multi-agency team in collecting information about specific populations, along with cross-sectoral stakeholders capable of, and committed to, undertaking a range of actions to improve health, well-being and service delivery.

2.3 Health and Well-being Information Needs

South Africa is faced with rising demands for health care, limited resources and increasing inequalities in health. Quality of Life (QOL) and Health Information Needs assessments have a central part to play: enabling researchers, practitioners, managers and policy-makers to identify those in need and to ensure that health care resources are created, developed and used to maximize health and well-being improvement (WHO, 2011: 1).

This is a vital health care planning tool to be used at the level of individuals, target groups, families, communities and populations. Health needs assessment can identify priority health needs, target resources to address inequalities and involve local individuals (Wright et al., 1998: 1310). The outcome of undertaking health needs assessments describes the state of health of local residents; enables the identification of the major risk factors and causes of ill health; and enables the identification of the actions needed to address these (Green, 2008: 9).

Human needs are basic needs for subsistence, reproduction, security, affection, etc. The relation between specific human needs and perceived satisfaction with each of them can be affected by mental capacity, cultural context, information, education, temperament, and the like, often in quite complex ways (Rifkin, 2009: 57). Moreover, the relation between the fulfilment of human needs and overall subjective well-being is affected by the (time-varying) weights individuals, groups, and cultures give to fulfilling each of the human needs relative to the others.

With this definition, the role of policy is to create *opportunities* for human needs to be met, understanding that there exists a diversity of ways to meet any particular need; built, human, social, and natural capital (Costanza et al., 1997: 275) represent one way of categorizing those opportunities. Time is also an independent constraint on the achievement of human needs. Social norms affect both the weights given to various human needs when aggregating them to overall individual or social assessments of subjective well-being, and also policy decisions about social investments in improving opportunities. Social norms evolve over time due to collective population behaviour (Azar, 2004: 53). The evolution of social norms can be affected by conscious shared envisioning of preferred states of the world (Costanza, 2000: 5).

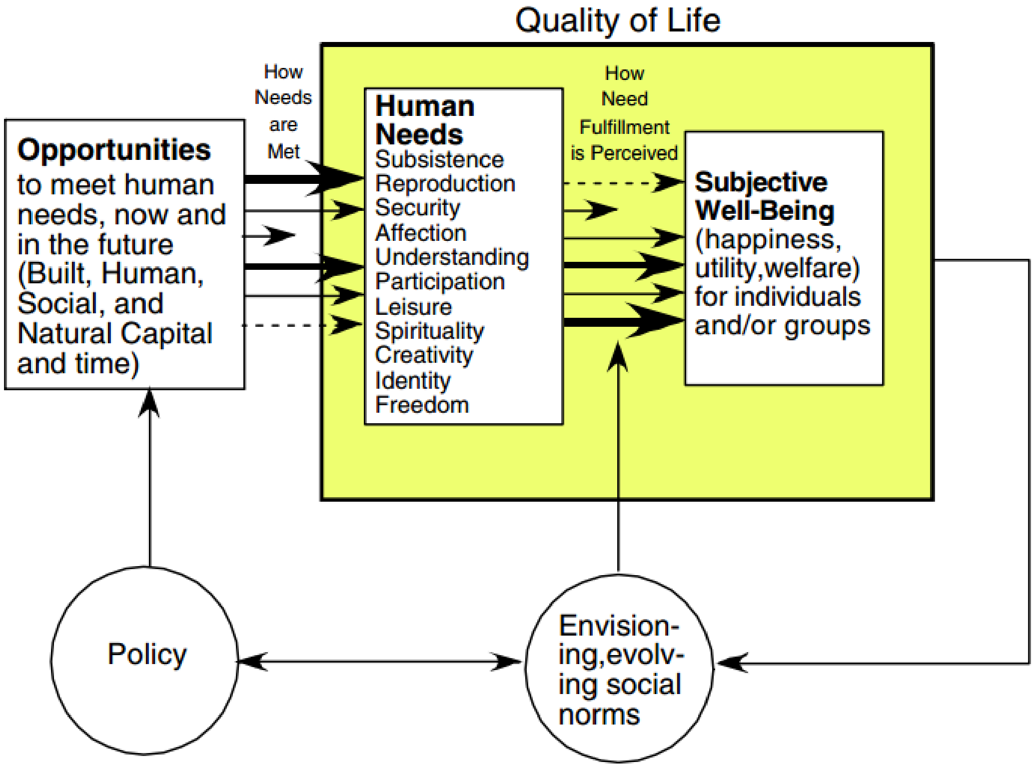

Fig 2.3: QOL as the interaction of human needs and the subjective perception of their fulfilment, as mediated by the opportunities available to meet the needs. (Adapted from Costanza, 2007: 269)

Table 2.1 is a list of collective human needs, their descriptors, and the inputs (or satisfiers) needed to fulfil each need. The last column highlights the fact that different types of inputs are needed to satisfy different needs. Time is included as an essential input along with built, natural, social and human capital (Costanza et al., 2007: 271). For example, for any individual there is a limited amount of time that must be distributed among various activities. Time should be best distributed in order to maximize QOL.

Thus, it is of high importance to establish collective human needs across cultures; to identify specific satisfiers for each need; and to determine the inputs needed to provide the satisfiers to fulfil the human need.

Table 2.1: List of Human Needs

Human needs	Descriptors (direct satisfiers)	Types of inputs needed
1. Subsistence "The minimal resources that are necessary for survival."	Food, shelter, vital ecological services (clean air and water, etc.…) **healthcare**, rest	Built capital* Natural capital* Human capital Time Social capital
2. Reproduction "A fundamental feature of all known life; each individual organism exists as the result of reproduction."	**Nurturing of children, pregnant women** Transmission of the culture Homemaking	
3. Security "The state of being free from danger or threat."	Enforced predictable rules of conduct **Safety from violence at home and in public** Security of subsistence into the future Maintain safe distance from crossing critical ecological thresholds Stewardship of nature to ensure subsistence into the future **Care for the sick and elderly**	Social capital* Built capital Time Natural capital
4. Affection "a feeling of fondness or tenderness for a person or thing; attachment."	*"Being able to have attachments to things and persons outside ourselves; to love those who love and care for us, to grieve at their absence."* (Nussbaum and Glover, 1995) **Solidarity, respect, tolerance, generosity, passion, receptiveness**	Time* Social capital Natural capital
5. Understanding "Sympathetic awareness or tolerance."	**Access to information** Intuition and rationality	Human capital* Natural capital Built capital Time Social capital
6. Participation "The act of taking part or sharing in something"	To act meaningfully in the world Contribute to and have some control over political, community, and social life Being heard Meaningful employment Citizenship	Social capital Human capital Natural capital Time
7. Leisure "use of free time for enjoyment"	Recreation, relaxation, tranquillity, access to nature, travel	Time
8. Spirituality	Engaging in transcendent experiences Access to nature Participation in a community of faith	Human capital Social capital Natural capital Time
9. Creativity/ emotional expression "Sense of connection to something bigger than ourselves."	Play, imagination, inventiveness, artistic expression	Human capital* Time* Natural capital
10. Identity "the fact of being who or what a person or thing is"	Status, recognition, sense of belonging, differentiation, sense of place	Social capital
11. Freedom "the power or right to act, speak, or think as one wants"	*"Being able to live one's own life and nobody else's. This means having certain guarantees of non-interference with certain choices that are especially personal and definitive of selfhood, such as choices regarding marriage, childbearing, sexual expression, speech and employment"* (Nussbaum and Glover, 1995) Mobility	Social capital* Natural capital

The above mentioned needs were derived primarily from an integration of Max-Neef's (1992) “Matrix of Human Needs”; Nussbaum and Glover's (1995) “Basic Human Functional Capabilities”; Frisch's (1998) “Quality of Life Inventory”; Cummins' (1993) “The ComQuality of life-S5”; Maslow's (1954) “Hierarchy of needs,”; Sirgy’s (2002) “Need Hierarchy Measure of Life Satisfaction” and the “Quality of Life Questionnaire” of Greenley et al. (1997).

This research determined the categories, new categories, and developed the definitions. It is important to note that some of the needs are overlapping and some are conflicting (Sirgy, 2002: 188). For example, subsistence is closely related to reproduction. Understanding and creativity may overlap in so far as knowledge may be necessary to enhance creativity and vice versa. In terms of the contradictory nature of some needs, some may believe that their QOL depends upon living in a community where certain religious views are enforced for all. Some individuals believe that their QOL depends on living in a community where all women are veiled or where access to abortion is forbidden, where others in the community may feel that their QOL is diminished by these conventions (Constanza et al., 2007: 275). An individual's recreational need to drive an automobile may conflict with others' subsistence needs for clean air.

It is also important to note that this enterprise is by its very nature slightly subjective (Diener & Suh, 1997: 193). There are no completely “objective” measures since QOL is, by its very nature, a normative, subjective concept. There will inevitably be disagreement between different individuals, however the purpose of the research is to identify a minimum set of needs that occur cross-culturally and over time. How these needs are met and the relative weights that various individuals and groups give to meeting one relative to the others will vary. It is also important to note that, while QOL is subjective and normative, there may be more objective, evolutionary reasoning behind it. The question of *“why do certain things and activities make people feel (subjectively) happy?”* is an important one deserving of additional research. For example, are the things and activities that make people happy also the things and activities that lead to the survival of human populations over time? This is an interesting and important question, but outside the scope of this paper.

The ability of humans to satisfy their basic needs come from the opportunities available and constructed from social, built, human and natural capital, and time. Policy and culture help to allocate the four types of capital as a means for providing these opportunities. The different capitals are defined below (Mulder et al., 2006: 14):

- **Social** capital: networks and norms that facilitate cooperative action
- **Human** capital: knowledge and information stored in our brains, as well as our labour
- **Built** capital: manufactured goods such as tools, equipment, buildings
- **Natural** capital: renewable and non-renewable goods and services provided by ecosystems.

Table 2.1 demonstrates the importance of these capitals as inputs to the satisfiers of the various human needs (Jackson et al., 1999: 427). For example, built capital is a primary satisfier of the need for subsistence (via, for example, shelter), but natural capital is also a primary satisfier of subsistence (via, for example, clean air and water), and human and social capital are also important (via, for example, healthcare). Likewise, the need for participation can be satisfied by involvement in social life (social capital) or meaningful use of one's talents (human capital).

The inherent nature of the capitals will help to guide policy and decision making in regards to meeting human needs. For example, social capital and information (a component of human capital) improve through use (Coleman, 1988: 104). This explains how social networks and scientific knowledge generally grow. Built capital and the labour element of human capital wear out through use. Some aspects of natural capital improve through use and repair themselves through solar energy capture (Heal et al., 2001: 333). The understanding of the nature of these capitals will help to most efficiently provide opportunities to meet human needs.

Sirgy (2002: 34) argues that human beings structure or organize their cognitive and affective experiences (and their memories of them) by life domains (e.g., work, family, friends, health, etc.). These life domains tend to be organized and structured around a focal set of human needs. Thus, it can be argued that the domains can be construed as categories of experience through which human needs using built, human, social, and natural capital is addressed.

From this orientation, QOL is a multidimensional construct emerging from the evaluation of multiple needs on the individual, community, national, and global levels. It is unlikely that satisfaction of all needs contribute equally to any given individual's or group's QOL. Rather, each need is assumed to contribute in varying degrees to overall QOL.

Schwarz and Strack (1999: 70) provide an extensive review of research that illustrates that a need will have greater impact when it is:

i. associated with more recent experience;
ii. is conceptualized as a part of a current phase (rather than former) of one's life;
iii. is not categorized as an extraordinary/extreme example of one's experience;
iv. is judged in the presence of others with exemplary characteristics in that domain (leading one to use that other individual as a standard for social comparison); and
v. is valued by others whom the individual respects.

It is clear that judgments of QOL necessarily reflect the outcome of a fluid, dynamic system across time and context. Moreover, the content of the needs themselves are dynamic, given overlap among and interaction between need categories (Constanza et al., 2007: 270). For example, security needs may change over one's lifetime or in response to a change in state in how other needs are met.

Thus, in designing an assessment of QOL, the goal should be to create a tool that will capture the needs of a particular individual (or group of individuals) at a particular time and place (Chen et al., 2001: 871).

In order to achieve this, useful population samples are needed to empirically identify and define QOL. A default strategy for doing so is to calculate the domain average for groups of needs within a given population as Frisch (1993, 1994a, b, 1998) did in calculating QOL. This approach will be helpful in guiding public policy decisions regarding individual and group priorities, as it suggests the ways in which various needs are differentially important (on average) for different groups. These groups may be defined by nation, community, age, occupation, or other sub-sample characteristics (Alesina & Ferrara, 1999: 1).

The most valuable measure of QOL will be constructed in a manner that permits variations (by domain group averages) to be used by respondents, recorded, and analysed (Guyatt et al., 1993: 624). These variations, themselves, provide information that appears critical for responsive public policy decision-making.

The outcomes of using such a process would permit us to measure and compare QOL within and between groups of individuals defined by population characteristics such as age (for example, the youth) and residential community (for example, Durbanville).

Health needs assessment and the establishment of QOL is not a rapid activity, but a developmental process that should be added to and amended over time. Thus, it is not an end in itself but a way of using information to plan health care access and public health programmes for the near future (Stevens & Gillam, 1998: 1448). Needs assessment enables the researcher to plan and deliver the most effective care to those in need and work collaboratively with the community to determine which health issues cause greatest concern and plan interventions to address those issues (WHO, 2011: 2).

2.4 The role of eHealth and mHealth

New horizons for health and well-being recently arose through the use of mobile technologies, defined as mHealth (WHO, 2011b: 5). The use of mobile and wireless technologies to support the achievement of health and well-being objectives has the potential to transform the face of health service delivery across the globe (Broomhead & Mars, 2012: 25).

mHealth is an abbreviation for ‘mobile health’, a term used for the practice of medicine and public health and well-being supported by mobile devices (Ling, 2004: 39). The term is most commonly used in reference to using mobile communication devices, such as mobile phones and tablet computers, for health services and information, but also to affect emotional states (Cipresso et al., 2012: 24). The mHealth field has emerged as a sub-segment of eHealth.

eHealth is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health and well-being locally, regionally, and worldwide by using information and communication technology (Germanakos et al., 2005: 67).

mHealth applications include the use of mobile devices in collecting community and clinical health and well-being data, delivery of healthcare information to practitioners, researchers, and patients, real-time monitoring of patient vital signs, and direct provision of care via mobile telemedicine (Broomhead & Mars, 2012: 28).

While mHealth certainly has application for industrialised nations, the field has emerged in recent years as largely an application for developing countries, stemming from the rapid rise of mobile phone penetration in low-income nations (Cipresso et al., 2012: 21). The field, then, largely emerges as a means of providing greater access to larger segments of a population in developing countries, as well as improving the capacity of health and well-being systems in countries such as South Africa to provide quality healthcare (Ling, 2004: 17).

Within the mHealth space, projects operate with a variety of objectives, including increased access to healthcare and health-related information (particularly for hard-to-reach populations); improved ability to diagnose and track diseases; timelier, more actionable public health and well-being information; and expanded access to ongoing medical education and training for health workers (Germanakos et al., 2005: 70).

For the first time the World Health Organization's (2009) Global Observatory for eHealth has sought to determine the status of mHealth in Member States; its 2009 global survey contained a section specifically devoted to mHealth. Completed by 114 Member States, the survey documented for analysis four aspects of mHealth: adoption of initiatives, types of initiatives, status of evaluation, and barriers to implementation.

Fourteen categories of mHealth services were surveyed: health call centres, emergency toll-free telephone services, managing emergencies and disasters, mobile telemedicine, appointment reminders, community mobilization and health promotion, treatment compliance, mobile patient records, information access, patient monitoring, health surveys and data collection, surveillance, health awareness raising, and decision support systems (WHO, 2009: 9).

The survey shows there is a groundswell of activity. The majority of Member States (83%) reported offering at least one type of mHealth service. The four most frequently mHealth initiatives, reported by WHO (2009: 19) were:

1) health call centres (59%),
2) emergency toll-free telephone services (55%),
3) managing emergencies and disasters (54%), and
4) mobile telemedicine (49%).

With the exception of health call centres, emergency toll-free telephone services, and managing emergencies and disasters, approximately two thirds of mHealth programmes are in the pilot or informal stage (Kay et al., 2011: 67).

Consistent with eHealth trends in general, higher-income countries show more mHealth activity than do lower-income countries. Countries in the European Region are currently the most active and those in the African Region the least active (ITU, 2012: 1). However, Africa developed an eHealth platform in support of accessible health and well-being information:

> “eHealth Africa’s mission is to build stronger health systems through the design & implementation of data-driven solutions that respond to local needs and provide underserved communities with tools to lead healthier lives” (eHealthAfrica, 2013).

With extensive experience running HIV, prevention of mother-to-child transmission (PMTCT), and maternal and child health projects, eHealth Africa is an expert in the health information field (eHealthAfrica, 2013). The initiative believes that the key to a successful community is quality health and well-being care and their projects strive to provide that in the communities in which they work. eHealth Africa (2013) provides information tools, education tools, training, support and maintenance for all the health and well-being projects.

More specifically, South Africa also developed a National eHealth Strategy (2012) enabling a long and healthy life for all South Africans. Their mission is to establish eHealth as an integral part of the transformation and improvement of health care services in South Africa. The overall aim of this strategy is to provide a single, harmonised and comprehensive eHealth strategy that:

a) Supports the medium-term priorities of the public health sector.
b) Paves the way for future public sector eHealth requirements.
c) Lays the requisite foundations for the future integration and coordination of all eHealth initiatives in the country

(The National Health Act, 2003)

There are 10 e's in ‘eHealth’ worth considering while designing a service (Eysenbach, 2001: 20):

1. **Efficiency** - one of the promises of eHealth is to increase efficiency in health care, thereby decreasing costs. One possible way of decreasing costs would be by avoiding duplicative or unnecessary diagnostic or therapeutic interventions,

through enhanced communication possibilities between health care establishments, and through patient involvement.

2. **Enhancing quality of care** - increasing efficiency involves not only reducing costs, but at the same time improving quality. EHealth may enhance the quality of health care for example by allowing comparisons between different providers, involving consumers as additional power for quality assurance, and directing patient streams to the best quality providers.
3. **Evidence based** - eHealth interventions should be evidence-based in a sense that their effectiveness and efficiency should not be assumed but proven by rigorous scientific evaluation. Much work still has to be done in this area.
4. **Empowerment of consumers and patients** - by making the knowledge bases of medicine and personal electronic records accessible to consumers over the Internet, eHealth opens new avenues for patient-centered medicine, and enables evidence-based patient choice.
5. **Encouragement** of a new relationship between the patient and health professional, towards a true partnership, where decisions are made in a shared manner.
6. **Education of physicians** through online sources (continuing medical education) and consumers (health education, tailored preventive information for consumers)
7. **Enabling information exchange** and communication in a standardized way between health care establishments.
8. **Extending the scope of health care** beyond its conventional boundaries. This is meant in both a geographical sense as well as in a conceptual sense. EHealth enables consumers to easily obtain health services online from global providers. These services can range from simple advice to more complex interventions or products such a pharmaceuticals.
9. **Ethics** - eHealth involves new forms of patient-physician interaction and poses new challenges and threats to ethical issues such as online professional practice, informed consent, privacy and equity issues.
10. **Equity** - to make health care more equitable is one of the promises of eHealth, but at the same time there is a considerable threat that eHealth may deepen the gap between the "haves" and "have-nots". People, who do not have the money, skills, and access to computers and networks, cannot use computers effectively. As a result, these patient populations (which would actually benefit the most from health information) are those who are the least likely to benefit from advances in information technology, unless political measures ensure equitable access for all. The digital divide currently runs between rural vs. urban populations, rich vs. poor, young vs. old, male vs. female people, and between neglected/rare vs. common diseases.

In addition to these 10 essential e's, eHealth should also be easy-to-use, entertaining and exciting (Oh et al., 2005: 33).

Mobile technology has provided an opportunity to revolutionise healthcare, especially in countries like South Africa that have the challenges of providing care in deep rural settings but also have a thriving telecommunications market (eHealth Strategy, 2012).

mHealth will advance through creating country-based eHealth strategies that incorporate it into the existing eHealth domain. Policies need to be complemented by standards, architectures, and solid partnerships to help pilot mHealth initiatives mature and realize their full potential – utilizing mobile and wireless technologies to improve health and well-being.

It is important that any health or well-being related service is designed for the specific target group and context in which it will be used. Thus, it is helpful to briefly look at the history of design and some of the field’s branches that can be used to achieve these goals.

2.5 Design

Design methods is a broad area that focuses on divergence: exploring possibilities and constraints of inherited situations by applying critical thinking through qualitative and quantitative research methods to create new understanding (problem space) toward better design solutions (Jones, 1991).

The craftsmanship model of production characterizing the beginning times of design required that end-users and producers be fully involved in the conception, development, and evaluation of products (Shah et al., 2009: 514). With the industrial revolution, mass production emerged, positing a divide between end-users and the whole production cycle (Castellacci, 2008: 979). End-users or clients became mainly targets of marketing and selling activities.

The emergence of co-design can be linked to two design approaches: user-centred design and participatory design. In the 1970s, design firms initiated an approach that came to be known as user-centred design, characterised by the reproduction or translation of user knowledge into principles and prescriptions that designers could work with (Nisbett, & Wilson, 1977: 86). The underlying principles were that designers should understand users and their needs and build trust to increase the efficiency of design outcomes through dialogue and participation. By giving a prominent place to the user, it was thought that more useful and relevant design ideas would emerge (Ehn, 1993: 43).

2.5.1 Participatory Design

The participatory approach was described as a set of methodologies, a mind-set, and an attitude towards accepting that people have different perceptions of the design process. These perceptions and perspectives can be articulated only if users themselves are provided with appropriate tools to express those (Shah et al., 2015: 95). Consequently, participatory design covers theories and practices that emphasize the role of the end-users as full participants in the design process.

Co-design is seen as moving beyond user-centred design, and is closely associated with participatory design. Some studies describe user-centred design as a United States driven approach, and participatory design as a Northern European approach (Albinsson et al., 2007: 2). These two approaches have influenced each other in their historical evolution, and marked the way co-design came to be defined and understood. Co-design can be considered “an updated term of participatory design”, as it shares its key principle of involving all stakeholders in the design process in order to ensure that the end-product meets user needs, and has a high rate of adoption (Steinmueller, 2001: 4).

The field of social design defines co-design as “a plan or method to do something” placing beneficiaries in positions of power and influence in the design and implementation process (Murcott, 2007: 123). The underlying vision is that one can design an unlimited number of views on reality but to be considered effective design, every view implemented should relate to the specific social groups that will benefit from the outcomes, and reflect their views – something that can be done best by involving the beneficiaries in the design process (Markus & Keil, 1994: 11). Therefore, to optimize the value of co-design, instead of designing technology that can be pushed towards communities, a bottom-up approach rooted in community participation should be employed.

2.5.2 Human-centered Design

In 2009, IDEO designed and launched the HCD Toolkit, a first-of-its-kind book that laid out how and why human-centered design can impact the social sector. In short order, a community of designers, entrepreneurs, and social sector innovators embraced it. The design methods gained popularity and a second edition was launched in 2011. In

April 2015, IDEO launched an exciting new evolution of the HCD Toolkit, the Field Guide to Human-Centered Design. The Field Guide is the latest in IDEO's (2015) suite of teaching tools and a step forward in sharing the practice and promise of human-centered design with the social sector.

Literature reveals that HCD is a successful method of identifying participants' needs, and co-designing a service that suits the target groups' needs. IDEO's (2015: 10) HCD Toolkit helps international researchers understand a community's needs in new ways, find innovative solutions to meet those needs, and deliver solutions with financial sustainability in mind. The HCD Toolkit was specifically designed for NGO's and social enterprises that work with impoverished communities in Africa (IDEO, 2011: 3). The toolkit walks researchers through the HCD process and provides support with activities such as running workshops, and implementing ideas (IDEO, 2015: 79). The HCD process has led to innovations such as the HeartStart defibrillator, Cleanwell natural antibacterial products, and the Blood Donor System for the Red Cross - all of which have enhanced the lives of millions of people. Effective development, implementation and evaluation of behaviour change interventions involve a systematic, stepwise planning and evaluation process (Reddy et al., 2003).

Human-Centered Design (HCD) will help the researcher to:

1) **hear** the needs of constituents in new ways,
2) **create** innovative solutions to meet these needs, and
3) **deliver** solutions with financial sustainability in mind.

By taking these three phases in turn, it creates the opportunity to build deep empathy with the communities and participants; to figure out how to turn what's been learned into a chance to design a new solution; and to build and test the ideas before finally putting them out into the world (IDEO, 2015: 11).

2.6 The Future of Health

New tools and incentive systems are promoting a more proactive model of health and well-being by helping individuals' better track and understand their behaviours and encouraging them to make healthier lifestyle choices (Peltzer, 2001: 250). Mobile technologies are leveraging advanced sensors and algorithms to provide deeper insights and individualized coaching to activate users around their health and well-being. The net effect of this approach is an overall healthier population that is less reliant on the resources provided by the broader healthcare system (Varshney, 2007: 114).

Armed with a greater degree of knowledge about their lifestyles and conditions, consumers are taking a more central role in determining when they interact with the healthcare system and how their care is delivered (Coyle & Meier, 2009). Individuals are being empowered with technologies and participation in social communities that enable them to gather valuable advice or self-diagnose before visiting a healthcare professional. As a result, individuals are better prepared to collaborate with their healthcare professional during these consultations on the best course of action, which can be further supported by guidance around individual treatment plans to ensure optimal outcomes (Geraghty, 2008: 296).

Healthcare providers are using new technologies, social platforms and data systems to streamline the way information is disseminated and accessed to deliver a more personalized and distributed model of health and well-being care (Broomhead & Mars, 2012: 27). Secure networks are offering a new 'commons' for doctors to share research and advice around conditions that fall outside of their expertise, while analytics tools interpret patient data to further support these decisions (Coyle & Meier, 2009). Similarly, digital platforms have evolved to ease the communication between doctors, patients and different medical personnel to ensure that pertinent records, treatment plans and face-to-face guidance is readily accessible, cutting down inefficiencies and mistakes (Varshney, 2007: 116).

CHAPTER THREE
METHODOLOGY

3.1. Participants

The target group involved the youth, defined by The National Youth Policy (2009-2014) as ages falling between 14 and 35 in South Africa. The study focused on a specific target group aged 14 to 18. The sample (N = 33) consisted of three independent groups, residing in Durbanville. The first group, Group A, consisted 10 participants (n = 10); the second group, Group B, consisted 15 participants (n = 15); and the third group, Group C, consisted 8 participants (n = 8).

The participants' QOL and health and well-being information needs were compared and analysed to establish whether the development of a health and well-being information service can be used within the specific context (Durbanville) or possibly other South African contexts. This comparison adds to the reliability and validity of the research (Bryman, 2012: 397). Certain criteria were set in place to secure a heterogeneous sample. The sample included different ages ($\bar{x} = 15$), races (79% White, 21% Coloured) and near equal gender distribution (55% female, 45% male). A letter was sent to inform the headmaster of Durbanville High School of the study[2]. The participants were recruited by word-of-mouth in a Durbanville based high school. The researcher provided recruitment documents[3] for possible participants.

3.2. Procedure

The research methodology was approached according to three steps set out in the HCD process: *hear, create,* and *deliver*. This process moved from concrete observations about individuals, to abstract thinking while uncovering insights and themes, then back to the concrete with substantial solutions (Cooley, 2000: 62). Within this context the action plan[4] was incorporated.

For the purposes of this study, a several–month Deep Dive was used (IDEO, 2011: 16). This mode of use enables a deeper, more nuanced understanding and theorization of a complex challenge or problem (Van der Ryn, 2013: 19). With a longer time frame, more topics can be examined and more participants can become active in the process. A several-month Deep Dive utilised the principle of finite timeframes to frame the entire challenge. This method was used to co-design robust solutions and to allocate

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[2] See Appendix A
[3] See Appendix B
[4] See Table 3.1: Action Plan Summary

resources on a multi-faceted challenge (IDEO, 2015: 10). Also, the researcher needed to engage many actors in the process, such as the different groups with different goals.

Figure 3.1: HCD: Hear, Create, Deliver process (IDEO, 2011)

3.3.1. Hear

It is very important to promote the well-being of the youth through creating health care awareness within communities that display available health care insufficiency. During the *hearing* phase, also known as the *inspiration* phase; stories and inspiration from the participants was collected, followed by the preparation for and conducting field research (IDEO, 2015: 29).

The first session of the action plan involved Group A (n = 10) completing a health information needs assessment questionnaire[5] to familiarise the researcher with the community's current QOL status and health and well-being needs. The identification of the main concerns within the particular community was established by investigating the completed health information needs assessment questionnaires. The second session of the action plan consisted of an introductory group discussion by Group B (n = 15). This established a comfortable and open group dynamic. Also, initial data was collected during both sessions to establish both group's health and well-being information needs.

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[5] **See Appendix C**

Measures

The health and well-being information needs questionnaire[6] consisted of two tools:

a) a health needs assessment adapted by the researcher for the South African context, as well as
b) a ComQol-S5 assessment.

a) Health needs assessment

Health needs assessment is a systematic method for reviewing the health and well-being issues facing a population, leading to agreed priorities and resource allocation that will improve health and well-being and reduce inequalities (Cavanagh & Chadwick, 2005).

According to the WHO (2011a), equity in health and well-being means that individuals' needs guide the distribution of opportunities for health and well-being. Health needs assessment is a priority for those concerned with community health and well-being (Billings & Cowley, 1995: 722). Recognising the health needs of individuals and communities leads to more flexible health and well-being services (Naidoo & Wills, 2000). The following steps were used to create and adapt a suitable health needs assessment:

Figure 3.2: The five steps of health needs assessment (Adapted from NICE, 2005)

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[6] **See Appendix C: Health and well-being information needs questionnaire**

b) Comprehensive Quality of Life Scale – School Version (ComQol-S5)

The QOL construct has a complex composition, so it is perhaps not surprising that there is neither an agreed definition nor a standard form of measurement. This is not due to a lack of ideas. Cummins (1996a) has recorded well over 100 instruments which purport to measure life quality in some form, but each one contains an idiosyncratic mixture of dependent variables.

In order to remedy this situation, the Comprehensive Quality of Life Scale (ComQol) has been developed. This scale has been designed in parallel forms suitable for any population sub-group. These forms are:

- ComQol – A: designed for use with the general adult population.
- ComQol – I: designed for use with people who have an intellectual disability or other form of cognitive impairment.
- ComQol – S: designed for use with adolescents 11-18 years who are attending school.

The scale also contains features of construction which reflect contemporary understanding of the QOL construct (Cummins, 1991; Cummins et al., 1994).

The scale that follows is an operationalization of the following definition of quality of life:

> "Quality of life is both objective and subjective, each axis being the aggregate of seven domains: material well-being, health, productivity, intimacy, safety, community, and emotional well-being. Objective domains comprise culturally-relevant measures of objective well-being. Subjective domains comprise domain satisfaction weighted by their importance to the individual." (Cummins, 1991: 53)

ComQol incorporates a contemporary understanding of the QOL construct. As such it contains the following features:

(a) It is multidimensional. There is consensus within the field that the most useful measures of life quality must incorporate the separate components which comprise this construct, even though the precise nature of these components are somewhat conjectural (Felce & Perry, 1995: 58). ComQol defines life quality in terms of seven domains which together are intended to be inclusive of all QOL components. These are:

1) Material well-being,
2) Health,
3) Productivity,
4) Intimacy,
5) Safety,
6) Place in community, and
7) Emotional well-being.

Evidence for the adoption of these seven domains has been presented by Cummins (1996b, 1997a).

(b) It is multi-axial. This takes two forms. The first is in the separate measurement of **objective** and **subjective** components. The contemporary literature is quite consistent in its determination that, while both of these axes form a part of the QOL construct, they generally have a very poor relationship to one another.

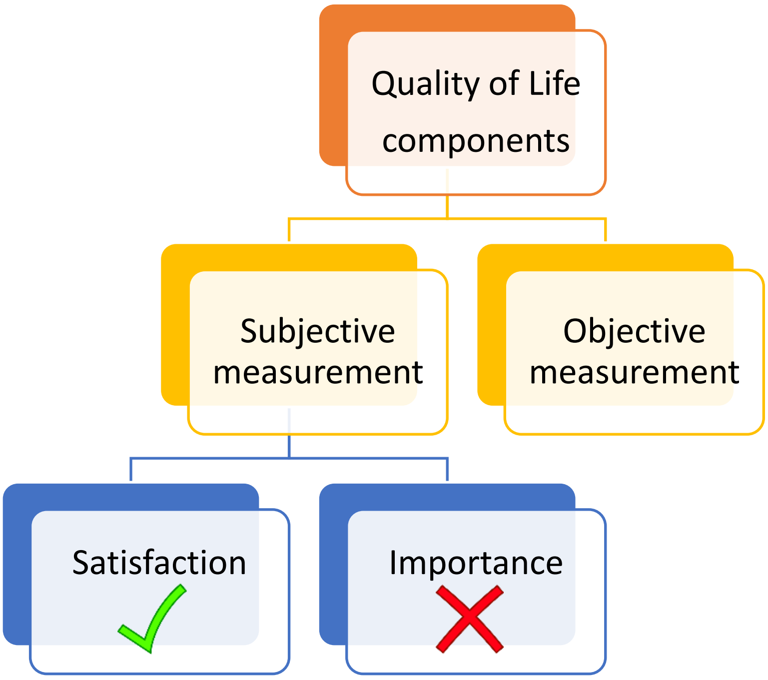

Figure 3.3: Measurement of the QOL components (Author, 2015)

The scale is also multi-axial in terms of its subjective measures. Each domain is separately rated in terms of its **importance** to the individual as well as on its perceived **satisfaction**. However, research shows that *importance* is not a useful construct to measure, at least in the way it is proscribed by ComQol. The reasons are as follows: importance entered as the second step after satisfaction explains no significant extra variance. As a consequence, ratings of importance confuse different underlying motivations. A rather similar conclusion has been reached by Wicker et al. (1993), who argue that ‘importance’ is inadequate as a measure of need. Thus, in the current project, the nexus between the measurement of importance and satisfaction will be broken. **Satisfaction** alone is the key response variable reflecting subjective QOL.

(c) It can be used with any section of the population. The researcher used the *ComQol-S* for use with adolescent students (Cummins, 1996b).

(d) The scale is psychometrically sound. It is reliable, stable, valid and sensitive (Cummins, 1991).

(e) The sum of the domain scores for satisfaction can be referenced to the ‘goldstandard’ of 75 ± 2.5% SM (Cummins, 1996b).

Researchers without a suitable health-related QOL measure in their own language have two choices: (1) to develop a new measure, or (2) to modify a measure previously validated in another language, known as a cross-cultural adaptation process. Experts propose a set of standardised guidelines for this process based on previous research and on published methodological frameworks (Fitzpatrick et al., 1992: 206). These guidelines include recommendations for obtaining semantic, idiomatic, experiential and conceptual equivalence in translation by using back-translation techniques and committee review, pre-testing techniques and re-examining the weights of scores. The researcher applied these guidelines for cross-cultural adaptation to Afrikaans.

3.3.2. Create

During this phase (also named the *ideation* phase), a workshop format was utilised to translate what has been heard from the participants through developing frameworks, opportunities, solutions, and prototypes (IDEO, 2011: 79). The third session of the action plan involved a co-design focus group, where concepts drawn from previous sessions were open for co-design and deliberation.

During the fourth action plan session, a further developed concept was presented to Group C (n = 8), with the intention of gaining critical feedback, leading to the concept prototype of an accessible health and well-being information service. There was two co-design workshops: one session with Group B, and one session with Group C. The participants was actively involved in the design process of a contextually relevant health and well-being information service suited to their specific needs.

3.3.3. Deliver

This phase (also named the *implementation* phase) usually starts to realise relevant solutions through rapid revenue and cost modelling, capability assessment, and implementation planning. This phase helps the launching of new solutions into the community (IDEO, 2015: 133). Unfortunately, the *deliver* phase was outside the scope of this project. The current project pertains to field of design. Professionals with the necessary skills to develop software and launch applications will be needed to continue the deliver phase.

However, the data gathered through the questionnaire and workshops can be used productively during the development of a youth-friendly health and well-being information service by future researchers and/or developers. The design concepts and eventual proof-of-concept of an idea generated during the co-design sessions are the final design output of this project. During each session the participants were compensated for their contribution by introducing and explaining the application: mobieG. MobieG is an existing health and well-being resource that can be accessed through a computer or mobile phone with Internet availability.

Table 3.1: Action Plan Summary

	Step 1: HEAR	**Step 2: CREATE**	**Step 3: DELIVER**
Description:	Gather stories and inspiration from the participants	Develop frameworks, opportunities, solutions, and prototypes	Realize relevant health information solutions
Action Plan:	Group A: Health Needs Assessment & Quality of Life Assessment Group B: Topic discussion	Group B: Co-design workshop Group C: Feedback workshop	Group A, B, and C: MobieG skills development workshop
Outcome:	Establish health and well-being status and information needs	Co-design and evaluate an youth-friendly health and well-being information service concept prototype	MobieG intervention and concept prototype refinement

The design characteristics provided the researcher with a mechanism to obtain information about the design process as well as the design concepts – these lead to the research findings

3.4. Data analyses: Thematic Analysis

Thematic analysis emphasizes pinpointing, examining, and recording patterns (or "themes") within data. Themes are patterns across data sets that are important to the description of a phenomenon and are associated to a specific research question (Bryman, 2012: 580).

Researchers review their data, make notes and begin to sort it into categories. Styled as a data analytic strategy, it helps researchers move their analysis from a broad reading of the data towards discovering patterns and developing themes (Braun & Clarke, 2006: 80). While researchers debate whether thematic analysis is a complete "method" per se, it is a process that can be used with many kinds of data, and with many goals in mind (Boyatzis, 1998).

Thematic analysis is a process of encoding information: The researcher develops "codes," words or phrases that serve as labels for sections of data (Joffe & Yardley, 2004: 56). Depending on the methodology and research question, codes can come in many shapes and sizes. Referring to a set of codes, Boyatzis (1998: 7) explains, “This may be a list of themes, a complex model with themes, indicators, and qualifications that are causally related; or something in between these two forms”.

Thematic analysis is flexible and what researchers do with the themes once they uncover them differs based on the intentions of the research and the process of analysis (Braun & Clarke, 2006: 99). Many researchers use thematic analysis as a way of getting close to their data and developing some deeper appreciation of the content (Aronson, 1995: 2).

During the project, it was important to look for patterns and relationships between categories and to continue grouping themes. The goal was to identify key themes and then to translate those into rich opportunities for design (IDEO, 2015: 80).

CHAPTER FOUR
RESEARCH RESULTS AND DISCUSSION

This chapter is set out in four sections. The results and discussion will be explained under each heading, as defined in the HDC process. Each phase (4.1. Hear, 4.2. Create, 4.3. Deliver) will be discussed separately. The last section (4.4. Research Implications) is dedicated to answering the research questions, and establishes whether or not the research objectives of the project were met. This section will end with concluding remarks and implications for future research.

4.1 HEAR

During this phase the research process was organic, exploring many creative possibilities. The research approach was experimental, yet grounded in the desires of the engaging community, to ensure that ideas evolved into appropriate solutions. Before engaging with participants, it was important to have a strategy around who to talk to, what to ask them, and what pieces of information to gather.

The researcher used a culturally adapted health and well-being information questionnaire to understand the community's QOL and health information needs. Group A completed the health and well-being information needs questionnaire in the comfort of their own homes. The questionnaire consisted of general project information, an informed consent[7] document, the QomQol-S5, and a health needs assessment. A teacher provided the questionnaires to interested participants and collected the booklet after a week to return to the researcher.

Group A consisted of ten participants (n = 10), residing in Durbanville, Western Cape. All participants were 18 years old and unmarried. The sample consisted of 3 male participants and 7 female participants, of whom 5 were white, and 5 were coloured. None of the participants were caring for someone with a disability. The following graph indicates the size of each participant's household:

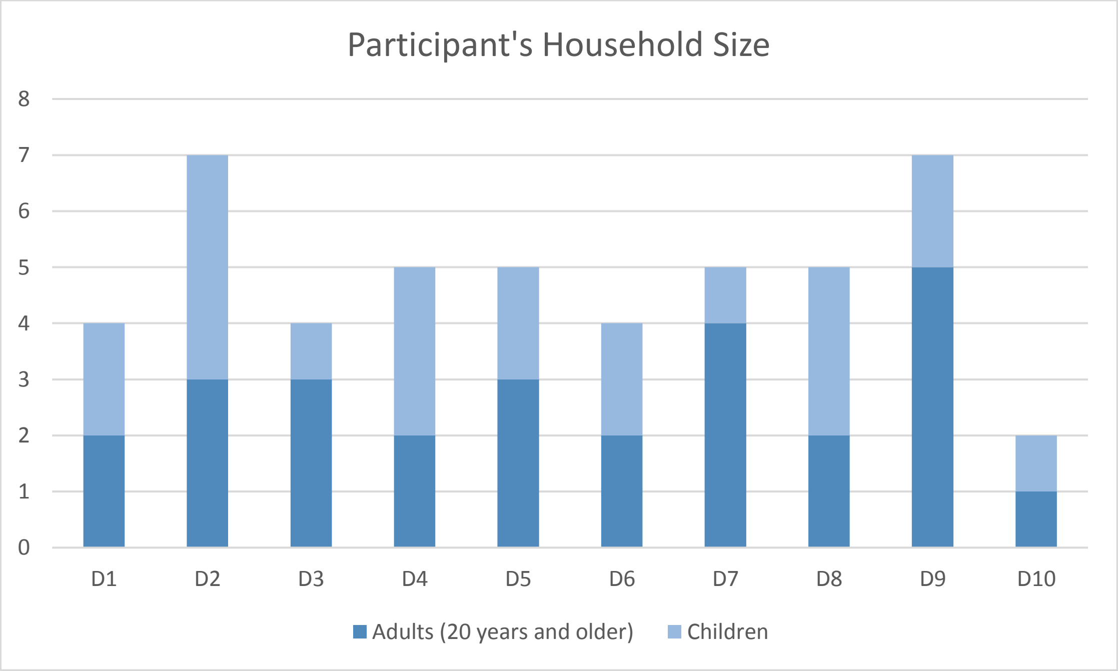

Figure 4.1: Participant's Household Size (Author, 2015)

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[7] **See Appendix C**

4.1.1. ComQol-S5

The understanding, measurement, and improvement of human experience have been major goals of individuals, researchers, communities and governments (Danna and Griffin, 1999). The overall assessment of human experience has been commonly expressed by the term *quality of life* (QOL) across multiple disciplines including psychology, medicine, economics, environmental science, and sociology (Cummins et al., 2003).

The ComQol-S5 was used to establish the participants' current QOL. This tool includes the following domains:

Figure 4.2: The seven quality of life domains (Author, 2015)

Drawing from multiple disciplines, an integrative definition of QOL combines measures of human needs with subjective well-being or happiness. QOL is proposed as a multi-scale, multi-dimensional concept that contains interacting objective and subjective elements (Azar, 2004: 51). QOL relates to the opportunities that are provided to meet human needs in the forms of built, human, social and natural capital (in addition to time) and the policy options that are available to enhance these opportunities (Easterlin, 2003: 11179).

Enhancing QOL has long been an explicit or implicit goal for individuals, communities, nations, and the world. As mentioned in Chapter 3, QOL refers to both the objective and subjective axes of human existence. Research reveals that subjective human conditions are both the cause and effect of objective human conditions (Costanza et al., 2007: 267).

When evaluating the state of human affairs or proposing policies to improve them, individuals typically proceed from assumptions about the characteristics of a ‘good life’ and strategies for achieving them (Azar, 2004: 61). For example, access to particular resources (such as health and well-being information) is a part of a good life and, therefore, increasing economic production per-capita is an appropriate goal. Unfortunately, the underlying assumptions are rarely tested and established. Therefore, there exists a need for a more basic approach to defining QOL that, in turn, can guide efforts to improve humans' daily life experience.

Examinations of QOL often fall under two headings:
Objective indicators of QOL include, for example, indices of economic production, literacy rates, life expectancy, and other data that can be gathered without a subjective evaluation being made by the individual being assessed. To the extent to which such a measure can be shown to be valid and reliable across assessment contexts, these objective measures are helpful in gathering standardized data that are less vulnerable to social comparison and local adaptation (Costanza et al., 2007: 268).

Subjective indicators of QOL gain their impetus, in part, from the observation that many objective indicators merely assess the opportunities that individuals have to improve QOL rather than assessing QOL itself. Subjective measures typically rely on questionnaire tools to gather respondents' own assessments of their lived experiences in the form of self-reports of satisfaction, happiness, well-being or some other near-synonym. Rather than presume the importance of various life domains (e.g., life expectancy or material goods), subjective measures can also tap the perceived significance of the domain (or need) to the respondent (Costanza et al., 2007: 269). Diener and Suh (1999: 193) provide convincing evidence that subjective indicators are valid measures of what individuals perceive to be important to their happiness and well-being. Nevertheless, there are individuals who cannot provide subjective reports or whose subjective reports may not be as trustworthy in reflecting their true welfare because of the internalisation of cultural norms, mental illness, lack of information, or other reasons.

It seems best, then, to attempt an approach to QOL that combines objective and subjective QOL approaches. Nussbaum & Sen (1993: 7) offer an integrative definition of QOL is as follows:

> "QOL is the extent to which **objective** human needs are fulfilled in relation to personal or group perceptions of **subjective** well-being."

The ComQol-S5 was analysed and interpreted using the group averages (%) to represent the community. The axes' results will be displayed below. The most useful level of analysis was at the level of the domain for two axes; objective (Figure 4.3), and subjective satisfaction (Figure 4.4). Details of Group A's responses on the ComQol-S5 can be found in Appendix E, with an example transcript of the participants' questionnaire in Appendix C.

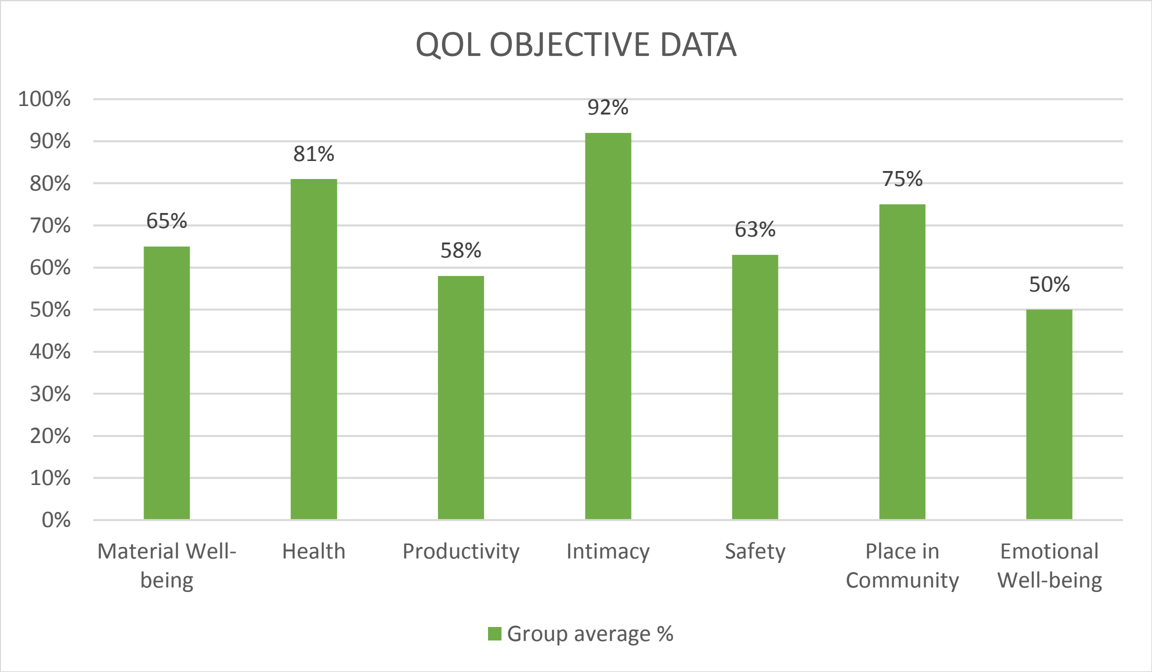


Figure 4.3: ComQol-S5 Objective data

The objective data in the table above represents the current QOL of the Durbanville youth. The group scored extremely high within the intimacy domain. Thus, the youth of Durbanville have an above average QOL regarding intimacy. The group also scored high within the health domain. The group showed an above average QOL regarding health.

The group showed sufficient QOL in their place in the community domain. Objectively, the Durbanville youth group is satisfied with their QOL relating to intimacy (92 %), health (81 %), and their place in the community (75 %).

The group revealed an average QOL with regards to material well-being (65 %), safety (63 %), and productivity (58 %). These domains should be improved to reach the most optimal QOL.

Lastly, and most significantly, the group showed extremely low QOL regarding emotional well-being (50 %). This is such an important domain for optimal health and well-being. The emotional well-being of the Durbanville youth must be greatly improved upon to reach a satisfactory QOL.

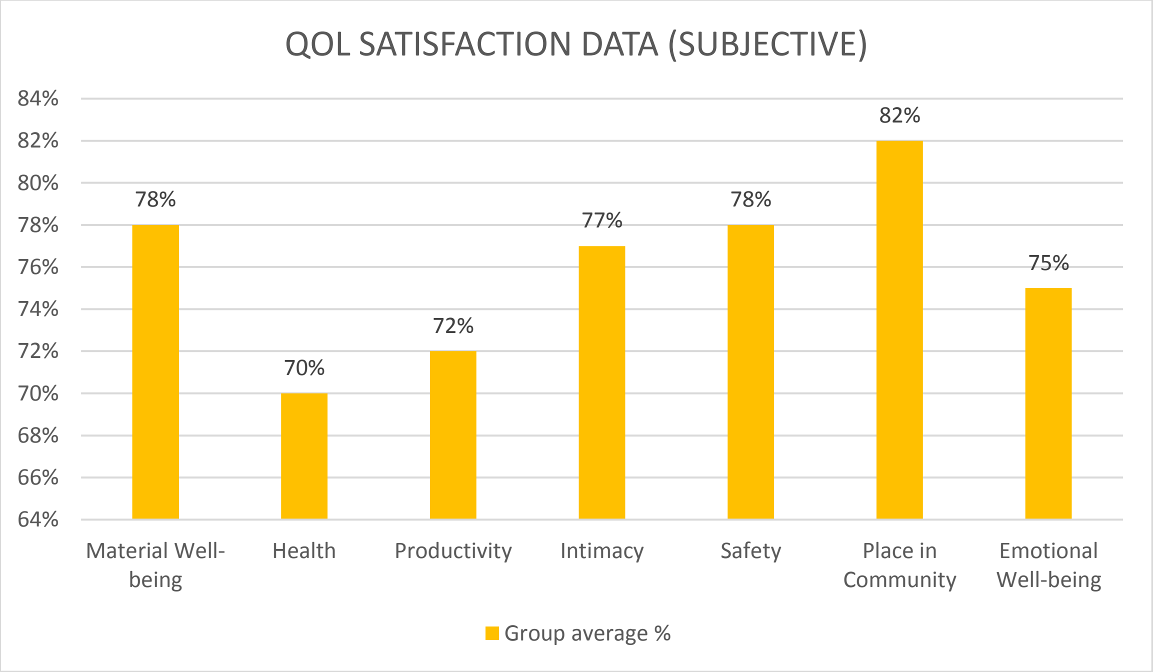


Figure 4.4: ComQol-S5 Satisfaction

Subjectively, the group felt satisfied with their overall QOL. The group scored 70 percent and above for all the domains. The group felt most satisfied with their place in the community (82 %), then safety and material well-being (78 %), then intimacy (77 %), then emotional well-being (75 %), then productivity (72 %), followed by health (70 %).

Thus, Durbanville youths tend to be quite satisfied with life in general, reporting an average of 76 %. This can be due to the fact that age does seem to play a determinant role: life satisfaction is at its highest in the youngest generation (Rogers, 1982: 308).

There are multiple inconsistencies in the analysis of objective QOL and subjective QOL. The following table indicates the comparison between the objective data and subjective data.

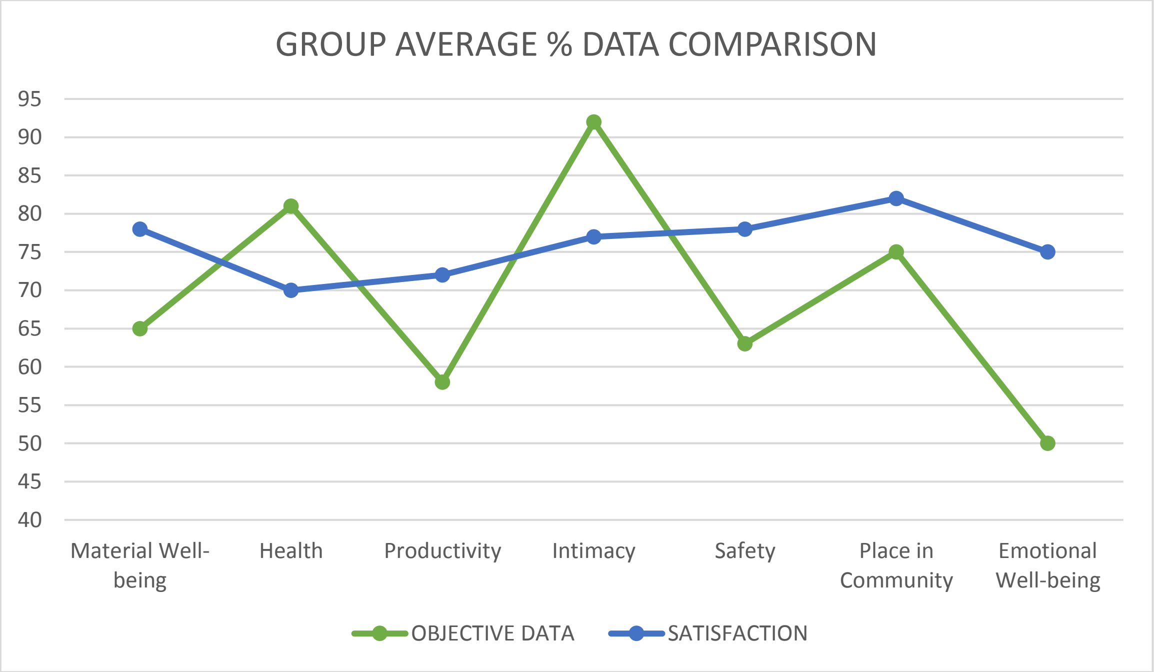


Figure 4.5: Objective Data and Subjective Satisfaction Data comparison

Satisfaction involves a cognitive, evaluative reflection on present and past experiences. There is a subtle but significant difference between the concepts of happiness and life satisfaction, which must be taken into account when interpreting relevant data.

The following explanation (Table 4.1) of the objective and subjective results displayed in Figure 4.5 clarifies the current QOL on all seven domains of the Durbanville youth group.

Table 4.1: Durbanville youth's QOL implications

QOL Domain	Objective and Subjective comparison
Material well-being	The objective data shows that the material well-being of the group should improve, however, the group is satisfied with this domain.
Health	Objectively, the group's health is good, but the participants are not satisfied with their health. This is important, since it is a domain that can be targeted for investigation and development.
Productivity	The productivity of the group is quite low according to the objective data, however, the group is satisfied with their current level of productivity.
Intimacy	The group scored extremely high on the intimacy domain objectively. It seems as if the group is not satisfied with this domain. This is important, since it shows that the group wants more intimacy.
Safety	Even though the group's safety should improve, they are satisfied with their current level of safety.
Place in community	The groups' place in the community is objectively good, and subjectively they are also satisfied with their place in the community. The scores complement each other.
Emotional well-being	Objectively, the groups' emotional well-being is significantly low. This is a domain that should be targeted for improvement. The group seems satisfied with their emotional well-being, however, this is problematic since the group is unaware of their low emotional well-being.

In summary, subjective and objective data are distinct types of information. Objective measures may be more suitable in establishing appropriate interventions. However, subjective information is necessary to complete the QOL picture and to enhance the interpretation of objective data. The ComQol-S5 contributed greatly to the quantitative understanding of the communities' QOL and current health and well-being.

Thus, from the data gathered, the most important domains to improve is the groups' emotional well-being followed by their safety and productivity. As mentioned in Chapter 2, research highlights the perspective of South African youth, revealing that the youth experience high levels of emotional stress that may be as a result of crime, health issues, poverty and discrimination. Literature shows that attention is needed in the area of mental and emotional health and well-being (Grootboom, 2007: 130); and Ungar (2008: 221) states that emotional health and well-being has many benefits that can add to the positive functioning of the disadvantaged youth in South Africa.

4.1.2. Health information needs assessment

The participants described their health as follows: None of the participants said their health was excellent, 5 participants described their health as very good, 4 participants described their health as good, 1 participants described his/her health as fair, and none of the participants answered that they were in poor health.

None of the participants have a disability, long-term illness or chronic condition except a single participant who needs glasses for sight problems.

Seven of the participants stated that the main difficulty they face in trying to improve their health is that they do not have not enough time, two participants stated that they do not have enough money, and one participant stated that he/she does not receive enough encouragement from family and friends.

The following themes, displayed in Table 4.2 emerged through thematic data analysis. The thematic analysis of the health needs assessment was aimed at data reduction. It was important to get familiar with the data set. The transcripts were read a three times. Discovering themes within the transcripts was an active process of identifying themes that fit together. The ‘candidate themes’ was reviewed to ensure internal coherence in each theme and strong distinctions between them. Three themes were identified, namely: Health, Sickness, and Unhappiness. Each theme contained multiple sub-themes associated with the main themes (*See* Table 4.2).

Table 4.2: Health needs assessment results

Theme	Sub-themes (Associations)
Health	• exercise • positive body-image • feel optimistic about life • feel happy • healthy diet • visit friends • positive mood • right state of mind • have energy • help from family • visit a doctor (if money is available) • rest (stay in bed, sleep) • medication • activities that makes them feel good
Sickness	• monthly period • worry/stress • fatigue/tiredness/weakness • sleeping problems • a cold (sneezing and coughing) • not being active enough • unhappiness • a poor state of mind • fever • headaches
Unhappiness	• unsupportive friends and family • group pressure • sport injuries • bullying from friends • dishonesty from others • disappointment from others • unhappy friends and family • overwhelming workload • Academic work (low marks) • a lack of sleep • illness • only wanting to sleep • anger and irritation/impatience • bad experiences from the past • coping with bad news • poor goal setting • group pressure • pressure to perform • poor concentration • depression • rough day/time

Participants stated in the questionnaire that they wanted to know more about the following health-related topics: organs (heart, lungs, kidneys, liver), chronic diseases, Diabetes, TB, STD's, cervical cancer, immune system, physical health (muscle building, exercising), sleeping problems, and healthy diets.

Participants stated that they don't know what to do, when their health and well-being:

- Does not feel right, and don't know what to do about it
- Is weakening, and they cannot go to a doctor
- Is fluctuating
- Is weak because of a lack of exercise
- Does not improve
- Upsets them

Participants stated that they feel *uncertain* about healthy diets and eating habits, sport injuries, organs (kidneys, heart problems), physical well-being (exercise), energy levels, and Asthma.

When participants need information about their health and well-being they ask a doctor, family member (mother, cousin, brother, grandfather, grandmother), friends, or they use the internet (search engines, such as Google). The participants stated that when they feel concerned about their own health or someone else's, they ask help from anyone close and trustworthy (such as friends and family members).

Participants were asked to rate their knowledge about health and well-being issues on a scale of 1-5 according to the following:

1. *I know nothing about this*
2. *I know what it is, but know little about it*
3. *I know enough about this*
4. *I know everything I need to know about this*
5. *I don't need any more information about this*

The graph below indicates the participant responses, ranging from topics the participants have less knowledge about (starting with dementia), to topics they felt they knew sufficiently (ending with safe sex). Group averages were used for each health topic.

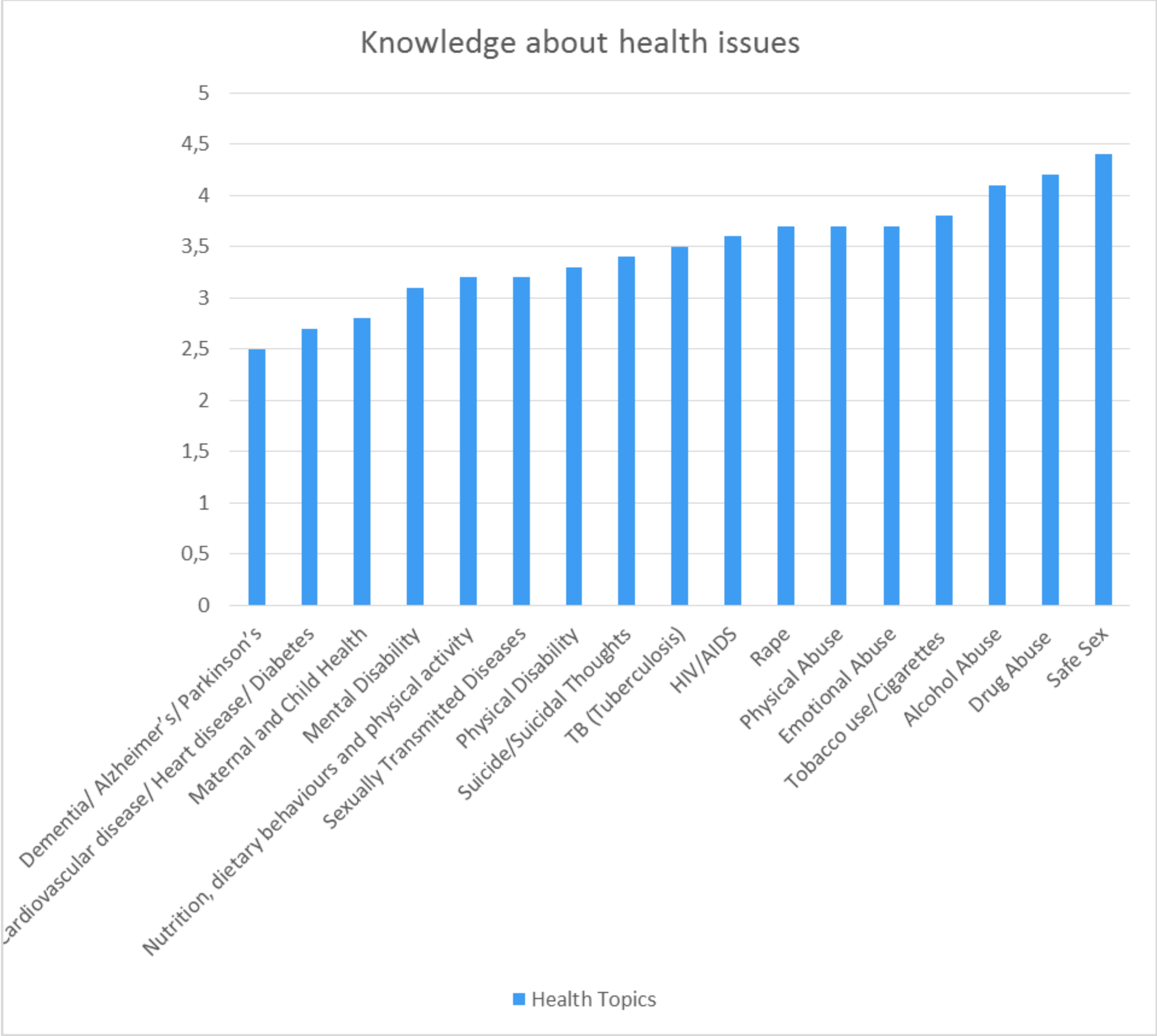


Figure 4.6: Participants' knowledge about health topics

As mentioned in Chapter 2, research by Billings and Cowley (1995) shows that equity in health and well-being means that individuals' needs guide the distribution of opportunities for health and well-being. Thus, the health needs assessment was critical for the current project that focused on community health and well-being. The health needs assessment identified priority health needs, addressed inequalities and involved local individuals (Wright et al., 1998: 1310). Agreeing with Green (2008); the outcome of the health needs assessments described the state of health of Durbanville youth residents; enabled the identification of the major risk factors and causes of ill health; and enabled the identification of the actions needed to address these.

The results from both tools: ComQol-S5 and the health needs assessment complement each other to understand the Durbanville youths' QOL and health needs. The ComQol-S5 provided quantitative data to aid in understanding the communities' QOL status. The health needs assessment provides qualitative data to aid in the understanding of the youth's health and well-being information needs. By comparing the quantitative and qualitative data, an in-depth understanding of the group's health and well-being was possible. This was exactly what the main goal of activities completed during the *Hear* phase.

The analysis of human needs is complicated by the different spatial and temporal scales of analysis at which human needs may be understood. One obvious level, of course, is the individual. In order to gauge QOL on the basis of human needs, measures of individual needs must be obtained.

Despite the interest in objective measures of health and well-being needs (ComQual-S5), often the most efficient way to operationally define such needs is through qualitative self-report (health needs assessment). For some health and well-being indicators, questionnaire methodology is most appropriate and generally provides reliable and valid information.

The goal was to build interpretations of the emerging patterns and relationships to common resources with the understanding that actual communities act differently, not only from one another but also internally with respect to the various needs. Therefore, there is no such thing as a "correct" scale.

These QOL measures represent a 'snapshot' in time. It is understood that any measurement data used for predictive purposes would need to be collected over sufficiently long time periods to successfully capture or model the co-evolution of humans with their environment and develop an effective knowledge base (Costanza et al., 2008: 18). The ability to properly receive and interpret patterns from measurements in combination with policy over rapid time frames will provide the key to improving QOL and collective survival.

In order to operationalize the measurement of the youth of Durbanville's health and well-being information needs, a working table below indicate the kinds of empirical indicators and satisfiers found in the results from the questionnaire. Table 4.3 is adapted for Durbanville's youth specifically, whereas Table 2.1 displays universal human needs by multiple researchers (Max-Neef', 1992; Nussbaum & Glover, 1995; Frisch, 1998; Cummins, 1993; Maslow, 1954; Sirgy, 2002; and Greenley et al., 1997). The table is adapted to the ComQol-S5 domains, with more satisfiers mentioned by the participants in the health needs assessment. Thus, it is an integration of the results obtained by the ComQol-S5 as well as the health needs assessment.

Table 4.3 provides a holistic view of the health and well-being status and needs of Durbanville youths. The table provides the seven QOL domains as the main needs (see Figure 4.2). The collective human needs discussed in Chapter 2 (see Table 2.1) is divided into subsections of the relevant seven domains. The descriptors typed in **bold** within Table 4.3 represents the found satisfiers specific to the needs of the Durbanville youth.

The table also lists the inputs needed to satisfy these needs. It is evident that all inputs is useful to achieve success in the current intervention. That is, human, social, natural, and built capital and time opportunities in the surroundings should be utilised.

Table 4.3: List of the Health and Well-being Needs of Durbanville's youth

Human needs (Durbanville's Youth)	**Descriptors (direct satisfiers)**	**Types of inputs needed**
1. Material well-being Leisure	Recreation, relaxation, tranquillity, access to nature, travel	Time
2. Health Subsistence	Food, shelter, vital ecological services (clean air and water, etc.…) **healthcare**, rest	Built capital* Natural capital* Human capital Time Social capital
Reproduction	**Nurturing of children, pregnant women** Transmission of the culture Homemaking	
Understanding	**Access to information** Intuition and rationality **Exercise, healthy diet, energy, active lifestyle** **Stress relief** **Enough sleep**	
3. Productivity Participation	To act meaningfully in the world Contribute to and have some control over political, community, and social life **Being heard** Meaningful employment Citizenship **Time-management**	Social capital
4. Intimacy Affection	*"Being able to have attachments to things and persons outside ourselves; to love those who love and care for us, to grieve at their absence."* (Nussbaum and Glover, 1995) **Solidarity, respect, tolerance, generosity, passion, receptiveness** **Friendship, family support** **Honesty**	Time* Social capital Natural capital
5. Safety Security	Enforced predictable rules of conduct **Safety from violence at home and in public** Security of subsistence into the future Maintain safe distance from crossing critical ecological thresholds Stewardship of nature to ensure subsistence into the future **Care for the sick and elderly**	Social capital* Built capital Time Natural capital

6. Place in community Identity	Status, recognition, sense of belonging, differentiation, sense of place Freedom from group pressure and bullying Acceptance	Social capital Human capital Natural capital Time
7. Emotional well-being Spirituality Creativity/ emotional expression Freedom	Engaging in transcendent experiences Access to nature Participation in a community of faith Play, imagination, inventiveness, artistic expression *"Being able to live one's own life and nobody else's. This means having certain guarantees of non-interference with certain choices that are especially personal and definitive of selfhood, such as choices regarding marriage, childbearing, sexual expression, speech and employment"* (Nussbaum and Glover, 1995) Mobility **Self-confidence (body)** **Optimism towards life, happiness, good mood, positive state of mind** **Support from friends and family** **Closure on bad experiences of the past** **Anger management**	Human capital Social capital Natural capital Time Human capital* Time* Natural capital Social capital* Natural capital

The challenge was to identify and target participants' genuine needs. Mobilising resources to meet these needs would certainly avoid further expenses, keep participants satisfied with services, and lead to better QOL. There is no single definition of genuine health and well-being needs, precisely within the context of public health and well-being policy, yet it makes sense to describe this inherently complex issue as 'what the population as a whole desire to receive from health and well-being services to improve overall health'.

As the needs of the youth community in Durbanville were established through the health needs assessment, it was possible to explore solutions through participatory co-design sessions, to satisfy their health and well-being needs (by using inputs) with the possibility of an overall improvement on their QOL.

The co-design sessions with Group B and C provided a possible designed solution to achieve this goal. The findings of this phase are discussed in section 4.2: *Create*.

4.2 CREATE

A target group can reveal the most important issues in the community, and the participants can direct the research activities in an appropriate direction. Co-design sessions offer a platform to obtain feedback on ideas, and bring participants deeper into the process. The purpose of a co-design session is to convene a sample from the community, and then get them to design alongside the researcher. The researcher is not just hearing the participants' voices (as discussed in section 4.1: *Hear)*, but empowering them to *become* the design team. Within this study, co-design activities facilitated the design of a health and well-being information service that responded to the needs identified in the *Hear* phase.

4.2.1. Co-design

The co-design exercise consisted of two sessions with two independent groups. Group B (n = 15) had a discussion and compiled affinity diagrams, followed by the creation of a concept prototype. Group C (n = 8) evaluated the concept prototype and created storyboards.

All sessions started with the researcher welcoming the group and a personal introduction. This was followed by an ice-breaker to encourage the students to feel comfortable. The researcher explained the full nature of the study and the activities involved. There was time allowed for questions and answers. Participants were informed that they were welcome to leave the study at any time. Before the activities commenced, the participants each signed an informed consent document with the permission of their teacher. The teacher made her classroom available for the co-design sessions. It was made clear to the participants that they could consult their teacher at any time. The sessions were conducted during free periods and recess. The sessions were supervised by a teacher. All the participants gave written consent for the use of the photos shown in this document.

The necessary materials were made available to all groups. The activities were explained in detail and the groups had a chance to discuss the topic before breaking up into smaller focus groups.

4.2.2. Co-design session 1: Group B

The first co-design session involved a discussion group, followed by the co-creation of affinity diagrams.

Figure 4.7: Group B with affinity diagrams

During the discussion group the participants all agreed that a **mobile application** will be the most suitable health and well-being information service for the youth. The bulk of the youth in the Durbanville area has access to the internet and smart technology. Thus, the service type was established as a mobile application.

Referring back to literature published by WHO (2011b) in Chapter 2, new horizons for health and well-being arose through the use of mHealth. The use of mobile and wireless technologies to support the achievement of health and well-being objectives has the potential to transform the face of health service delivery in Durbanville. Not only using mobile communication devices for health and well-being services and information, but also to affect emotional states of the youth. As mentioned by Ling (2004) mHealth largely emerges as a means of providing greater access to larger segments of a population in developing countries, as well as improving the capacity of health and well-being systems in countries such as South Africa to provide quality health and well-being care.

The participants collaborated to complete an affinity diagram, with the health and well-being issues that they would like to receive information on, when using a health and well-being information mobile application. The following themes appeared on the affinity diagram:

- Peer-pressure
- Low self-esteem
- Depression
- Stress
- Anxiety
- Bereavement
- Abuse
- Domestic Violence

All of the themes that emerged were closely related with emotional well-being issues. This is significant, since emotional well-being was the domain that showed extremely low scores during the *Hear* phase (see Figure 4.3).

Group B also created an affinity diagram explaining which functions they would prefer when using the health and well-being mobile application (as seen in Fig 4.9):

- Users want **anonymity**/no name must be visible
- Users want to be able to **talk to an expert** via phone call/texts
- Users want to have a forum where they can **share their stories**
- Users want to have the option to **leave comments** on topics/stories
- Users want the option to **browse and play music** while exploring the topics on the application
- Users want to **search** the application for the topic they want to explore (search engine/function)
- Users want access to **self-help steps** written by experts
- Users want explanatory **visual videos** created by experts
- Users want the application to be **free** of charge
- Users want **contact/address details** of clinics and practices nearby
- Users want a list and details of all the available **help-lines**
- Users want to be able to take **quizzes** (For example; “Is my self-esteem low?”)
- Users want chat/text access to **counsellors** for mental/emotional support
- Users want to receive **motivational** quotes and speeches
- Users want the application to look **colourful, youthful and fun**

- Users also want a ‘fun’ function that will contribute to general well-being (For example; “Fashion advise”, “Make-up Tips”)

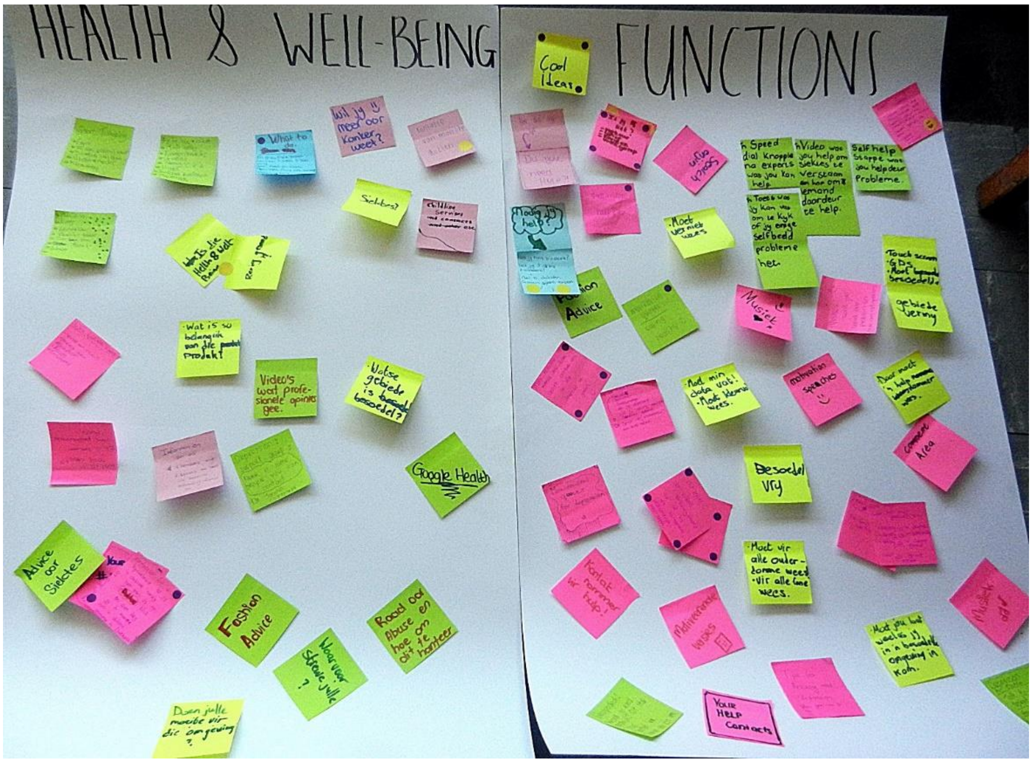
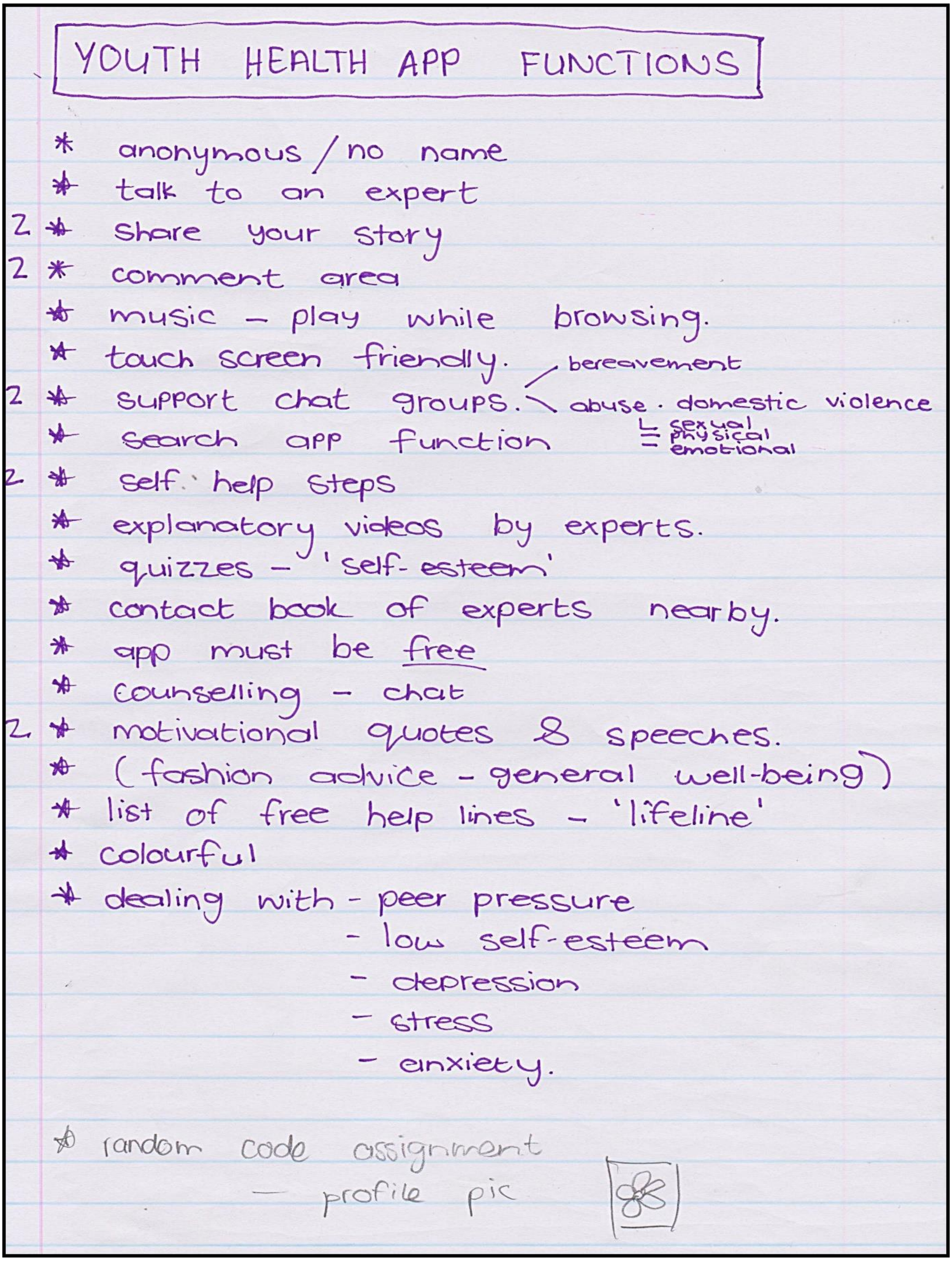


Figure 4.8: Affinity Diagrams

Affinity diagramming was used to sort large amounts of data into logical groups. Existing items and/or new items identified by the participants was written on sticky notes, which were sorted into categories in this workshop, as an activity.

This was an effective tool since affinity diagramming is a simple and cost effective technique for soliciting ideas from a group and obtaining consensus on how information should be structured (Beyer & Holtzblatt, 1999: 34). Here too, the real voice of the participants came through, not the researchers interpretation (which could have been subjective).

The group summarised which functions would be the most important to include in the development of a youth-friendly health and well-being mobile application (see Figure 4.9).



YOUTH HEALTH APP FUNCTIONS

* anonymous / no name
* talk to an expert
2 * share your story
2 * comment area
* music – play while browsing.
* touch screen friendly.
2 * support chat groups. < bereavement
abuse · domestic violence
└ sexual
= physical
= emotional
* search app function
2 * self help steps
* explanatory videos by experts.
* quizzes – 'self-esteem'
* contact book of experts nearby.
* app must be free
* counselling – chat
2 * motivational quotes & speeches.
* (fashion advice – general well-being)
* list of free help lines – 'lifeline'
* colourful
* dealing with – peer pressure
– low self-esteem
– depression
– stress
– anxiety.

* random code assignment
– profile pic

Figure 4.9: Functions

After discussing all the topics, functions and features that the participants wanted access to on a new health and well-being mobile application, the group created the first concept prototype (see Figures 4.10 to 4.12)

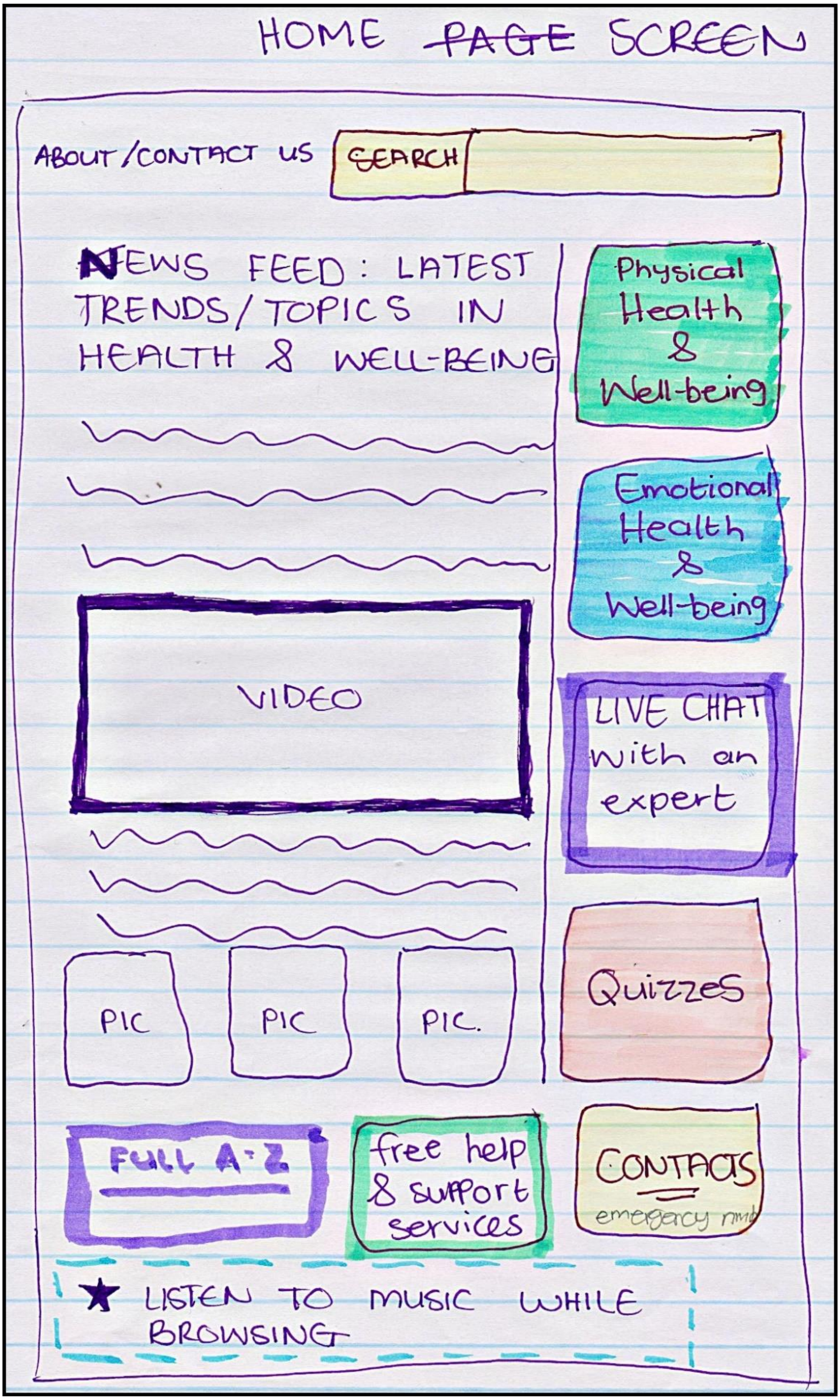


Figure 4.10: Home screen

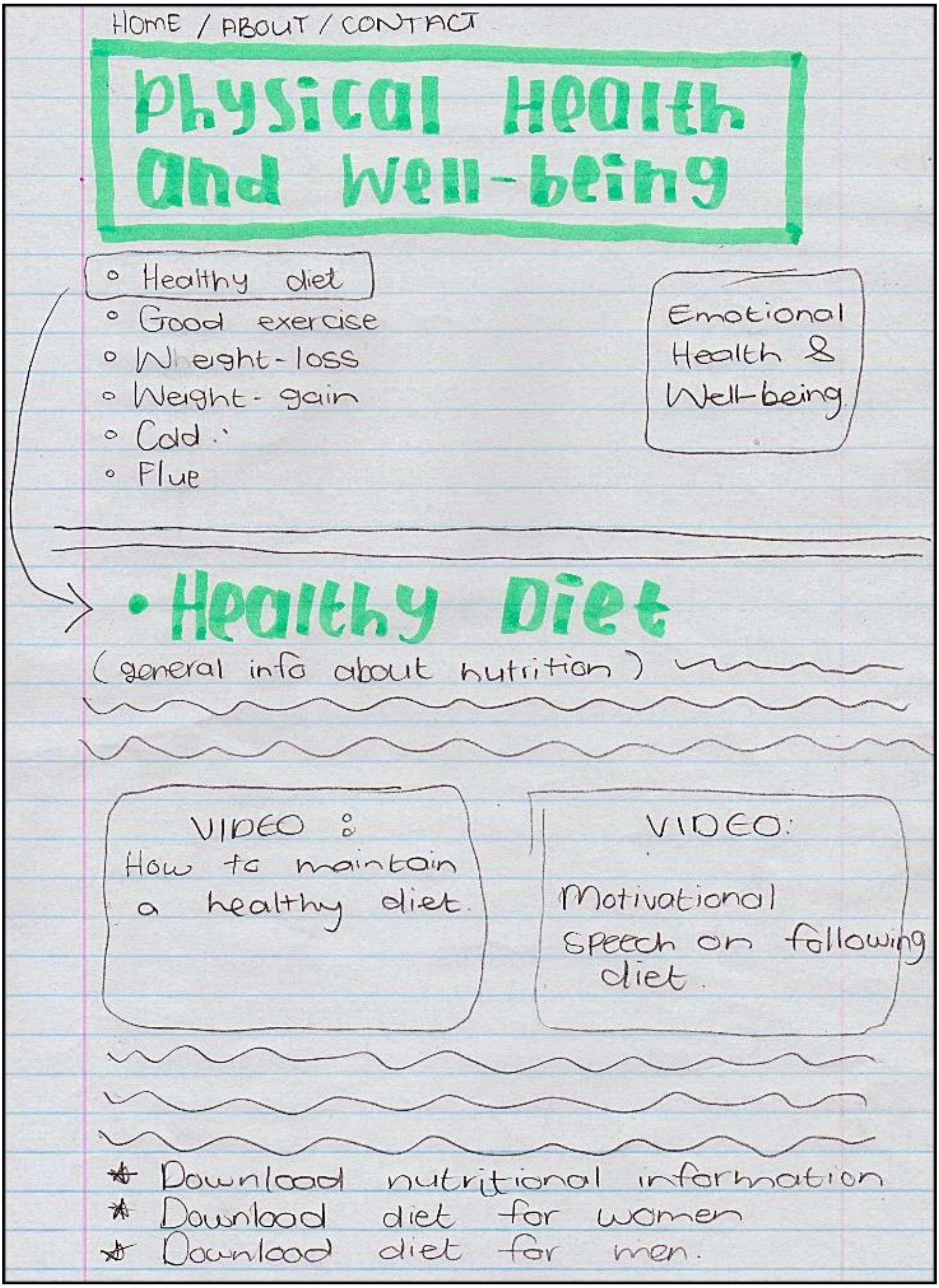


Figure 4.11: Physical health and well-being page

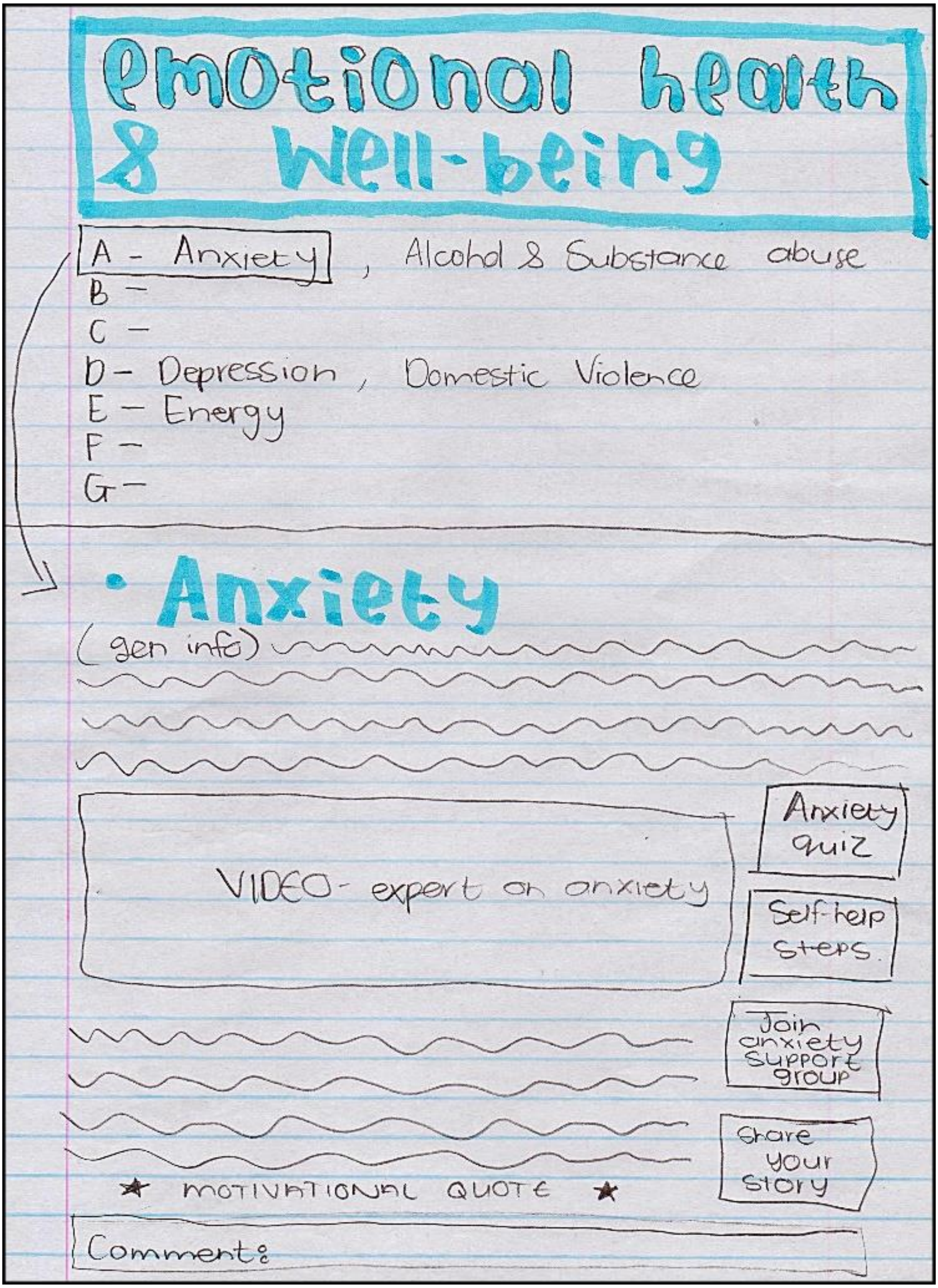


Figure 4.12: Emotional health and well-being page

Figure 4.10 illustrates the home screen of the mobile application. Firstly, the group drew a search function. This will allow users to search any health or well-being topic on the database. The bulk of the page includes a newsfeed, including current trends in health and well-being. Videos by experts may also be included within the newsfeed. The right column of the home screen illustrates links to the physical health and well-being page, the emotional health and well-being page, a live chat with an expert, the quiz page, and contact details of local health and well-being professionals. The bottom row includes links to the page with information about available health and well-being resources free of charge. For example: Lifeline, SADAG (South African Depression & Anxiety Group), MobieG, and the South African substance abuse helpline. Also, there is an A-Z link that will take users to a page of all the health and well-being topics on the application in alphabetical order. Lastly, there is the option to browse and listen to music while using the application. Users can remain completely anonymous while using the application.

Figure 4.11 roughly depicts how the physical health page on the mobile application will work. The page will list topic links alphabetically. If the user clicks on the topic 'healthy diet', information and visual aids will be displayed. The user will have the option of watching videos by experts on the topic as well as downloading documents with information and guidelines to their smartphones.

The same principles apply if a user clicks on the emotional health and well-being link roughly displayed in Figure 4.12. However, since the youth of Durbanville showed a direct need for emotional well-being education and support, the group decided to allow users to comment on the related topic, take a quiz about the topic, get access to self-help steps, join a support group with peers experiencing similar problems, and to have a safe space in which they can share their stories by posting it to a board specifically related to a topic (for example, anxiety).

4.2.3. Co-design session 2: Group C

Group C co-designed a health and well-being concept prototype on a personal computer and co-designed storyboards that illustrated a situation in which the health and well-being mobile application would be helpful.

Firstly, an introduction took place and the full nature of the study was explained. Following the icebreaker, the idea of a health and well-being information resource was discussed and participants were tasked to converse about how they would like to receive health and wellbeing information. Similar to Group B, the group decided that a mobile application would best suit their needs. The group then co-evaluated the initial illustrations (as seen in Figures 4.10– 4.12). Group C were extremely impressed with the idea. The researcher gave the group access to a personal computer on which they could computerise the prototype drawings. The group named the health and well-being mobile application "**WeHelp**". The group used the program 'Photoscape' to co-design the concept prototype:

Figure 4.13: Concept Prototype: Home screen

The mobile application will need smart technology (for example; a mobile phone that performs many of the functions of a computer, typically having a touchscreen interface, Internet access, and an operating system capable of running downloaded applications) to work properly (Page, 2013: 40). At first this might sound problematic for developing country users. However, this is certainly not the case. The most recent survey (Thomas, 2014) on smartphone usage in South Africa revealed the following information:

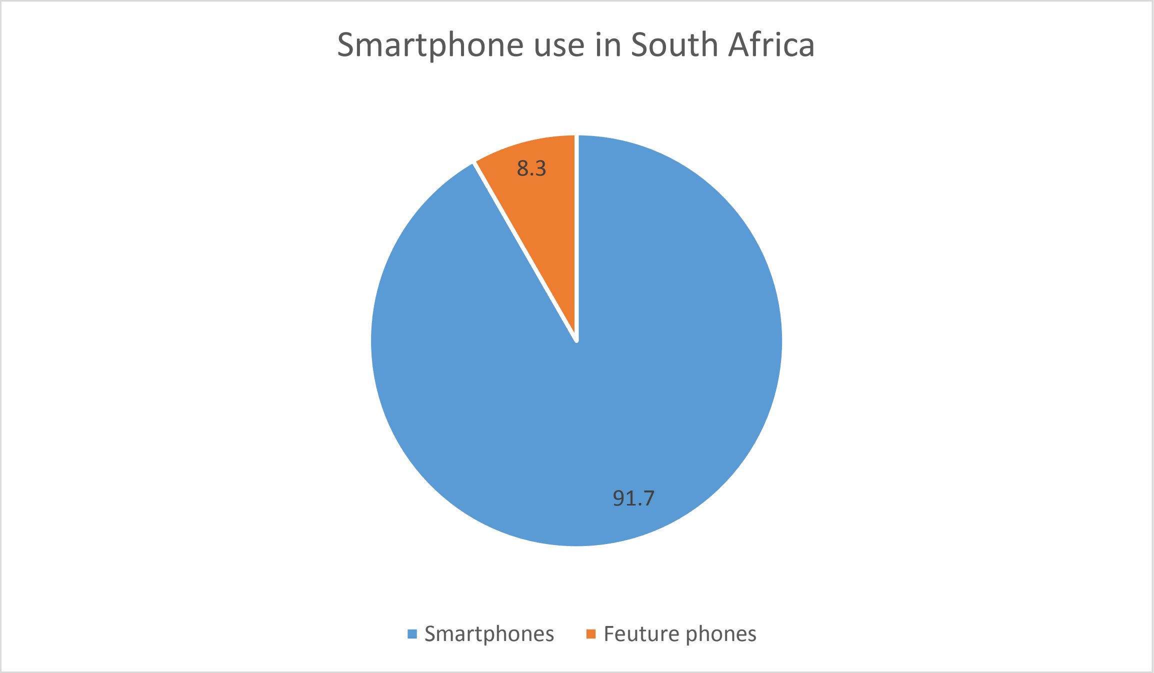


Figure 4.14. Smartphones in South Africa
(Adapted from Thomas, 2014)

As discussed in the literature review, there are 10 e's in eHealth worth considering while designing a service (Eysenbach, 2001). With the Durbanville youth groups' concept prototype in mind, the concept prototype was evaluated to establish whether it sufficiently satisfied these demands.

1. **Efficiency**:
   The health and well-being mobile application will increase efficiency in health care, and decrease costs since it will be free of charge. Communication possibilities between health care establishments, and through patient involvement will be enhanced.

2. **Enhancing quality of care:**
   Increasing efficiency involves not only reducing costs, but at the same time improving quality. The mobile application may enhance the user’s quality of health and well-being for example by directing users to the best quality health and well-being information.

3. **Evidence based**:
   This intervention was evidence-based in the sense that the effectiveness and efficiency was not assumed but proven by research (rigorous scientific evaluation) and directly obtaining data from the community (Durbanville).

4. **Empowerment of users**:
   The mobile application will empower the youth by making the health and well-being information accessible to users through a mobile application.

5. **Encouragement:**
   The mobile application will encourage a new relationship between the user and health and well-being professionals, towards a true partnership, where decisions are made in a shared manner.

6. **Education:**
   Users will receive health education, tailored preventive information and health and well-being support.

7. **Enabling information exchange and communication**:
   The application will serve as a platform for health and well-being information exchange in a standardized way between establishments.

8. **Extending the scope of health care beyond its conventional boundaries:**
   WeHelp will enable users to easily obtain health and well-being services online from providers. These services will range from simple advice to more complex interventions or products.

9. **Ethics:**
   EHealth involves new forms of patient-physician interaction and poses new challenges and threats to ethical issues such as online professional practice, informed consent, privacy and equity issues. The mobile application will give the user the option to remain completely anonymous.

10. **Equity:**

    People, who do not have the money, skills, and access to computers and networks, cannot use smart technology effectively. As a result, these are those who are the least likely to benefit from advances in information technology, unless political measures ensure equitable access for all. The digital divide currently runs between rural vs. urban populations, rich vs. poor, and between young vs. old. Smart technology is expanding rapidly and is accessible to most of the youth.

WeHelp was conceptualised as a platform that needs to be easy-to-use, entertaining (users can listen to music) and exciting (users can share their experiences and join support groups). It is important to note that the **WeHelp** mobile application meets the requirements of a successful eHealth intervention. This aspect clearly highlights a correlation between previous research findings in the field, regarding guidelines for successful eHealth solutions, and the findings from this study.

With **WeHelp** in mind, Group C was asked to create storyboards displaying a situation in which the service would be useful. The group divided into smaller groups to complete the activity.

The storyboards reflected a scenario in which the youth would use this health and well-being mobile application. The groups of participants created four storyboards. The themes consisted of: depression and suicide, self-defence, romantic relationships, and self-harm.

Figure 4.15: Group C creating storyboards

Figure 4.16: Depression and suicide storyboard

Figure 4.17: Self-defence and Depression and suicide storyboard

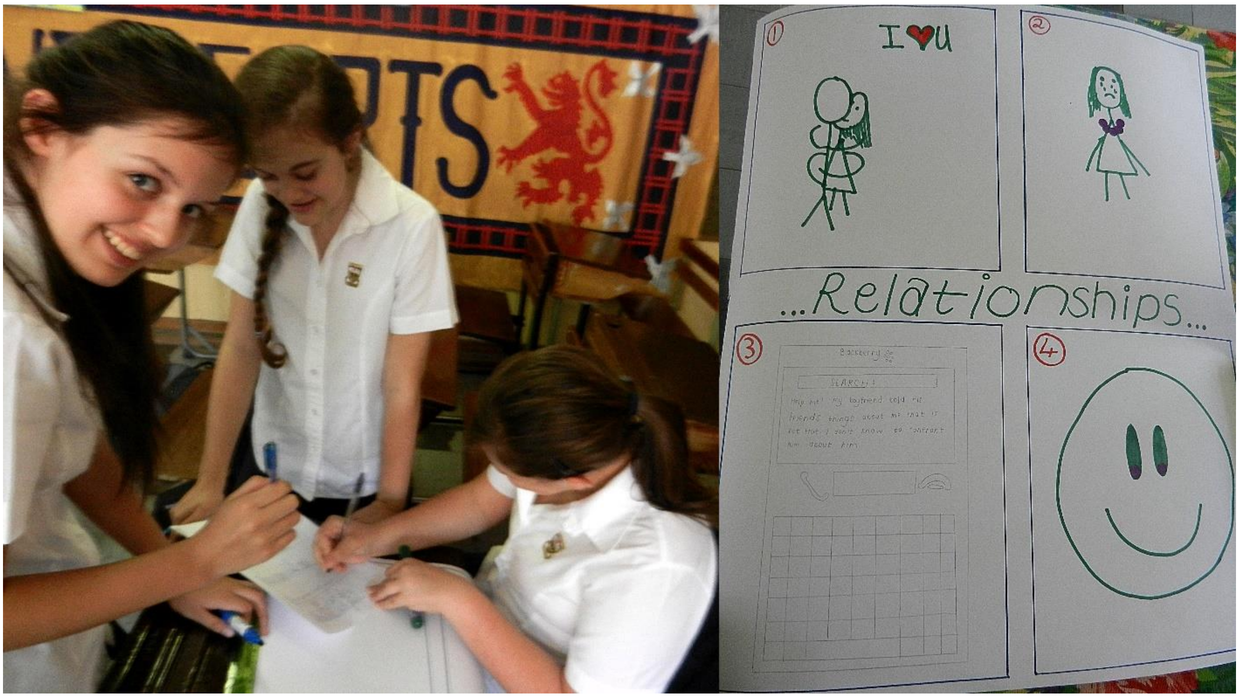


Figure 4.18: Interpersonal relationship storyboard

Figure 4.19: Self-harm storyboard

The storyboards were used as a technique for illustrating an interaction between the individual (youth) and a product (health and well-being mobile application). The medium was visual with a narrative format, which included a series of drawings/sketches and words to tell a story.

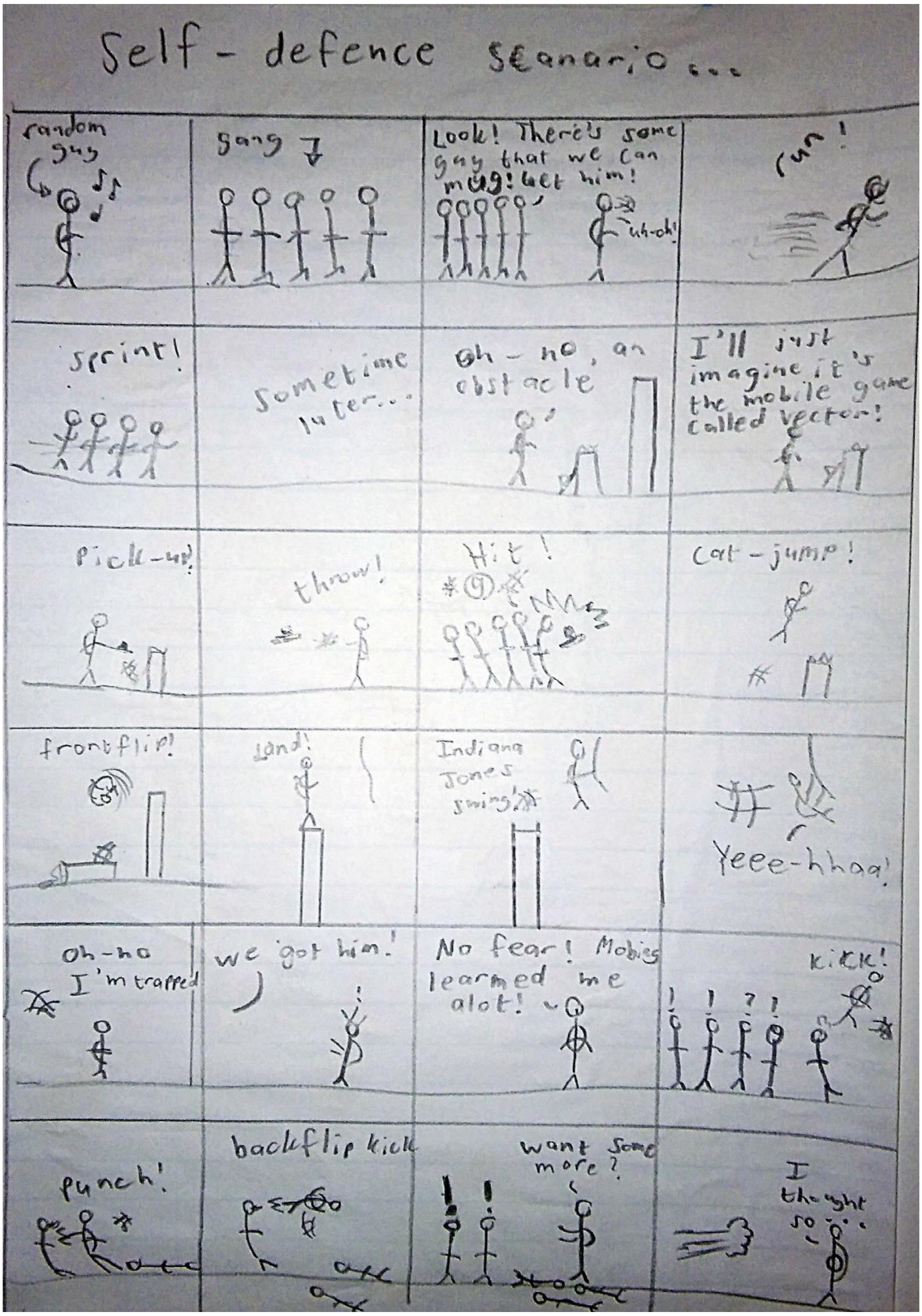
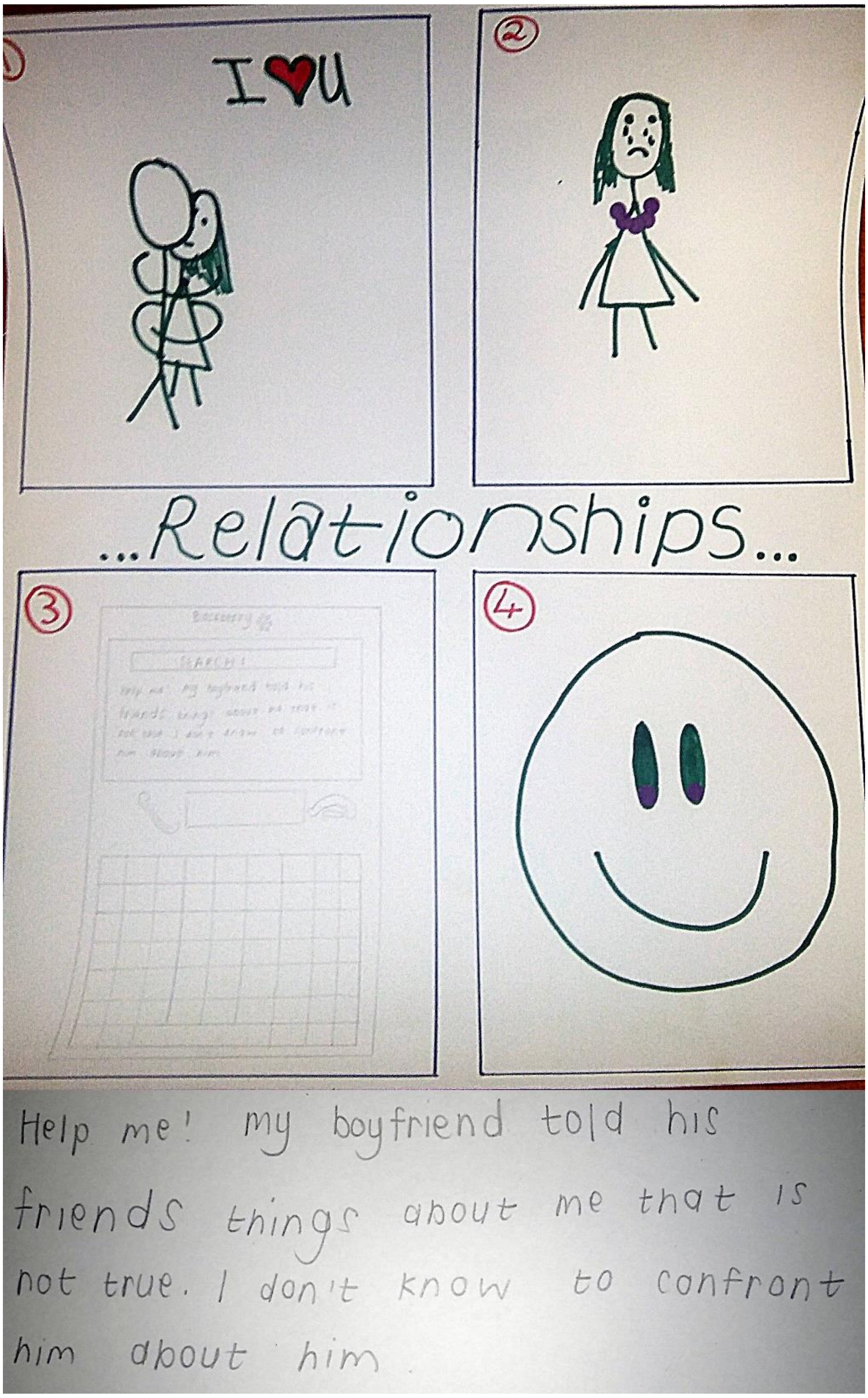


Figure 4.20: Self-defence

The participant that created the storyboard above (4.19) explained that he would use **WeHelp** to learn about self-defence, and also to get information on safety against violent gang members. As Cho and Wilke (2010) explains; youths are at risk of physical and psychological trauma resulting from problems such as abuse, gender-based violence, and other forms of physical violence. WeHelp, as designed by the Durbanville youth, will have the option to receive text-based counselling after a traumatic occurrence. There will also be tips on safety against violence.



Help me! my boyfriend told his friends things about me that is not true. I don't know to confront him about him.

Figure 4.21: Interpersonal relationships

The group that created the relationship storyboard explained that they would use **WeHelp** if they were being emotionally abused and heartbroken by an intimate partner. They would text a counsellor to obtain tools on how to handle the situation and also find out what a healthy interpersonal relationship is.

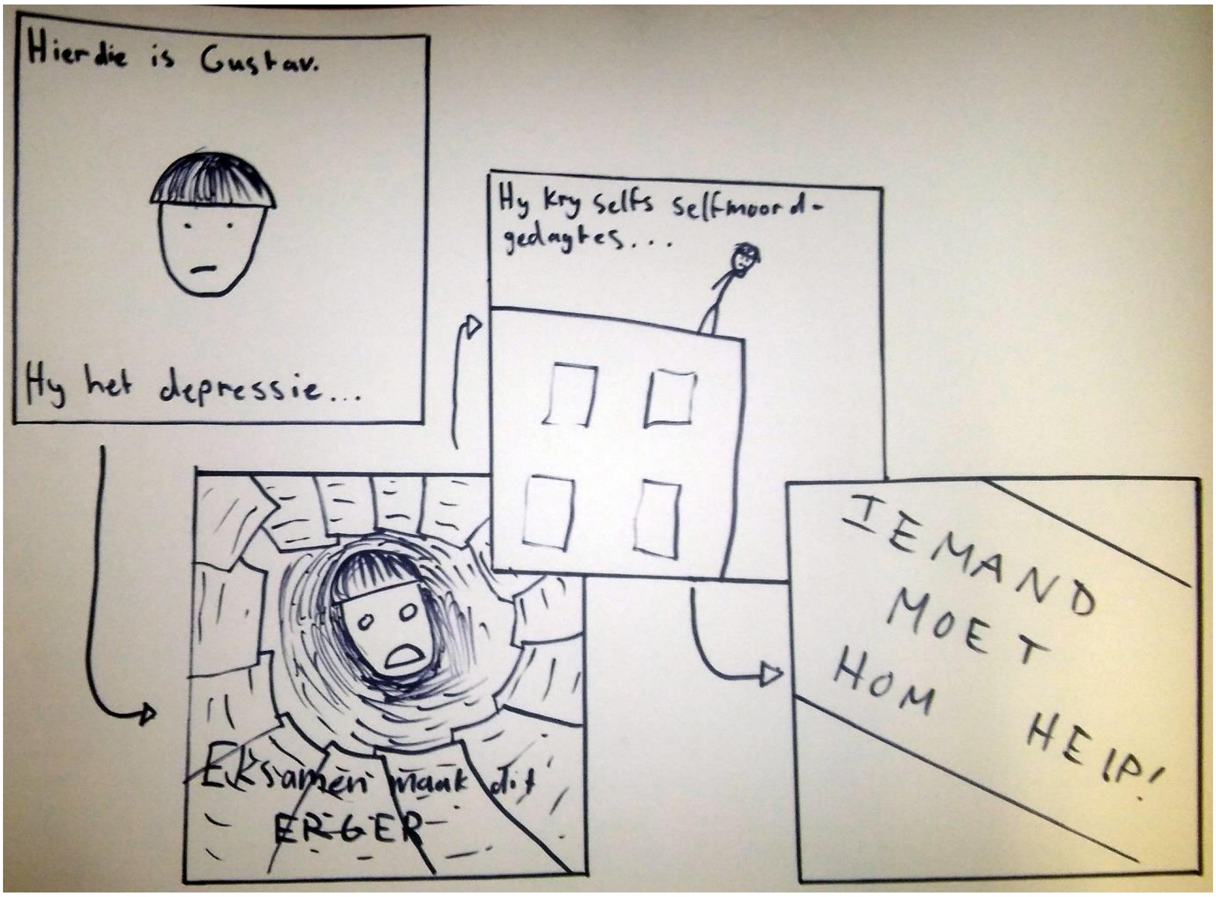


Figure 4.22: Suicide

The group that created the suicide storyboard used a character, Gustav, to illustrate in which situation **WeHelp** would be useful. ‘*Gustav is a high school student and he was diagnosed with depression. When he has school examinations, he feels overwhelmed and his depression symptoms elevate. He starts to contemplate suicide, he can’t handle the pressure. Gustav is in desperate need of help.* ***WeHelp*** *may save his life.’*

Research shows an enormous concern over the rate of youth depression and suicide (Malan, 2014). One in four South African teenagers have attempted suicide and one in three hospital admissions for suicide involve youth. Yet, most schools don’t have counsellors or psycho-social support systems in place (Malan, 2014). Research has shown that there are many psycho-social factors that could play a role, such as untreated mental illness, substance abuse, family problems, trauma, rape and poverty, which all have the potential of contributing to a person feeling suicidal. WeHelp, as conceptualised, will provide counselling and information about depression and suicide.

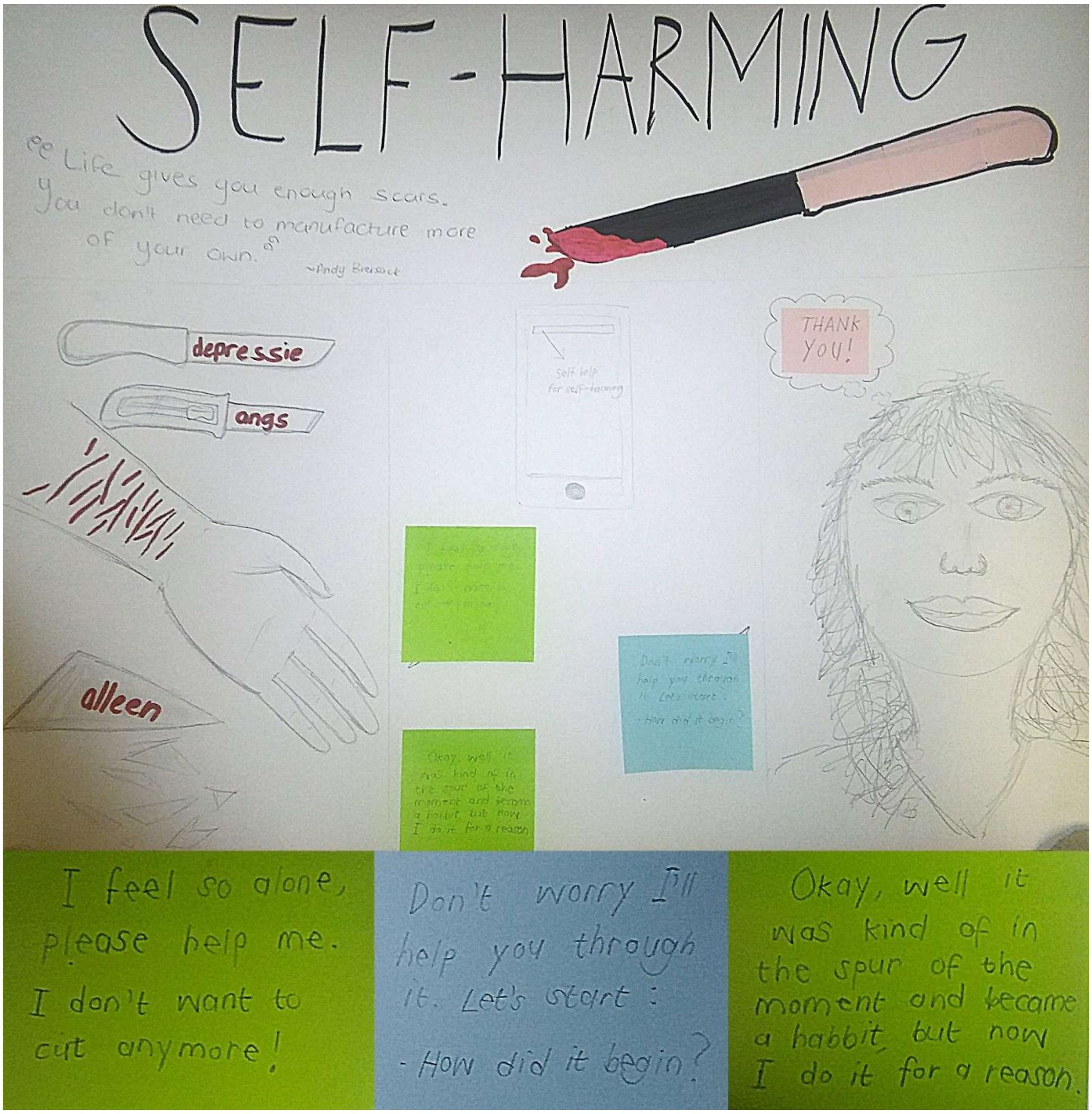


Figure 4.23: Self-harm

The fourth group created a self-harm storyboard. They explained that they would use **WeHelp** to talk to a counsellor when they are in a situation where they want to cut their wrists (self-mutilation). They explained that the cuts help youths to feel better emotionally when they are lonely, very anxious, and/or depressed.

According to Ross and Heath (2002: 67) self-mutilation is an increasingly prevalent problem affecting the youth. Literature (Plante, 2006: 189) confirms that the youth may be more vulnerable to self-mutilate for a number of developmental reasons. Suyemoto (1998: 550) raises the possibility that some adolescents use self-mutilation as a way to *overcome a difficult adolescence*. **WeHelp** will aim to raise awareness on the topic of depression, self-harm, and suicide. There would, for example, be counsellors available as well as information on coping mechanisms.

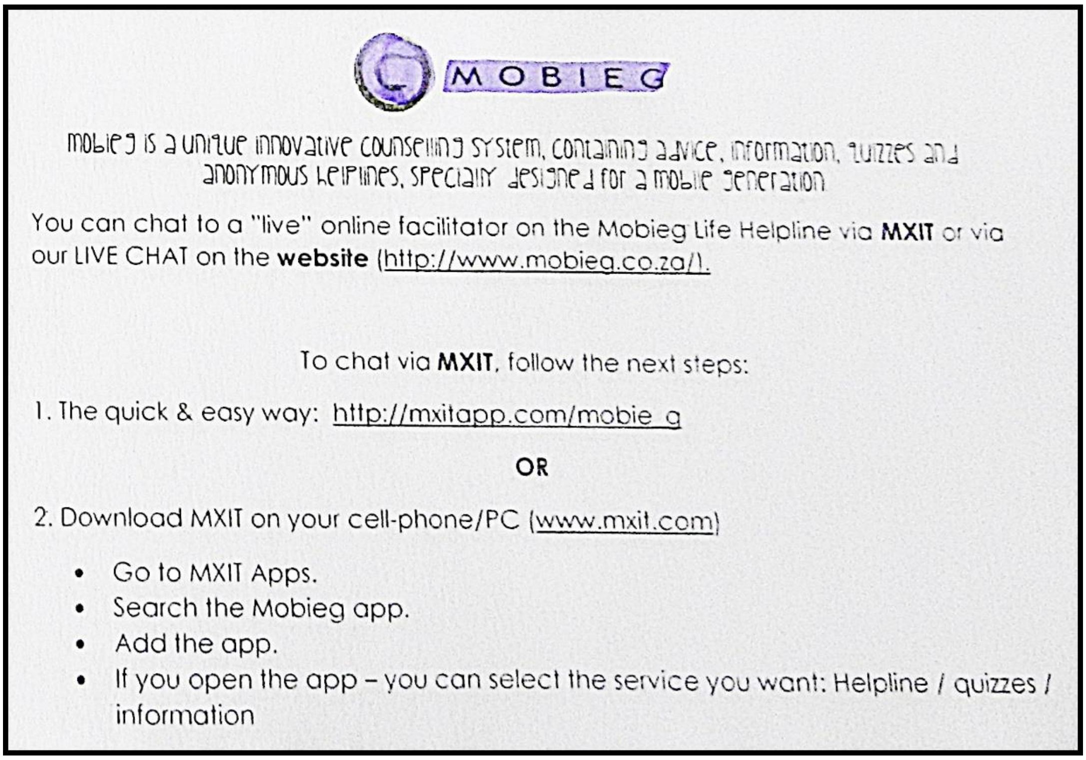
Morrow, Panday and Richter (2005: 23) state that individuals', families' and societies' emotional well-being are being placed at risk by various threatening environmental conditions, such as economic disparities and disasters, an increase in crime and violence, the HIV epidemic, food famines, terrorism, increasing divorce rates, inadequate education structures, and natural disasters. Youth, including South African youth, are especially vulnerable.

Interestingly, the participants did not mention some of the key health and well-being issues highlighted by existing literature. The following topics did not surface as health and well-being needs: sexual abuse, gender-based violence (Cho & Wilke, 2010: 395); sexual and reproductive health disorders, STD's, HIV/AIDS, unwanted pregnancies, and pregnancy related complications (Sprague et al., 2011: 1); poverty and familial disruptions (Smith, 2012: 3); smoking, alcoholism and substance abuse (Kandal, 1980: 238); unemployment (NYDA, 2015: 22); and basic sanitation (WYR, 2003: 99).

4.3 DELIVER

The *Deliver* phase usually entails the development and launching of new solutions into the community (IDEO, 2015: 133). As mentioned in Chapter 3, the traditional idea of delivery is outside the scope of the current project. However, in order to address the gap which may have been left (due to user expectation of an available health and well-being information service) MobieG was introduced.

All the participants received a workshop and document containing information about an existing source of health and well-being mobile application support: mobieG.



MOBIEG

mobieg is a unique innovative counselling system, containing advice, information, quizzes and anonymous helplines, specially designed for a mobile generation

You can chat to a "live" online facilitator on the Mobieg Life Helpline via **MXIT** or via our LIVE CHAT on the **website** (http://www.mobieg.co.za/).

To chat via **MXIT**, follow the next steps:

1. The quick & easy way: http://mxitapp.com/mobie_g

OR

2. Download MXIT on your cell-phone/PC (www.mxit.com)

- Go to MXIT Apps.
- Search the Mobieg app.
- Add the app.
- If you open the app – you can select the service you want: Helpline / quizzes / information

Figure 4.24: MobieG support document

MobieG offers free text-based helplines on social media where one facilitator can attend to numerous calls simultaneously via a unique, innovative system. Users of the system can access help via any cell-phone and receive counselling for any life crisis's that they are experiencing. It is a hugely cost effective way of helping young individuals in need (regardless of race or gender) anonymously, immediately and free of charge (http://www.mobieg.co.za/).

4.4 RESEARCH IMPLICATIONS

4.4.1. Aim

Design an intervention that will improve the youth's access to contextually relevant health and well-being information.

The research activities resulted in a conceptual, youth-friendly mobile application that would improve access to health and well-being information. The solution was co-designed with participants to speak directly to their needs and concerns.

However, since the mobile application may not be actualised in the near future, an alternative health and well-being resource was introduced to participants: MobieG. Participants received a document (Figure 4.24) explaining how to use it after the researcher discussed the service in detail.

4.4.2. Main Research Question

What are the characteristics of a health and well-being information solution to address the health and well-being information needs of youth residing in resource-restricted settings?

The main research question was answered by the youth through HCD and more specifically, during the co-design sessions. The characteristics of a health and well-being information solution were established as a youth-friendly mobile application. The purpose of this mobile application is to address the youth's health and well-being needs within a resource-restricted setting.

4.4.3. Subsidiary Research Questions

(a) *How does Human Centered Co-design activities influence social research aimed at understanding the health and well-being needs of the youth?*

The process set out by the HCD framework influenced the research by aiding in the understanding of the community the researcher was designing for. The health and well-being needs of the youth in Durbanville were established by the participants themselves. The first method used to establish user needs were established by evaluating the responses of the participants on the health needs assessment in the questionnaire.[8] The second method facilitated the identification of contextually relevant health and well-being needs during the co-design sessions (a HCD tool) through discussion groups and affinity diagrams.

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[8] **See Appendix C**

(b) *What are the health and well-being information needs of age-specific youth groups residing in Durbanville?*

The health and well-being needs of the age-specific (aged 14 to 18 years) youth groups residing in Durbanville was established by examining the health needs assessment, having discussion groups, looking at the affinity diagrams and storyboards.

The participants revealed various pivotal health and well-being needs. The participants is in need of information about:

Table 4.4: Participant's needs (Group A, B, and C)

➢ **exercise, body-image, healthy nutrition, energy, muscle building, sport injuries**
➢ **mental wellness, stress/anxiety, fatigue, sleeping problems, suicide, self-harm**
➢ **Immune system, colds/flu, headaches, fever,**
➢ **Chronic diseases, TB, Organs (heart, lungs, kidneys, liver), Diabetes, Asthma**
➢ **unhappiness/depression, overcoming bad experiences, low self-esteem, coping with Bereavement**
➢ **healthy interpersonal relationships, peer pressure, bullying, abuse, self defence**
➢ **time-management, anger-management, goal-setting, patience, irritation, concentration**
➢ **menstrual cycle, STD's, Cervical cancer**
➢ **available resources and access to medication**

(c) *How can design contribute to the development of an accessible, youth-friendly health and well-being information service?*

Design, particularly Human Centered Co-design, supplied the foundation for the development of the concept prototype **WeHelp**. The youth community members of Durbanville designed a health and well-being mobile application to suit their needs.

4.4.4. Objective

The main objective was to determine the youth’s health and well-being information needs.

The objective was met through the health needs assessment and co-design sessions. As mentioned, the youth’s health and well-being information needs relate to the topics listed in Table 4.4.

4.4.5. Subsidiary objectives

(a) *Identifying suitable social research activities for working with the youth.*

HCD was identified as a suitable research methodology. Within this framework the activities used worked well. These included a questionnaire, co-design sessions, affinity diagrams, concept prototype creation and evaluation, storyboards and discussion groups.

(b) *Developing an accessible health and well-being information service concept.*

The groups contributed, co-designed, evaluated and refined a health and well-being mobile application (**WeHelp**).

(c) *Establishing trust and forming a relationship with the participants through providing full dedication to the project.*

This objective was met by efforts from the researcher. The researcher spent sufficient time with the groups, ensuring that the environment was informal and comfortable. The researcher was always available to the participants and provided chocolates to thank the participants for their time.

(d) *Empowering the participants through a workshop on how to use existing technology relevant to them.*

After each session the participants were informed of potential support services, such as MobieG. They were educated on how to use the service and received documents explaining the application.

(e) *Establishing how the youth community want to receive health and well-being information.*

All the participants voted for a mobile application as the means through which they would want access to health and well-being information.

(f) *Designing a suitable solution to increase access to relevant health and well-being information.*

The solution came to light as **WeHelp**: an interactive, youth-friendly health and well-being mobile application. The application's purpose is to increase the youth's access to relevant health and well-being information, when they require it, using a platform (medium) they prefer.

4.5. Conclusion

The project addressed all aspects proposed at the beginning of the research process. During the *Hear* phase, the QOL of Durbanville's youth was established, and their health and well-being needs were clearly identified. A possible solution for the youth of Durbanville was co-designed by the community and took the form of a health and well-being mobile application: **WeHelp**. The youth was introduced to an existing source of support during the *Deliver* phase, called MobieG.

CHAPTER FIVE
REFLECTION

The following chapter describes my personal experience throughout this project, thus the chapter has been written from a first person perspective. I made separate notes of reflection following my research, data documents, and practical contact with participants, as well as the observation of facts and events. As I reflect over the time invested in completing this research project, I can simply say that every aspect of the study has been enlightening.

5.1 Overall Self-reflection

My level of self-confidence has increased significantly as a result of conducting this research. This was mainly achieved through overcoming insecurity and communicating with primary data sources – members of the sampling group in a confident manner.

At the initial point of the research I was hesitant with my choice of primary data collection because it involved approaching and co-creating a product with unfamiliar individuals. The prospect of being refused by prospective members of the sampling group was negatively affecting my level of self-confidence before the primary data collection process. However, as a result of tremendous efforts which included spending many hours preparing for primary data collection I was able to overcome the sense of insecurity and conduct the research in a confident manner. Moreover, I believe my level of communication skills has also been greatly enhanced as a result of conducting the research.

I will greatly benefit from the increased level of self-confidence in the future as an individual, as a researcher and as a professional. HCD researchers have to possess a high level of self-confidence and good communications skills in order to be able to communicate their vision to participants. It can be said that being engaged in the study has contributed to my leadership skills in an indirect way.

On personal and professional levels I greatly benefited from the research experience through improving my time-management skills. Specifically, the research process required extensive preparation and planning for each phase of the study and each phase of the study had to be conducted in an organised manner. Therefore, all the unnecessary activities, such as watching television, were avoided during the research process and weekly plans were set in order to do specific proportions of the study. At the same time, provisions for occasional days off study was ensured within the plan in order to avoid being pressurised and burnout which could negatively affected the study.

Initially, I faced challenges in terms of ensuring the progress of the study according to the timetable. These challenges mainly arose at the stage of establishing a date for the co-design sessions that suited all the participants. I underestimated the duration of time required for recruiting participants and accommodating them with suitable co-design dates. I was behind schedule, since data collection is one of the first steps in HCD. This issue was dealt with through re-adjusting the time-plan for the study, as well as, increasing the level of personal discipline in terms of following set plan. In general, the research experience has contributed to the improvement of my time-management skills which provides considerable benefits for my personal, as well as, professional life.

Upon reflection of the project as a whole, I would not change much. The study went according to plan, and more useful data was obtained than anticipated. I appreciated the opportunity to share what I hope is compelling research around the future of youth-friendly health and well-being information services.

5.2 Methodological Reflection

5.2.1. The Development of Secondary Research Skills

The first challenge started with the task of coming up with a proposal which included finding a researchable topic, identifying the problems and developing an appropriate research methodology. Over the years this foundation stage provided the blue print for the rest of the research journey. This is especially so because it forced me to rethink through the work and to follow the rules for rigorous, formal presentation of the arguments in such a way that brought major changes in the way I had initially planned to approach the study.

I had basic secondary research skills before engaging in this research; however those skills were greatly improved as a result of conducting the current study. The 21st century has been characterised as the information age, and in this age researchers can obtain advantage through analysing information about various aspects of the subject, as well as, information related to internal and external factors affecting the subject. Dealing with information from such a perspective requires secondary research skills. My secondary research skills gained during the course of this research will contribute immensely to my research progression in the near future.

Specifically, I gained competency in the following direction of secondary research: Prioritising the secondary data. An immense amount of data is available regarding any topic in various secondary data sources including books, journals, magazines, newspapers, internet etc. My research experience has taught me that it is not physically possible to analyse all the available data related to the research question. I tried to rule out the general, outdated and unreliable resources and merely used applicable, up-to-date, and peer reviewed resources.

For example, during the literature review stage of the research I learned to prioritise the secondary data related to the research questions according to a set of important criteria such as the authority and credentials of the author, date of publication, the credentials of publisher etc. A vast amount of secondary data related to health and wellbeing issues in general, and youth interventions in particular was initially found as a result of my literature review. However, as a result of prioritising literature according to the above mentioned criteria only the most substantial contributions to the research area, for example the work of IDEO (2015), was discussed in the literature review chapter of the work. The skill of prioritising the secondary data according to a criteria offers a range of substantial benefits, such as time-saving and increasing the level of validity of secondary research findings.

Another great contribution of the research experience to my level of competency as a researcher relates to the formation of a critical mind-set towards the secondary data. Prior to engagement with this research I was prone to accept most of the viewpoints formulated in literature as correct. The current research experience changed this viewpoint. I was able to identify a range of shortcomings associated with some works discussed in literature review. This critical mind-set acquired will prove to be highly beneficial in my future, since I will be equipped with necessary skills in order to identify the shortcomings associated with secondary data and improving the contents of my own materials.

5.2.2. The Development of Primary Research Skills

I acquired valuable primary research skills during the course of conducting this research. It was an unprecedented experience, where I was involved in primary data collection and analysis in an individual and group setting. I established the most popular qualitative and quantitative research methods during the study and also had the practical experience of conducting research through administering questionnaires and facilitating co-design sessions.

Participants

The importance of sampling in general and the choice of the most suitable sampling method in particular was appreciated and I gained an in-depth knowledge about sampling through analysing the most popular sampling methods.

The target group was the youth residing in Durbanville. I am passionate about the youth, and this is how I decided to focus on the young individuals of Durbanville. I remained the main contact person throughout the project. The participants were all Durbanville community members. I worked with three groups (N = 33). Due to informed consent I used participants’ over the age of 18 to answer the questionnaires. The rest of the sample consisted of younger participants for the co-design sessions. Focusing on an age-specific target group in one area made the research useful.

The context relevant to the present study was the community living environment, participants’ health and well-being, and access to technology. Prior to the study it was important to identify relevant contextual aspects for the co-design sessions. I was familiar with the context, since I grew up in Durbanville. The community is mostly Afrikaans-speaking and includes middle- and lower-class individuals. There are black, coloured and white community members. Talking to members of the community and observing the environment worked well as I gathered information about the context. I also handed out the QOL questionnaires before-hand including demographic and contextual questions about Durbanville.

Reflecting upon the contextual aspects, I tried not to make any assumptions, even though I grew up in Durbanville. I made an effort to take as much information in as possible and actively listen to the participants.

I provided for the literacy levels by recruiting participants from Durbanville High School aged 14 to 18. It was helpful working with small groups with the same literacy level.

The participants were selected by word-of-mouth. I asked a teacher at Durbanville high school to inform students about the research project. I compiled a recruitment document that was handed out by the teacher at Durbanville high school to those interested in the study

Measures

The primary data was obtained by the use of questionnaires (health needs assessment and ComQol-S5), and co-design sessions (observations, discussion groups, affinity diagrams, storyboards, and prototype co-creation). Prior to establishing data collection methods, I analysed advantages and disadvantages of various methods and thus obtained in-depth knowledge about these data collection methods.

The health needs assessment provided in-depth qualitative information about the participants health and wellbeing information needs. I will definitely use this as a tool for qualitative data collection in the future. I received so much insight that I knew what to expect throughout the co-design sessions. The quantitative ComQol-S5 provided me with strong empirical data. There was recurring themes that stood out in the statistics.

The data obtained from the questionnaire booklet was extremely powerful, since the participants completed it anonymously. I believe that the combination of qualitative and quantitative data provided all the necessary information to make this project relevant and valuable.

Procedure

Engagement in primary data collection and analysis made an immense contribution to my development as a researcher. The positive role of my dissertation supervisor needs to be stressed here, who offered valuable and practical advice on the HCD process.

Now, being equipped with primary research knowledge and skills I am able to create competitive advantages for HCD; acquiring valuable primary information about various aspects of health and wellbeing.

I identified the body or person who could give permission by talking to my supervisor, Vikki du Preez and doing enough research on ethics. Informed consent was used to obtain permission for data collection through the co-design sessions. I determined the relevant ethical considerations by doing in-depth research and considering how the research will affect the participants in each step.

I chose HCD as a method because it is proven to work well within the South African context (IDEO, 2011: 3). I used the steps set out by HCD: *Hear, Create, Deliver.* Following the guidelines, but still allowing change to a certain extent was helpful during the project.

I decided on the number of participants per co-design session by considering the practical aspects such as the necessary amount of materials and venue size. Also, I wanted a group that included both genders and different races, but that was still manageable. All three groups' participants were enough to do in-depth research, but also get a general understanding of the community.

I determined the number of co-design sessions according to the quality of data obtained during the first session. One session for both Group B and Group C was enough. Thus, I planned one session, evaluated the data, and then decided if a follow-up session was necessary. I experienced difficulties with the scheduling of the sessions. It was a struggle to establish a time suiting all the participants. Three co-design sessions fell through because of participants' schedules changing (for example, school work and sport events). Being patient, persistent and re-establishing a time that suited everyone worked well. The number of co-design sessions worked well; I gathered all the data I needed and established a WhatsApp group for communication. For future projects, I will arrange the sessions as early as possible in the year to allow for the time that it takes to set an appropriate date, venue and time-frame.

The determination of the duration of the sessions was done by planning a detailed agenda. I planned the session roughly according to what information I needed to get out of the session. It is difficult to establish how much time is needed for each component of the session. I thought 3 hours was the maximum time I could expect participation. The sessions ran quicker than expected. The sessions concluded within

2 hours. Each session should be kept as short as possible. Time is problematic as participants' attention span lowers towards the end of the session, however the data obtained in these sessions were very useful. I provided for this possibility by being engaging and energetic throughout the session. I also provided chocolates during each session. Being flexible with time and allowing change worked well when establishing a time-frame and compiling a preliminary agenda.

HEAR

On reflection, I found that it is most rewarding if the researcher already has a fairly good grasp of the subject area and is able to identify several research questions and hypotheses upon which he/she plans to design the research instrument. The contextual aspects were thoroughly considered. I was familiar with the environment. I think it is very important for the researcher to familiarise themselves with the environment if it is unknown. For future projects I will spend enough time familiarising myself with the environment and the community members.

I made provision for contextual aspects such as language and available health resources during the planning phase. I provided for the local language by adapting all documents to Afrikaans. Working with participants' home language worked well. I also considered the fact that there is not a public or state hospital in the area. However, there is a clinic that offers free services to members of the community that cannot afford the private hospital (Durbanville Medi Clinic). The clinic can possibly be used as a resource to distribute health and well-being information. During this phase it was helpful talking to members of the community and observing the environment.

Group A completed a questionnaire booklet, including a quantitative quality of life test and a qualitative health needs assessment prior to the co-design sessions. The data obtained in these questionnaires steered me towards the appropriate direction for planning the co-design sessions. All documents were translated to the participants' local language: Afrikaans.

During each co-design session (Group B and Group C) we had a group discussion to establish what the participants' needs were and what they wanted to design as a resource to address their needs. Group B created an affinity diagram illustrating their health and well-being information needs. During the group discussions, I suggested that the participants write down any health and well-being subjects on sticky notes that they wanted information on. I also wrote down the topics that came to light during the group discussions.

CREATE

This phase consisted of the actual design of a youth-friendly health and well-being information service. Durbanville provided me the opportunity to proceed to commence my field work. I remained in Durbanville administering the questionnaires, and conducting two co-design sessions in a classroom at Durbanville high school. I found the field work to be a very interesting part of the research process.

It was important to consider the contextual aspects for the planning of the co-design sessions. Fortunately, I speak Afrikaans and know the environment well. Speaking the home language and being familiar with the surroundings counted in my favour. The co-design approach in terms of the local language worked well since I was able to translate the documents to the participants' home language and spoke Afrikaans during the session. I translated the data back to English for the writing-up. Speaking the home language is highly important. A translator should be present if the researcher is not familiar with the language. The co-design approach for the participants' literacy level worked well. All participants were in the same educational system. However, if working with lower literacy levels in the future, the questionnaires will have to be adapted to a simpler form with more pictures.

The participants were invited to a classroom at Durbanville high school with the permission of the teacher. I followed the agenda as a guideline.

I planned two co-design sessions for two independent groups. The planned duration of the sessions were assumed to be 2 to 3 hours long. The planned agenda follows:

Table 5.1: Agenda

Activity	Allocated Time
◦ Icebreaker	◦ 20min
◦ Welcome	◦ 10min
◦ Discussion	◦ 20min
◦ Design, design, design	◦ 1-2 hours
◦ Conclusion	◦ 10min

My allocated time for the different activities worked well; the agenda gave a structure to the sessions and ensured that the necessary data was gathered. The timing was adequate for each component of the session.

My decision on which materials and equipment to use was made through doing sufficient research and conversing with my design supervisor. For example, the A1 posters allowed for group participation. There was enough sticky notes and permanent markers to engage all participants. I allowed the participants to partake in a way that made that made them comfortable. I tried to create an informal environment to ensure comfort. The participants were encouraged to take off their shoes, move around, sit on the floor, stand or sit at desks. The participants seemed most comfortable sitting on the floor around their poster. The materials used worked well; the posters, sticky notes and permanent markers allowed all participants to jot down their ideas at the same time. For future projects I will include even more coloured sticky notes and markers. The environment was informal and comfortable.

The participants in Group B and Group C decided on a health and well-being mobile application. During the preparation of the design probes, I found from previous experience that affinity diagrams and storyboards works well for co-design activities.

Group B used white A1 posters, sticky notes, and markers to create affinity diagrams. The participants created two separate affinity diagrams:

- HEALTH AND WELL-BEING TOPICS
- MOBILE APPLICATION FUNCTIONS

The affinity diagrams worked extremely well within the group setting. All the individuals of the group participated. It established comfort as the participants were able to move around in the venue to attach their sticky notes to the poster. This exercise also ensures a sense of empowerment; every participant had the opportunity to contribute.

Following the affinity diagram exercise, Group B co-designed the health and well-being mobile application using A4 paper and coloured markers. They illustrated how the application should appear on a mobile device and how it should preferably work.

Group C stated that they would also prefer a mobile application to address their health and well-being needs. I explained and presented the concept prototype, and they were extremely impressed with Group B’s idea. Group C co-evaluated the initial concept prototype and co-designed a prototype on my personal computer.

Followed by the computerised prototype co-design activity, Group C divided into four smaller groups and created storyboards on A1 posters illustrating any situation in which they would think to use the health and well-being mobile application. This exercise worked well as the participants chose their own groups ensuring comfort to co-design storyboards with sensitive topics, such as self-harm and suicide.

I found that both design probes (affinity diagrams and storyboards) worked well and steered the participants in a creative direction. Keeping the session as informal as possible and allowing the participants to co-design without interjecting provided me with strong data. The sessions was made easy by ensuring that everyone felt comfortable, without forcing participation. I tried to speak as little as possible and gave them the power to co-create what they wanted. The design probes worked extremely well. It was easy to explain and the participants enjoyed co-creating the affinity diagrams and storyboards. In the future I will include more design probes.

DELIVER

Concluding each session, I introduced MobieG to the participants. MobieG is an existing source of support for the participants, similar to what they designed. I handed out printed documents explaining the application and how to use it. It was extremely important to offer all participants an existing source of support that they could use anytime when faced with a health and well-being issue.

The method used worked extremely well; HCD focuses on the participants. It is a valuable method for the South African context.

I believe the following is of extreme importance for researchers when conducting co-design research within a HCD framework:

- Allow TIME for the session to take place. Participants must have a time that suits them.
- Plan early, it can take months to recruit participants.
- Provide food and beverages to say thank you.
- Ensure everyone has transport.
- Consider ALL ethical aspects.
- Plan ahead of time!!

5.3 Scientific reflection

It is possible that the youth in other communities may also benefit from this health and well-being mobile application. However, the Durbanville youth group has access to smart phone technology, whereas that might not be the case in all communities in South Africa or even globally. Thus, for the health and well-being mobile application to be successful, users will need access to smart technology.

Literature (Thomas, 2014) reveals that South Africa is a mobile using country. Over 90 percent of South Africans use smartphones to access the internet. Therefore, this health and well-being application may be very useful for the rest of South Africa's youth.

Globally, the number of smartphone users worldwide will surpass 2 billion in 2016, according to new figures from eMarketer (2015). In 2015, there was over 1.91 billion smartphone users across the globe, a figure that will increase another 12.6% to near 2.16 billion in 2016.

This is important to note, since mobile applications can be developed to reach approximately 2 billion individuals. The implications for the youth is enormous. With the use of a health and well-being information application, the youth can have access to pivotal information to satisfy their health and well-being needs and improve their QOL. The application can bring attention to youth health and well-being awareness. By providing accurate health and well-being information, the youth will be empowered and better equipped to make informed decisions about their health and well-being. WeHelp also acts as a support group platform for youth members. Peer support is an extremely powerful tool for youths with similar experiences.

The research produced critical insights on societal problems from a personal and local scale and may deliver possible contributions on a global scale. The field of design both aided in the development of technology and provided tools for assessing the relevance, risks, and benefits of technological systems. New technology and research discoveries have had a major influence in shaping human history. Thus, it is possible to have a beneficial influence on shaping a future where health and well-being information and resources is available to all.

5.4 Substantive reflection

New, relevant health and well-being innovations can aid in the development of a more proactive and empowered individual; who can be more in control of their health and well-being. These individuals should have access to more health and well-being information, and hopefully a desire to share it with the broader community.

The research can be implemented in reality and it is thus important for the field of design, specifically HCD, and it also sheds light on the health and well-being needs of the youth. However, the most significant findings of the project is that the health and well-being needs of the Durbanville youth were established through participatory, co-design practice.

As the project came to a close, I considered the observations and data as a whole. Interestingly, new connections, similarities and differences came to light. The participants were in need of health and information needs pertaining to all seven quality of life domains: Material well-being, Health, Productivity, Intimacy, Safety, Place in community, and Emotional well-being. Dahlgren and Whitehead (1991) justifies that there are complex, multi-layered influencing factors with an impact on the health and well-being of individuals. The theme that emerged the most throughout the project was the lack of emotional health and well-being. As mentioned in Chapter 4, it is also important to note that the participants did not mention some of the health and well-being issues that is considered to be extremely problematic in the South African context.

It is important to note that participatory, co-design practice proved useful for identifying particular health and well-being information needs of the youth pertaining to exercise, body-image, healthy nutrition, energy, muscle building, sport injuries, mental wellness, stress/anxiety, fatigue, sleeping problems, suicide, self-harm, immune system, colds/flu, headaches, fever, chronic diseases, TB, Organs (heart, lungs, kidneys, liver), Diabetes, Asthma, unhappiness/depression, overcoming bad experiences, low self-esteem, coping with Bereavement, healthy interpersonal relationships, peer pressure, bullying, abuse, self-defence, time-management, anger-management, goal-setting, patience, irritation, concentration, menstrual cycle, STD’s, Cervical cancer, and available resources and access to medication.

Tackling health and well-being inequalities requires action within multiple layers of influence, and HCD was used to identify, assess and prioritise where effective action should be targeted. Participatory, co-design practices also proved useful for the concept development of a possible solution to address the above mentioned needs of the youth. The health and well-being mobile application (WeHelp), as conceptualised by the youth of Durbanville, can lead to a significant difference in the community if actualised in the near future. As Thomas (2014) mentions, youths have high accessibility to smart technology, therefore the development of a health and well-being mobile application is an appropriate and realistic outcome.

Investing in the youth is beneficial for society as a whole. **WeHelp**, as conceptualised by the Durbanville participants, should have a positive impact on the youth and community. It is definitely worth considering the development of this health and well-being information service catering to the specific needs of the Durbanville youth.

CHAPTER SIX
CONCLUSION

6.1 Summary

The youth is an enormous part of the South African population. Literature reveals that there is great benefit in investing in the youth by creating pathways for accelerated development. When the youth can claim their right to health and well-being, education and decent employment conditions, they become a very powerful force for economic development and positive change (Pollack, 2012).

Enabling the youth to attain a good quality of life, health and well-being, is of the utmost priority. Not only is it critical to the youth themselves, it is also of vital importance in terms of attaining broader development goals related to education, poverty alleviation and gender equity (Howe et al., 2014: 191).

According to the Department of Health (2014), the youth is a key population for research and interventions pertaining to health and well-being. Between the ages of 10-24, the youth experience a period of changes in terms of physical, psychological, and social development. Not only do their bodies change, but it is also a time of discovering, exploring and experimenting in all aspects of life. This period often establishes a basis for health and well-being or ill-being for the future. These changes vary between individuals and to an extent, for example between males and females. In important ways, developments taking place during adolescent years are shaped by the social and cultural environment in which they take place, examples include existing norms and values with regard to gender, whether a young individual is in or out of school, her/his family relationships and the levels of support received. Important too is whether a young individual grows up in an urban or rural setting. Also of great influence are the broader legal and policy environment with regard to access to health and well-being services, information and education. The extent to which the youth are able to influence the development of policies affecting their needs is also important (Wegelin-Schuringa, 2014: 10).

As discussed throughout the previous chapters, HCD was the foundation of the current project. The health and well-being intervention were embedded within the HCD phases: *Hear, Create*, and *Deliver*. The participants were active designers throughout the whole process. Embracing HCD during this project meant believing that all problems, even the seemingly unmanageable ones like poverty, gender equality, clean water, and quality health and well-being care are solvable. Moreover, it meant believing that the individuals who face those problems every day are the ones who hold the key to their solution (IDEO, 2015: 9).

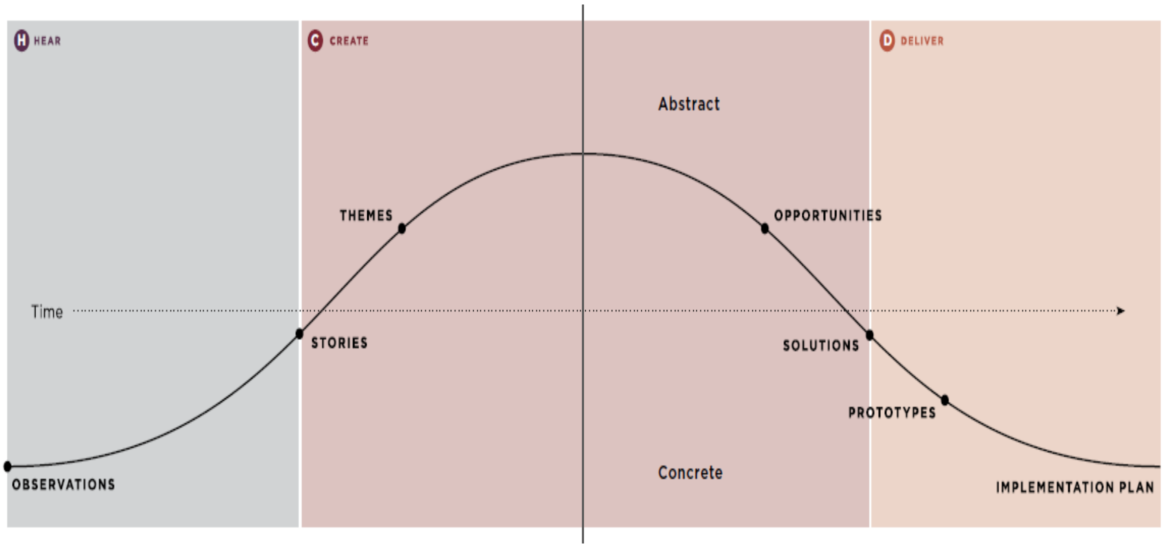

Figure 6.1: Human-Centered Design process (IDEO, 2011: 8)

The figure above illustrates the entire project journey. Garrett (2010) stresses the importance of participation in all stages of the HCD process. The different groups actively participated during several stages of the innovation process: they participated during the initial exploration and problem definition (Group A) both to help define the problem and to focus ideas for a possible solution (Group B), and during development, they evaluated proposed solutions (Group C).

Identifying and meeting the needs and expectations of youth and the communities in which they live is an important feature of any successful youth friendly initiative. Youth involvement and participation is crucial to the success of the initiative. Services must be designed and implemented to meet the needs and aspirations of the intended youth clients as the beneficiaries. To achieve this, researchers and designers must understand the needs of the youth being served and must empathize with them. Thus, the needs assessment and the QOL of the youth (to determine their needs) is one of the first criteria that was met (Oxfam, 2007: 5).

The participants' QOL and health and well-being information needs were compared and analysed and established that the development of a health and well-being information service may be highly beneficial within the specific context (Durbanville) or possibly other South African contexts.

The identification of the main concerns within Durbanville was established by:

- investigating the completed health information needs assessment questionnaires,
- listening during focus group discussions,
- analysing affinity diagrams and storyboards, and
- identifying themes from all the data gathered.

In contradiction to literature by Cho and Wilke (2010); Sprague et al., (2011); Smith (2012); Kandal (1980); NYDA (2015); and the WYR (2003), the youth of Durbanville did not mention sexual abuse, gender-based violence; sexual and reproductive health disorders, STD's, HIV/AIDS, unwanted pregnancies, and pregnancy related complications; poverty and familial disruptions; smoking, alcoholism and substance abuse; unemployment; and basic sanitation as priority health and well-being information needs.

From the data gathered, the most important domain to improve is the groups' emotional well-being. The bulk of the themes that emerged were closely related with emotional well-being issues, such as: body-image, stress and anxiety, fatigue, sleeping problems, suicide, self-harm, unhappiness and depression, overcoming bad experiences, low self-esteem, coping with bereavement, unhealthy interpersonal relationships, peer pressure, bullying, abuse, anger-management, irritation, and poor concentration.

The youth may experience high levels of emotional stress as a result of crime, health issues, poverty and discrimination. Thus, attention is needed in the area of mental and emotional health and well-being. Physical and emotional changes during the period of youth, may lead to mental health problems. It is estimated that around 20% of youth suffer from mental health issues (Wegelin-Schuringa, 2014: 12). If unattended, such problems may contribute to low educational achievement, unemployment, substance use, risk-taking behaviours, crime, and poor sexual and reproductive health, self-harm and inadequate self-care.

Youths have insufficient access to health and well-being information and services to make informed choices. However, the availability of on-line information and social networking sites changes the possibilities to obtain information.

The service was developed together with the youth in all phases of the service cycle: situation analysis (needs and preferences on how to meet these needs), planning, implementation, monitoring and evaluation. The involvement was of such nature that the youth felt ownership of the services provided and were able to suggest and influence changes for improvement.

The participants agreed that a mobile application will be the most suitable health and well-being information service for the youth. The bulk of the youth in the Durbanville area has access to the internet and smart technology. Thus, the service type was established as a mobile application. **WeHelp** was conceptualised as a platform that needs to be easy-to-use, entertaining and exciting. As mentioned, the **WeHelp** mobile application meets the requirements of a successful eHealth intervention. This aspect clearly highlights a correlation between previous research findings in the field, regarding guidelines for successful eHealth solutions, and the findings from this study.

The outcome of this exercise was an intervention logic for youth friendly health and well-being services that is based on evidence, and integrates the multiple dimensions of such services. This enables designers to plan and implement interventions in a more holistic manner that are better aligned to the priorities identified by youth itself.

6.2. Significance of the research project

The significance of this study will redound to the benefit of society considering that health and well-being plays a primary role in the quality of an individual’s life. The lack of available health and well-being care resources in South Africa justifies the need for more effective, alternative services. Thus, available health and well-being services will increase the youth’s knowledge about their health and well-being that may lead to informed decision-making and access to counselling and support. For researchers, the study uncovers a new methodology to achieve project goals.

The use of mobile and wireless technologies to support the achievement of health and well-being objectives has the potential to transform the face of health service delivery in Durbanville. Not only using mobile communication devices for health and well-being services and information, but also to better emotional states of the youth.

The health needs assessments, establishment of quality of life, and co-design activities ensured the identification of the youth’s health and well-being information needs. This was addressed by designing and implementing alternative methods through participatory practice. The project provides all the necessary data to develop a contextually relevant health and well-being mobile application for the youth of Durbanville.

6.3. Recommendations for future research

Firstly, the actualisation of the health and well-being mobile application was outside the scope of the project. It will be highly beneficial for the youth of Durbanville if **WeHelp** could be developed by future researchers.

Secondly, the findings from the research highlights a number of new avenues that could be explored in future studies. It may be beneficial to identify contextually relevant health and well-being information needs of the youth on a larger scale within multiple communities. This may establish general health and well-being needs of the youth. Consequently, a health and well-being mobile application can be developed on general principles which can be accessible to all South African communities.

Thirdly, the unique methodology that was presented did not attempt to examine its usefulness in other contexts. It may be important for future researchers to use this conceptual framework in different contexts to establish whether it provides valuable information within new contexts, locations and different cultures.

Lastly, the data reveals a lack of emotional health and well-being of the youth. It may be beneficial for future researchers to design an intervention specifically catering to the emotional health and well-being domain.

6.4. Concluding Remarks

It is important that the health and well-being needs of the youth are approached in a more holistic manner. Consequently, creative partnerships need to be forged with all sectors of society, so that as their health and well-being needs are being addressed, socio-economic and cultural factors that significantly impact on the health and well-being development of South African youths are addressed in a more comprehensive manner.

It’s a ‘fool’s paradise’ to deny the youth well-being and health-promoting, and perhaps life-saving, information and services. The youth are the future of society, but they are also very much it’s present.

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APPENDICES

APPENDIX A: LETTER TO DURBANVILLE HIGH SCHOOL'S HEADMASTER

Dear Mr Germishuys

I, Janet Rademan, am currently busy with my Masters in health design at the Cape Peninsula University of Technology. I want to inform you that I will be conducting action research with the consent of Ms Wallace and Mrs Viviers to promote health and well-being awareness among Durbanville youth. Detailed information for the students is as follows:

Who is conducting the study?

This study is being conducted as part of Masters Research in the Department of Design, Cape Peninsula University of Technology, South Africa. The study has received ethical approval.

What is the study about?

This research is focused on the health and well-being information needs of an age-specific (high school) youth group who are residing in Durbanville. The aim of the research is to identify the health and well-being information needs of the youth, as well as discovering more about the youth's attitudes towards health and wellbeing.

Who can take part?

Individuals aged between 14 and 18, residing in Durbanville are eligible to take part.

What does taking part entail?

The study involves three sessions with three independent groups. Firstly, Group A will complete a questionnaire, which will include general questions about health, well-being and how you would want to receive health information. The questionnaire will take around 30 minutes to complete. Should you wish to change or add to the document, you can ask the researcher and return to the questionnaire at any time during the process.

Group B will take part in a discussion group. This session will focus on what the group's health information needs are, and in which way you would like to receive the relevant information.

Thirdly, Group C will evaluate and co-design the health information service according to your needs. This will entail giving feedback on the service concept that was designed by Group B. Lastly, all participants will be able to learn about how to use existing health and well-being technology.

What are the benefits of taking part?

We hope that you will find it a positive experience to contribute to knowledge about community youth well-being. You will receive snacks and beverages during each session. You will be able to co-design a health service that suits your needs. Also, you will be able to develop skills and learn about health and well-being. You will represent your community, and contribute to research promoting the availability of health and well-being information. You will receive a list of free health support services that you can use if needed.

Are there any risks involved in taking part?

The questionnaire includes questions about mental health and negative experiences. It is possible that you may feel upset thinking about these things. If you find it too upsetting, you can discontinue your participation at any time. Sources of support are detailed at the end of this questionnaire. The project does not represent a referral service. It is possible that the co-designed health service cannot be actualised in the near future. There are no other disadvantages or risks to taking part in this study.

Do I have to take part?

No, completing the questionnaire or participating in the co-design sessions is entirely up to you. You can withdraw from the study at any time, without giving a reason.

Will my taking part be kept confidential?

A numeric code will be attached to the data so it remains totally anonymous and all information will be treated with the utmost confidentiality.

The results of the study will be written up as part of the thesis for my MTech Degree. You will not be identifiable in the write up or any publication which might ensue.

If you have any further questions you can contact me at:

rademanjanet@gmail.com (Janet Ellen Rademan)

The study is supervised by Ms. Vikki du Preez. If you wish to contact the supervisors, contact details are:

dupreezv@cput.ac.za (Ms. Vikki du Preez)

Best wishes

Janet Ellen Rademan

rademanjanet@gmail.com

084 568 4773

APPENDIX B: RECRUITMENT FLYER

What are

YOUR health

&

well-being needs ?

YOU CAN PLAY A ROLE
IN YOUTH
EMPOWERMENT !

IF YOU ARE...

Interested in participating or have any further questions, you can contact me, Janet, at :

rademanjanet@gmail.com
084 568 4773
(Whatsapp or SMS)

Please contact me
BEFORE
the 1 5th of June

"I LOOK
FORWARD TO
MEETING YOU !"

APPENDIX C: HEALTH AND WELL-BEING INFORMATION NEEDS QUESTIONNAIRE

Participant's code: _________

Health and Well-being

Questionnaire 2014

Janet Ellen Rademan

rademanjanet@gmail.com

084 568 4773

Cape Peninsula University of Technology

INDEX

Information sheet

Dear Participant

Thank you for your interest in this study.

Who is conducting the study?

This study is being conducted as part of Masters Research in the Department of Design, Cape Peninsula University of Technology, South Africa. The name of the researcher is Janet Ellen Rademan and contact details are given at the end of this information sheet. The study has received ethical approval.

What is the study about?

This research is focused on the health and well-being information needs of an age-specific (high school) youth group who are residing in Durbanville. The aim of the research is to identify the health and well-being information needs of the youth, as well as discovering more about the youth's attitudes towards health and wellbeing.

Who can take part?

Individuals aged between 14 and 18, residing in Durbanville are eligible to take part.

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The study involves three sessions with three independent groups. Firstly, Group A will complete a questionnaire, which will include general questions about health, well-being and how you would want to receive health information. The questionnaire will take around 30 minutes to complete. Should you wish to change or add to the document, you can ask the researcher and return to the questionnaire at any time during the process.

Group B will take part in a discussion group. This session will focus on what the group's health information needs are, and in which way you would like to receive the relevant information.

Thirdly, Group C will evaluate and co-design the health information service according to your needs. This will entail giving feedback on the service concept that was designed by Group B. Lastly, all participants will be able to learn about how to use existing health and well-being technology.

What are the benefits of taking part?

We hope that you will find it a positive experience to contribute to knowledge about community youth well-being. You will receive snacks and beverages during each session. You will be able to co-design a health service that suits your needs. Also, you will be able to develop skills and learn about health and well-being. You will represent your community, and contribute to research promoting the availability of health and well-being information. You will receive a list of free health support services that you can use if needed.

Are there any risks involved in taking part?

The questionnaire includes questions about mental health and negative experiences. It is possible that you may feel upset thinking about these things. If you find it too upsetting, you can discontinue your participation at any time. Sources of support are detailed at the end of this questionnaire. The project does not represent a referral service. It is possible that the co-designed health service cannot be actualised in the near future. There are no other disadvantages or risks to taking part in this study.

Do I have to take part?

No, completing the questionnaire or participating in the co-design sessions is entirely up to you. You can withdraw from the study at any time, without giving a reason.

Will my taking part be kept confidential?

A numeric code will be attached to the data so it remains totally anonymous and all information will be treated with the utmost confidentiality.

The results of the study will be written up as part of the thesis for my MTech Degree. You will not be identifiable in the write up or any publication which might ensue.

If you have any further questions you can contact me at:

rademanjanet@gmail.com (Janet Ellen Rademan)

The study is supervised by Ms. Vikki du Preez. If you wish to contact the supervisors, contact details are:

dupreezv@cput.ac.za (Ms. Vikki du Preez)

Informed Consent

Cape Peninsula
University of Technology

FID/REC/ICv0.1

FACULTY OF INFORMATICS AND DESIGN

Consent for individual participation in the Research

Title of the study: The identification of contextually relevant health and well-being information needs of the youth through Human Centered Co-Design.

Name of researcher: Janet Ellen Rademan

Contact details: email: rademanjanet@gmail.com phone: 0845684773

Name of supervisor: Vikki du Preez

Contact details: email: dupreezv@cput.ac.za phone: 0798741593

Purpose of the Study: To design an intervention that will improve access to relevant health and well-being information.

Participation: Participation will consist of filling out a health and well-being needs assessment questionnaire; or participating in youth-friendly health and well-being information service co-design workshops.

Confidentiality: Participants will receive assurance from the researcher that the information they will share will remain strictly confidential unless noted below. Participants will understand that the contents will be used only for an MTech thesis and journal article, and that confidentiality will be protected by a participation code (anonymous).

Anonymity will be protected in the following manner: Participants' identities will remain unknown during the project and writing-up of the findings. Participation is completely anonymous.

Conservation of data: The data collected will be kept in a secure manner: The data collected through the questionnaire will be stored on a password protected computer, and will only be available for researchers (by request) interested in developing a youth-friendly health information service. The questionnaire transcripts will not include participants' identities, and will be stored in a locked cabinet for no longer than necessary.

Voluntary Participation: Participants will be under no obligation to participate and if they choose to participate, they can withdraw from the study at any time and/or refuse to answer any questions, without suffering any negative consequences. If participants 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:				
The venue may be described:				

Acceptance: I, ____ agree to collaborate in the above research study conducted by Janet Ellen Rademan of the Faculty of Informatics and Design at the Cape Peninsula University of Technology, which research is under the supervision of Ms. Vikki du Preez.

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.

My signature: _____________________________ Date: ____________________

Researcher's signature: ______________________ Date: ____________________

Quality of Life questionnaire

(COMPREHENSIVE QUALITYOF LIFE SCALE – SCHOOL VERSION)

This scale has three sections. The first will ask you for some factual information. The next two will ask how you feel about various aspects of your life.

To answer each question put a (√) in the appropriate box. Please ask for assistance if there is anything you do not understand.

Please answer all the questions and do not spend too much time on any one item.

What is your date of birth? ______/______/______
Day month year

What is your sex? (circle one) Male Female

SECTION 1

This section asks for information about various aspects of your life. Please tick the box that most accurately describes your situation.

1.a) Where do you live?

HOUSE	FLAT	ROOM (in HOSTEL)

Do your parents own the plac where you live or do they pay rent?

Besit	Huur

1.b) How many clothes and toys do you have compared with other people of your age?

More than almost anyone	More than most people	About average	Less than most people	Less than almost anyone

1.c) If either of your parents has paid work, please give the name of their job.

Father: ____

Mother: ____

2.a) How many times have you seen a doctor over the past 3 months?

None	1-2	3-4 (about once per month)	4-5 (about once in 2 weeks)	8 + (about weekly)

2.b) Do you have any on-going medical problems? (e.g. visual, hearing, physical, health, etc.).

Yes	
No	

If yes, please specify:

Name of medical condition	*Extent of the condition*
e.g. Visual	Require glasses for reading
Diabetes	Require daily injections
Epilepsy	Requires daily medication
_________________________________	____________________________________
_________________________________	____________________________________
_________________________________	____________________________________

2.c) What regular medication do you take each day? If none tick box ☐

OR

Name(s) of medication (don't worry if you get the spelling wrong):

____
____
____
____

3.a) How many hours do you spend on the following each week? (Average over past 3 months)

	0	1-10	11-20	21-30	31-40 +
Hours work for pay					
Hours at school					
Hours unpaid child care					

3.b) In your spare time, how often do you have nothing much to do?

Almost always	Usually	Sometimes	Not usually	Almost never

3.c) On average, how many hours TV do you watch each day?

No TV	1-2	3-5	6-9	10 +

4.a) How often do you talk with a close friend?

Daily	Few times a week	Once a week	Once a month	Less than once a month

4.b)) If you are feeling sad or depressed, how often does someone show they care for you?

Almost always	Usually	Sometimes	Not usually	Almost never

4.c) If you want to do something special, how often does someone else want to do it with you?

Almost always	Usually	Sometimes	Not usually	Almost never

5.a) How often do you sleep well?

Almost always	Usually	Sometimes	Not usually	Almost never

5.b) Are you safe at home?

Almost always	Usually	Sometimes	Not usually	Almost never

5.c) How often are you worried or anxious during the day?

Almost always	Usually	Sometimes	Not usually	Almost never

6.a) Below is a list of leisure activities. Indicate how often in an average month you attend or do each one for your enjoyment (not employment).

Activity	Number of times per month
(1) Go to a club/group/society	
(2) Meet with friend(s)	
(3) Watch live sporting events (Not on TV)	
(4) Go to a place of worship	
(5) Chat with neighbours	
(6) Eat out	
(7) Go to a movie	
(8) Visit family	
(9) Play sport or go to a gym	
(10) Other (please describe)	

6.b) Do you hold an unpaid position of responsibility in relation to any team, club, group, or society?

Yes	
No	

If no, go to question (c)

If 'yes', please indicate the highest level of responsibility held:

Committee Member	
Committee Chairperson/Convenor	
Secretary/Treasurer/Team Vice-captain	
Captain, Group President, Chairperson or ConvenorIndien	

6.c) How often do people outside your home ask for your help or advice?

Almost always	Usually	Sometimes	Not usually	Almost never

7.a) How often can you do the things you really want to do?

Almost always	Usually	Sometimes	Not usually	Almost never

7.b) When you wake up in the morning, how often do you wish you could stay in bed all day

Almost always	Usually	Sometimes	Not usually	Almost never

7.c) How often do you have wishes that cannot come true?

Almost always	Usually	Sometimes	Not usually	Almost never

SECTION 2

How Important are each of the following life areas to you? Please answer by placing a (√) in the appropriate box for each question.

There are no right or wrong answers. Please choose the box that best describes how important each area is to you. Do not spend too much time on any one question.

1. How important to you ARE THE THINGS YOU OWN?

Could not be more important	Very important	Somewhat important	Slightly important	Not important at all

2. How important to you is YOUR HEALTH?

Could not be more important	Very important	Somewhat important	Slightly important	Not important at all

3. How important to you is WHAT YOU ACHIEVE IN LIFE?

Could not be more important	Very important	Somewhat important	Slightly important	Not important at all

4. How important to you are CLOSE RELATIONSHIPS WITH YOUR FAMILY OR FRIENDS?

Could not be more important	Very important	Somewhat important	Slightly important	Not important at all

5. How important to you is HOW SAFE YOU FEEL?

Could not be more important	Very important	Somewhat important	Slightly important	Not important at all

6. How important to you is DOING THINGS WITH PEOPLE OUTSIDE YOUR HOME?

Could not be more important	Very important	Somewhat important	Slightly important	Not important at all

7. How important to you is YOUR OWN HAPPINESS?

Could not be more important	Very important	Somewhat important	Slightly important	Not important at all

SECTION 3

How *satisfied* are you with each of the following life areas? Please (√) the box that best describes how **satisfied** you are with each area.

There are no right or wrong answers.

1. How satisfied are you with the THINGS YOU OWN?

Delighted	Pleased	Mostly satisfied	Mixed	Mostly dissatisfied	Unhappy	Terrible

2. How satisfied are you with your HEALTH?

Delighted	Pleased	Mostly satisfied	Mixed	Mostly dissatisfied	Unhappy	Terrible

3. How satisfied are you with what you ACHIEVE IN LIFE?

Delighted	Pleased	Mostly satisfied	Mixed	Mostly dissatisfied	Unhappy	Terrible

4. How satisfied are you with your CLOSE RELATIONSHIPS WITH FAMILY OR FRIENDS?

Delighted	Pleased	Mostly satisfied	Mixed	Mostly dissatisfied	Unhappy	Terrible

5. How satisfied are you with HOW SAFE YOU FEEL?

Delighted	Pleased	Mostly satisfied	Mixed	Mostly dissatisfied	Unhappy	Terrible

6. How satisfied are you with DOING THINGS WITH PEOPLE OUTSIDE YOUR HOME?

Delighted	Pleased	Mostly satisfied	Mixed	Mostly dissatisfied	Unhappy	Terrible

7. How satisfied are you with YOUR OWN HAPPINESS?

Delighted	Pleased	Mostly satisfied	Mixed	Mostly dissatisfied	Unhappy	Terrible

Health Needs Assessment

Instructions

Please answer the questionnaire honestly, the data gathered will be kept confidential.

Please complete all sections by following the instructions at the beginning of each question.

Write clearly using a black pen. If you make a mistake and wish to change your answer, simply cross out your mistake and choose the answer that is right for you.

Personal Details

Please provide us with some information about yourself. This will assist us with the analysis of the questionnaire results.

Participation Code: ___________________

✓ **Please tick the following that apply to you**

Ethnic Group:	White	☐	Black	☐
	Coloured	☐	Indian	☐
	Mixed Ethnic	☐	Other	_______________
Gender:	Male	☐	Female	☐
Age Range:	14-15	☐	15-16	☐
	16-17	☐	18	☐
Marital status:	Single	☐	Divorced	☐
	Married	☐	Widowed	☐
How many people live in your household, including you?		☐	Number of adults (aged 20+):	☐
			Number of children/young people:	☐
Are you caring for someone with a disability or needing medical support?	Yes	☐	No	☐

Which of these best describes what you are doing at present?

Full-time paid work	☐	Unemployed	☐
Part-time paid work	☐	Permanently sick or disabled	☐
Full-time education/student	☐	Fully retired from work	☐
Looking after the home	☐	Other	☐

Your Health

How would you describe your health? Please tick the response that best describes you.

Excellent ☐

Very good ☐

Good ☐

Fair ☐

Poor ☐

Do you have a disability, long-term illness or chronic condition? Please tick all that apply.

I do not have such a condition ☐

Learning disability ☐

Physical disability ☐

Mental illness ☐

Asthma ☐

Diabetes ☐

Other (please specify below) ☐

____

If you have a disability, long-term illness or chronic condition, does it affect your participation in physical activities?

Yes ☐ No ☐

What is the main difficulty you face in trying to improve your health? Please tick one option.

Not enough facilities close by ☐

Facilities not open at the right time ☐

Not enough time ☐

Not enough money ☐

Don’t know how to get started ☐

Not enough encouragement from family and friends ☐

I’m too unhappy ☐

Please complete the following sentences (There are no right/wrong answers):

I feel healthy when

I feel ill when

I feel unhappy when

I want to know more about (name any health issues/risks)

I don’t know what to do when my health

I feel unsure about (name anything health-related)

When I need information about my health I ask (name person or place)

When I feel unhealthy, I go to

When I am concerned about myself/someone else I ask for help at/from

I need support when

I struggle with

Health Information Needs

✓ **Please tick (can tick more than one option)**

I want to receive health information through:

A doctor/nurse/hospital (face-to-face)	
A traditional healer	
The internet	
Facebook	
Whatsapp or something similar	
Mxit	
SMS	
Video's explaining my issue	
Brochure	
Brochure with pictures	
A Book	

✓ **Please tick**

On a scale of 1-5:

6. I know nothing about this
7. I know what it is, but know little about it
8. I know enough about this
9. I know everything I need to know about this
10. I don't need any more information about this

Health Issues	**1**	**2**	**3**	**4**	**5**	**This is present in my life**
Nutrition, dietary behaviours and physical activity						
HIV/AIDS						
TB (Tuberculosis)						
Cardiovascular disease/ Heart disease/ Diabetes						
Dementia/ Alzheimer's/ Parkinson's						
Physical Disability						
Mental Disability						
Sexually Transmitted Diseases						
Safe Sex						
Maternal and Child Health						
Rape						
Physical Abuse						
Emotional Abuse						
Suicide/Suicidal Thoughts						
Tobacco use/Cigarettes						
Alcohol Abuse						
Drug Abuse						

APPENDIX D: INFORMED CONSENT DOCUMENT

Informed Consent

Cape Peninsula
University of Technology

FID/REC/ICv0.1

FACULTY OF INFORMATICS AND DESIGN

Consent for individual participation in the Research

Title of the study:	The identification of contextually relevant health and well-being information needs of the youth through Human Centered Co-Design.
Name of researcher:	Janet Ellen Rademan
Contact details:	email: rademanjanet@gmail.com phone: 0845684773
Name of supervisor:	Vikki du Preez
Contact details:	email: dupreezv@cput.ac.za phone: 0798741593

Purpose of the Study: To design an intervention that will improve access to relevant health and well-being information.

Participation: Participation will consist of filling out a health and well-being needs assessment questionnaire; or participating in youth-friendly health and well-being information service co-design workshops.

Confidentiality: Participants will receive assurance from the researcher that the information they will share will remain strictly confidential unless noted below. Participants will understand that the contents will be used only for an MTech thesis and journal article, and that confidentiality will be protected by a participation code (anonymous).

Anonymity will be protected in the following manner: Participants' identities will remain unknown during the project and writing-up of the findings. Participation is completely anonymous.

Conservation of data: The data collected will be kept in a secure manner: The data collected through the questionnaire will be stored on a password protected computer, and will only be available for researchers (by request) interested in developing a youth-friendly health information service. The questionnaire transcripts will not include participants' identities, and will be stored in a locked cabinet for no longer than necessary.

Voluntary Participation: Participants will be under no obligation to participate and if they choose to participate, they can withdraw from the study at any time and/or refuse to answer any questions, without suffering any negative consequences. If participants 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:				
The venue may be described:				

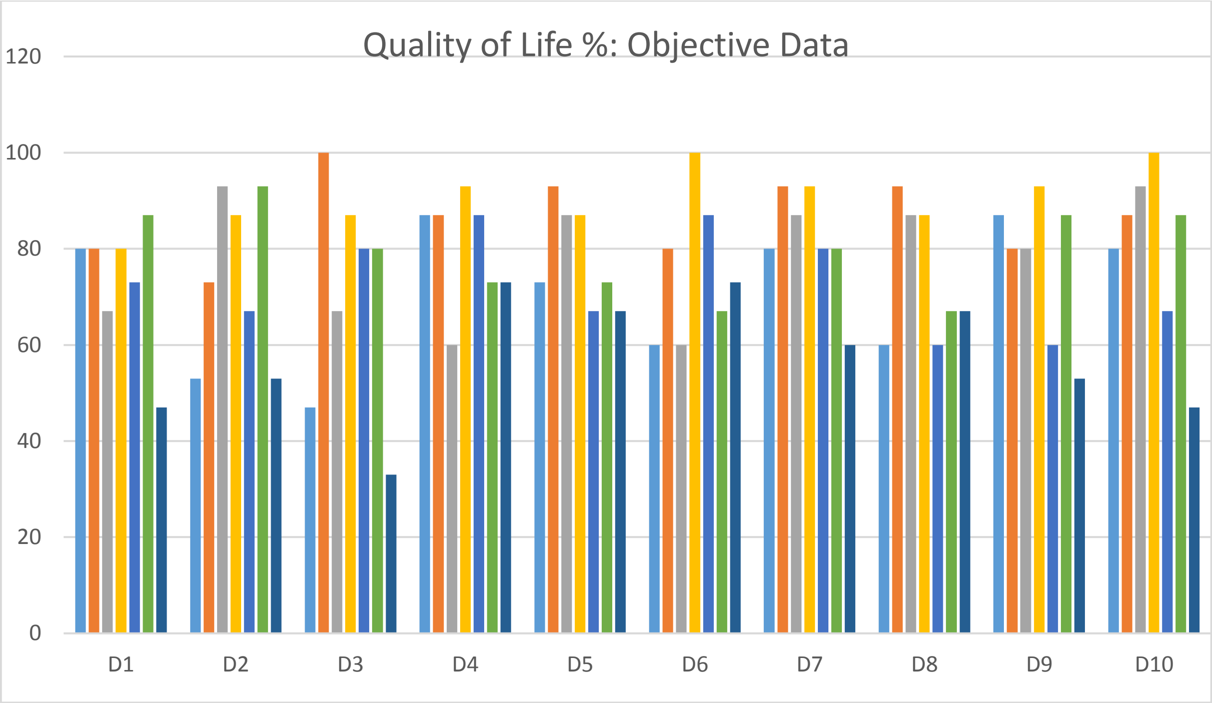
Acceptance: I, ____ agree to collaborate in the above research study conducted by Janet Ellen Rademan of the Faculty of Informatics and Design at the Cape Peninsula University of Technology, which research is under the supervision of Ms. Vikki du Preez.

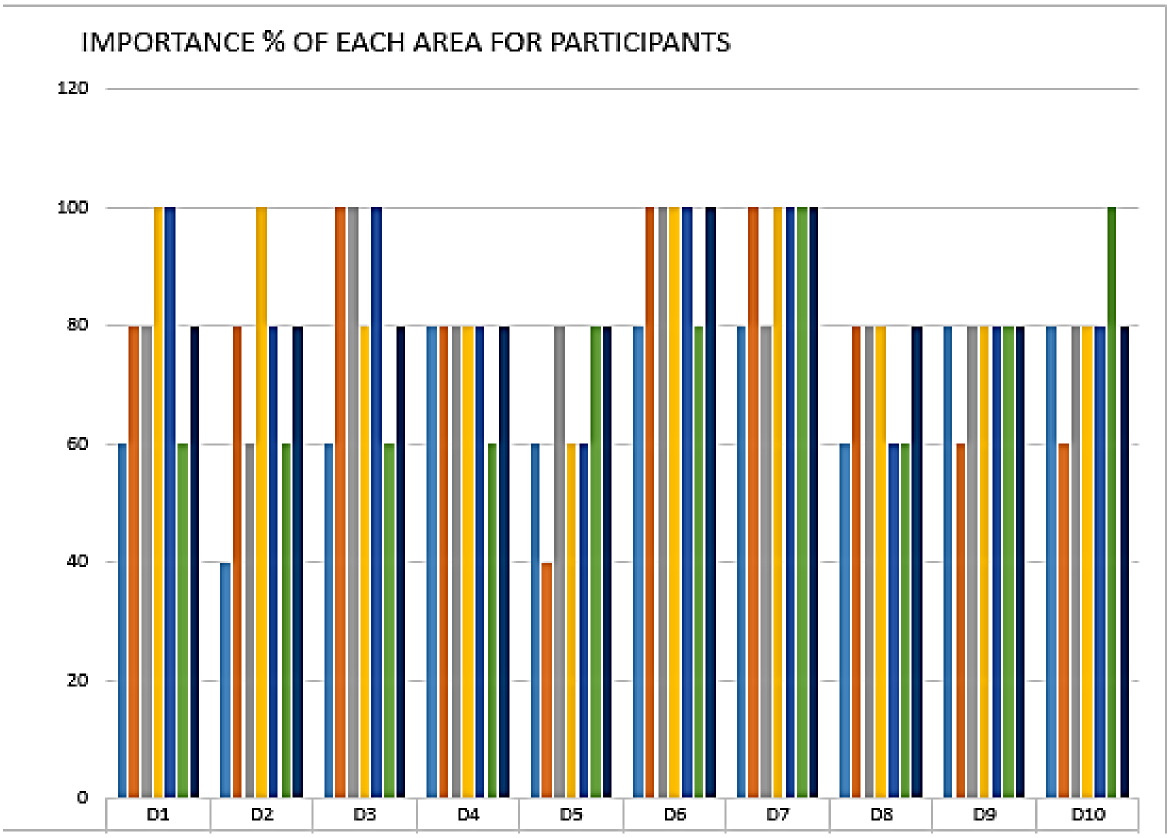
If I have any questions about the study, I may contact the researcher or the supervisor. If I have any questions regarding the ethical conduct of this study, I may contact the secretary of the Faculty Research Ethics Committee at 021 469 1012, or email naidoove@cput.ac.za.

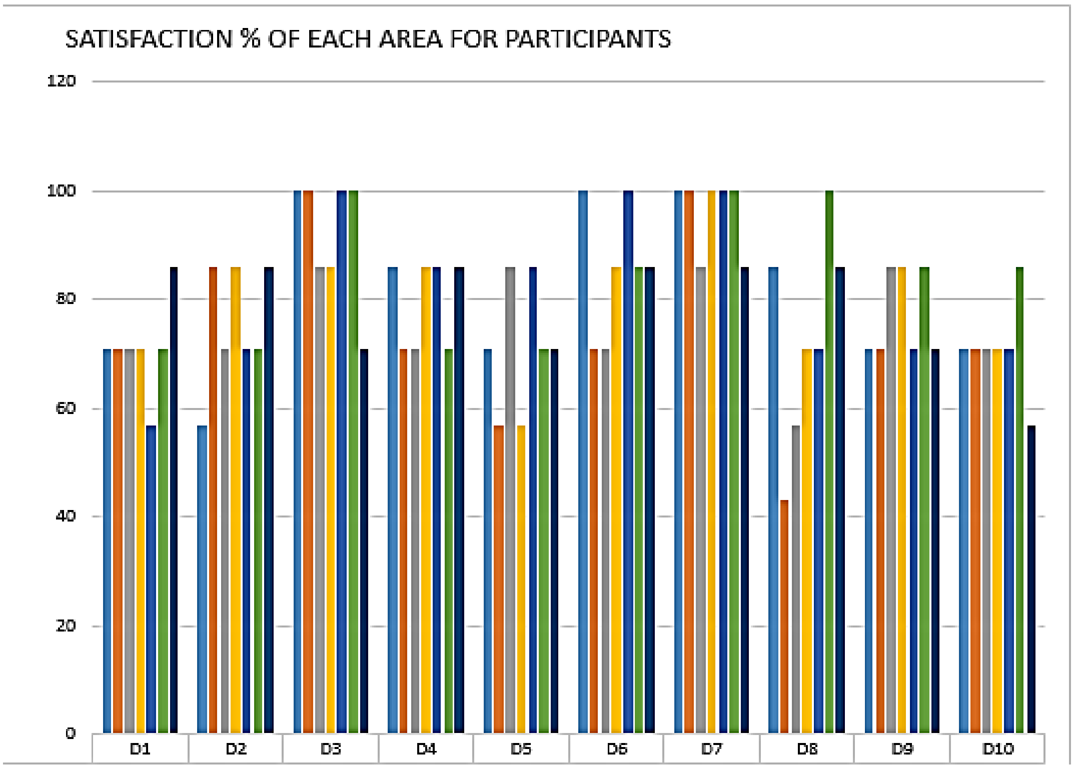
My signature: _____________________________ Date: ____________________

Researcher's signature: _____________________ Date: ____________________

APPENDIX E: DETAILED COMQOL-S5 RESULTS






SATISFACTION % OF EACH AREA FOR PARTICIPANTS
120
100
80
60
40
20
0
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10