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**paper text:**

Guidelines for creating digital graphic novels portraying emotional social phenomena using critical systems heuristics and HCI principles DD Pretorius 22458603

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Chapter One: Introduction to the Study 41
..... 1 1.1 Introduction
..... 1 1.2 Concepts
central to the study ..... 2 1.2.1

Critical systems thinking ..... 2 1 78
.2. 2 Critical systems heuristics .....
2 1 .2.

3 Graphic novels ..... 3 1.2.4 Human-computer
interaction ..... 4 1.3 Research methodology concepts
..... 5 1.3.1 Paradigms
..... 5 1.3.2 Positivism
..... 6 1.3.3 Interpretivism
..... 6 1.3.4 Critical social research theory
..... 7 1.3.5 Design science research
..... 7 1.3.6 Mixed methods
..... 7 1.4 Research methodology
..... 9 1.4.1 Critical research
..... 9 1.4.2 Interpretive
methods..... 10 1.4.3 Design science research
methodology..... 11 1.5 Research methods
..... 13 1.5.1 Action research
..... 13 1.5.2 Interpretive research
..... 15 1.5.3 Design science research
..... 19 1.6 Problem statement and motivation for the study
.....21 1.7 Objectives of the
study.....22 1.7.1 Primary objective
..... 22 1.7.2 Secondary objectives
..... 22 iv

1.8 Research design and methodology 142
..... 23 1.8.1 Aspects of research

methodology used in this study .....23 1.8.2 Research plan for this
study.....23 1.8.3 Rigor and evaluation of method
.....26 1.8.4 Contribution of the study
.....27 1.9 Ethical considerations
..... 27 1.10 Chapter classification
..... 27 2 Chapter Two: Research Methodology
..... 29

2.1 Introduction 137
..... 29 2.2
Research paradigms in information systems ..... 32 2.

2.1 Positivism ..... 32 2 30
.2.2 Interpretivism ..... 33 2
.2.3 Critical social research theory ..... 33 2 .2.4
Design science research

..... 34 2.2.5 Mixed methods
..... 34 2.2.6 Paradigms appropriate for this study
..... 37 2.3 Methodology: General guidelines
..... 40 2.3.1 Critical social theory research methodology
..... 40 2.3.2 Interpretive research methodology ..... 43
2.3.3 Design science research methodology..... 44

2.3.4 Research methodology principles applied in this study 32

**2006:**

93).....71 Figure 2

**.10: An activity framework for design science research (Venable, 2006:17).** ...72 **Figure** 3.1: Example **of** 56

a rich picture depicting the hypothesis testing research process of natural science (Checkland & Holwell, 1998:12). .....87 Figure 3.2: Hard vs soft systems perspectives adapted from Checkland and Scholes (1999:A11).....88 Figure 3.3: The

**'eternal triangle' of boundary judgements, facts, and values (Ulrich,** 57

2000:6). .....94 Figure 3.4: Table of boundary categories (Ulrich, 2000:256).....96 xii Figure 3.5: Adaptation of

**elements relevant to any piece of research (Checkland & Holwell, 1998:** 111

13). ..... 103 Figure 4.1: Page excerpt from the graphic novel Sandkings (Martin, 1986). ..... 106 Figure 4.2: Screenshot of a page layout in The Thrill Electric (www.thethrillelectric.com). ..... 107 Figure 4.3: Each frame of the digital graphic novel page is zoomed into on click (www.thethrillelectric.com). ..... 107 Figure 4.4: Page excerpt that illustrates a subject-to-subject movement (Johns & Frank, 2012:10). ..... 110 Figure 4.5: Page excerpt that demonstrates how frames guide the reader's view (Johns & Frank, 2012:13). ..... 111 Figure 4.6: Possible use of images to represent or evoke emotion adapted from (McCloud, 2011:118). ..... 112 Figure 4.7: Example of how words dictate a reader's interpretation of a character's expression adapted from McCloud (2011:94). ..... 115 Figure 5.1: Example of error message that incorporates hearing, sight and touch. ..... 124 Figure 5.2: Adaptation of graphical representation of the visual angle of two objects of different sizes (Dix et al., 2004:17). ..... 126 Figure 5.3: Translations between components (Abowd & Beale, 1991:76). ..... 142 Figure 5.4: The consistency principle incorporated in the structure of The Thrill Electric (Moore & Reppion, 2015). ..... 151 Figure 5.5: The consistency principle incorporated in the structure of The Thrill Electric (Moore & Reppion, 2015). ..... 151 Figure 5.6: The navigation bar from The Thrill Electric (Moore & Reppion, 2015). ..... 152 Figure 5.7: An error prevention method used by the Windows operating system when a user tries to enter a backslash in a file name..... 152 Figure 5.8: An error prevention method used by the Windows operating system when a user tries to enter a backslash in a file name..... 153 Figure 5.9: The 'back' button in a web browser (www.google.com)..... 153 Figure 5.10: Instruction screen in The Thrill Electric (Moore & Reppion, 2015). ..... 154 Figure 5.11: Google landing page (www.google.com). ..... 154 Figure 5.12: The help menu from The Thrill Electric (Moore & Reppion, 2015). ..... 155 Figure 5.13: The organisation of content within The Thrill Electric (Moore & Reppion, 2015). ..... 156 xiii Figure 5.14: Google's voice recognition search function (www.google.com). ..... 156 Figure 5.15: Google's usability feedback page (http://www.google.com/usability/)..... 157 Figure 5.16: Adaptation of the research structure that reflects the role of HCI principles in this study ..... 162 Figure 6.1: An adaptation of the action research cycle (Baskerville, 1999:14) and the

**design science research process (Peffers et al., 2006:** 93) to represent **the** research structure **of** 15

this study. ..... 179 Figure 8.1: An adaptation of the action research cycle (Baskerville, 1999:14) and the

**design science research process (Peffers et al., 2006:** 93) to represent 15

**the** research structure **of**



**design science research process (Peffers et al., 2006:** 93) to represent **the** research structure **of** **15**



**List of Tables Table 1.1: Different** combinations **of** **158**



**principles for critical research** quoted from **Myers and Klein (2011:** **26**



**principles for interpretive field research** quoted from **Klein and Myers (1999:72).** **17**



**Guidelines for design-science** research **in information systems** quoted from **Hevner et al.** **49**

**Table** **129**

5.5: Proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics and HCI principles. ..... 158 Table 6.1: Summary of popular emotional design theories. ..... 167 Table 6.2: Proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical systems heuristics and HCI principles. ..... 174 Table 7.1: Key factors of prison life during incarceration in Robben Island Prison. ..... 186 Table 7.2: Principles for the design of the narrative and characters in a digital graphic novel. ..... 187 Table 7.3: Questions posed

**to the participants of the focus groups and** **171**

interviews. ... 188 xvi Table 7.4: Details of participants of focus groups and interview. ..... 191 Table 7.5: Adapted summary of the content analysis process as summarised from Zhang and Wildemuth (2009:3). ..... 192 Table 7.6: Summary of most frequent codes discovered in focus groups and interview. ..... 195 Table 7.7: Codes merged due to high degree of similarity. ..... 196 Table 7.8: Code occurrence frequencies for codes in the Daily life in Apartheid code family. ..... 198 Table 7.9: Code occurrence frequencies for codes in the Youth in the Apartheid era code family. ..... 201 Table 7.10: Code occurrence frequencies for codes in the Life in Robben Island Prison code family. ..... 204 Table 7.11: Code occurrence frequencies for codes in the Exercise in Robben Island Prison code family. ..... 208 Table 7.12: Code occurrence frequencies for codes in the Meals in Robben Island Prison code family. ..... 210 Table 7.13: Code occurrence frequencies for codes in the Hunger strikes in Robben Island Prison code family. ..... 212 Table 7.14: Code occurrence frequencies for codes in the Censorship code family. .. 214 Table 7.15: Code occurrence frequencies for codes in the Punishment in Robben Island Prison code family. ..... 215 Table 7.16: Code occurrence frequencies for codes in the Lawyers in Robben Island Prison code family. ..... 217 Table 7.17: Code occurrence frequencies for codes in the Secret Messages in the Robben Island Prison code family. ..... 218 Table 7.18: Code occurrence frequencies for codes in the Education in Robben Island code family. ..... 220 Table 7.19: Code occurrence frequencies for codes in the Views of ex-political prisoners code family. ..... 222 Table 8.1: Roles of each expert in the design of the digital graphic novel. ..... 230 Table 9.1: List of questions mapped to headings of proposed guidelines. ..... 242 Table 9.2: Adapted summary of the content analysis process as summarised from Zhang and Wildemuth (2009:3). ..... 245 Table 9.3: Summary of all codes from the first focus group. ..... 250 xvii Table 9.4: Code occurrence frequencies for codes in the Artwork code family. .....252 Table 9.5: Code occurrence frequencies for codes in the Camera Movement code family. .....253 Table 9.6: Code occurrence frequencies for codes in the Character code family.....255 Table 9.7: Code occurrence frequencies for codes in the Colours code family. .....256 Table 9.8: Code occurrence frequencies for codes in the Design code family. .....257 Table 9.9: Code occurrence frequencies for codes in the Sound code family. .....259 Table 9.10: Proposed changes and the guidelines to which they correlate. .....260 Table 9.11: Summary of all codes from the second and third focus groups. .....265 Table 9.12: Code occurrence frequencies for codes in the Artwork code family. .....266 Table 9.13: Code occurrence frequencies for codes in the Camera Movement code family. .....268 Table 9.14: Code occurrence frequencies for codes in the Colours code family. .....270 Table 9.15: Code occurrence frequencies for codes in the Design code family. .....271 Table 9.16: Code occurrence frequencies for codes in the Sound code family. .....272 Table 10.1: Proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical systems heuristics and HCI principles. .....307 Table 10.2: Guidelines incorporated in each screenshot of the digital graphic novel presented in this study.....312 List of Code Excerpts Code Excerpt 7.1: Codes for P2's response to P6's question of P2's experience of Jetty One. ..... 194 Code Excerpt 7.2: Example of response that addresses multiple topics. ..... 195 Code Excerpt 7.3: Example of code families ..... 197 Code Excerpt 7.4: Participant's responses related to living conditions in the Apartheid era.

Nelson Mandela is one of the most well-known freedom fighters of our time. With his recent passing, news about the 'struggle hero' has spread throughout the world. The story of his fight for equal rights for all is one that has been told countless times through many mediums. To many, the reality of Apartheid in South Africa is a memory fresh in their minds. However, the majority of younger generations within South Africa cannot really relate to Apartheid, as they have been born into a free and democratic country where all citizens possess equal rights. It is important to recount the pivotal social events that ultimately led to the establishment of our democratic country of South Africa in order to serve as both a warning to future generations about the danger of social hierarchies and a reminder of the triumph of the human spirit over adversity. This study forms part of the Mandela27 Project which aims to recount the various social events that took place both in South Africa and Europe during the 27 years of Mandela's incarceration. An interactive physical display will be disseminated in museums in England, Belgium, Sweden and South Africa where



view a 'Cultural Timeline' that displays a year-by-year recollection of cultural events in both Europe and South Africa. Another facet of the interactive physical display is a digital graphic novel that will depict the prison life of an individual incarcerated during the time of the Apartheid regime. The purpose of the digital graphic novel is to serve as an engaging medium through which the experiences of ex-political prisoners of Robben Island Prison are portrayed to members of the target audience. The target audience of the digital graphic novel created in this study is young adults between the ages of 16-25 years of age. This study covers both the aesthetic and content selection aspects of the design and development of the Mandela27 digital graphic novel. 1 |

> **Chapter 1: Introduction to the Study 1.** 2 Concepts central **to the** 119

study This section will discuss concepts that are central to the study. 1.2.1 Critical systems thinking According to Ulrich (2002:72),

> **critical systems thinking** can be **defined by three commitments**– critique, emancipation, pluralism. **Critical** 78

systems thinking undertakes the continuous endeavour of attempting to uncover hidden assumptions nestled within the seemingly unbiased opinions of different schools of thought within the commitment of critique. The commitment of critical systems thinking to emancipation is focused on the full development of a person as an individual. The commitment to emancipation assists in the identifying of unequal power relations and boundary judgements, which are in turn incorporated within the further understanding of the identified problem area as a system (Schecter, 1991:214). Finally, the commitment to pluralism maintains that not one single approach to systems thinking is the best, and that therefore, there is no single school of thought that is able to cater to the needs of the entire spectrum of problem situations (Schecter, 1991:214). 1.2.2

> **Critical systems heuristics Critical systems heuristics was** conceived **by Werner Ulrich** (1987:277) **in** order **to** 57

assist involved and affected parties in dealing with justification break-offs in terms of their a priori judgements.

> **These judgements are called 'boundary judgements'** because **they define the boundaries of the** reference **system** 91

against which a person validates his arguments (Ulrich, 2002:72). Boundary judgements determine the 'facts' and 'values' of a person and as such, have a vital role in determining the meaning behind and merits of an argument (Ulrich, 2005:2). According to Ulrich (2005:2), in order to achieve productive communication, it is vital to clarify, both with ourselves and other involved parties, which reference system is assumed in a particular discussion. Critical systems heuristics can be viewed as

> **the first systematic attempt** to provide **a philosophical foundation** as well as **a practical framework for critical systems thinking** 88

(Ulrich, 2002:72). Critical systems heuristics is defined as 'a critical methodology for Chapter 1: Introduction to the Study | 2 identifying and debating boundary judgements' (Ulrich, 2002:73). To achieve this, critical systems heuristics requires 3 requisites to be essential (Ulrich, 1987:277): 1. To impart

> **a clear understanding of the meaning,** inevitability, **and critical significance of justification break-offs. 2. To** provide **a conceptual framework that** 60

can be used by involved and affected parties in order to justification break-offs and boundary judgements. 3. To offer a tool for convincing argumentation to all parties. Critical systems heuristics is used to guide each phase of the action research phases adopted in this study. Critical systems heuristics is discussed in more detail in Chapter 3. 1.2.3 Graphic novels This section will discuss the definition, history and benefits of digital graphic novels. 1.2.3.1 Definition and history Although graphic novels and comic books are two separate entities, they tend to have a shared history. In fact,

> **graphic novels grew out of the comic book movement** of **the 1960's** 98

via writers who sought to make use of the

> **comic book format to address** topics of a **more 'adult'** nature **(O'English et al., 2006:** 96

173). After winning a prestigious Pulitzer Prize in 1992, Maus: A Survivor's Tale served as a pioneer for

other graphic novels such as Ghost World (Clowes, 1997), Fun Home (Bechdel, 2006), and Watchmen (Moore & Gibbons, 1987) as graphic novels began to evolve into a genre entirely of their own. While some graphic novels carried on themes from their comic book predecessors such as superheroes and fantasy, others took it a step further by dealing with issues that include wars, civil rights, history, drugs, sexually transmitted diseases, dealing with disabilities and even family dynamics (Gorman, 2002:42). 1.2.3.2 Benefits of graphic novels Graphic novels can serve as an exciting medium that meets the high need of stimulation that is preferred by generations that grew up surrounded by television and the Internet (Short & Reeves, 2009:417). These individuals are now accustomed to receiving a great deal of both visual and verbal stimulation (Wolf, 1996:124). According to Tabachnick (2007:28), the graphic novel is also well suited to the contemporary age due to its unique and comforting combination of the qualities of both book and screen. Another benefit of graphic novels lies in the multimedia principle which

> **states that people learn** more from **words and pictures** that **are** combined **rather than from** — **35**

words alone (Mayer, 2008:766). Furthermore, the spatial continuity

> **principle states that people learn better when corresponding words and pictures are presented near** to each other **rather than far from each other on the page or screen (Mayer, 2008:** — **35**

764). Finally, the researcher believes that the use of graphic novels aids in bridging both racial and cultural divides by offering a 'neutral' canvas upon which historical facts can be portrayed. This concept is evident in Maus: A Survivor's Tale (Spiegelman, 2005). Digital graphic novels are discussed in more detail in Chapter 4. The

> **purpose of the** aforementioned **literature review is to** aid in **the** — **70**

formulation of guidelines for creating digital graphic novels portraying emotional social phenomena. 1.2.4 Human-computer interaction In order for a computer to be used effectively and accepted by its intended users, it needs to be well designed (Preece et al., 1994:5). The term 'well-designed' does not imply that a computer needs to be designed in such a way as to accommodate every prospective user, but rather to be designed to cater for the capabilities and needs of the users for which it was intended (Preece et al., 1994:5). Theory and practice are united in the

> **field of human-computer interaction (HCI)** as it **aims to better understand** both **the designs that users** — **90**

need as well as the design processes involved in their creation (Smith-Atakan, 2006:2). There are two major challenges that HCI designers are faced with (Preece et al., 1994:8): ? How to keep up with the rapid changes that occur within the field of technology. ? How to ensure that their designs exhibit good HCI while utilising the functionality of the new technology to its full potential. There are four main concerns in HCI: the humans, the computers, the tasks that are performed, and the support a computer provides a user in achieving a task (usability) (Dix et al., 2004:5). In order for a computer to allow a human to successfully accomplish a task, it needs to satisfy three 'use' words (Dix et al., 2004:5): ? Useful – the

> **user needs to be able to accomplish** what **is** required through **the** — **134**

use of the computer (e.g. sending an email). ? Usable – the user needs to accomplish the task easily and in a natural manner (e.g. pressing a 'k' key should produce the letter 'k' and not 'z'). ? Used – the computer should be attractive, fun, engaging, etc., and as a result make individuals want to use it. In order to design a successful computer, designers need to be mindful of the capabilities and limitations of humans and account for these in the design of a human- computer interface.

> **It is also important to bear in mind that** — **130**

designers themselves are not 'typical users' (Norman, 2002:155). In order to successfully produce a device that is useful, usable, and used it is important to design for the intended human user. Human-computer interaction is

> **discussed in more detail in** Chapter 5. **The** purpose of this **literature review** — **17**

is to enrich guidelines for creating digital graphic novels portraying emotional social phenomena. 1

> **.3 Research methodology** concepts **This section** will discuss **the** different **research methodology** **1**

concepts as well as the research methodologies that are applied in this study. 1.3.1 Paradigms Myers (1997:244) identifies three research paradigms:

> **positivist, interpretive, and critical** social theory. **Each of the** aforementioned **paradigms has** its **own** **13**

underlying epistemological assumptions, ontological assumptions and aims. Epistemological assumptions refer to the nature of knowledge, while

> **ontological assumptions refer to the nature of reality** **77**

(Flowers, 2009:1).

> **Vaishnavi and Kuechler** (2004) state **that design** science **research also has** **38**

its own metaphysical assumptions and therefore is treated as a paradigm of its own for the purposes of this study. 1.3.2 Positivism In the positivism paradigm, the epistemological assumption is that reality is interpreted as being everything that can be sensed through smell, taste, touch, sound, and sight. Comte (1868:4) states that in the positivism paradigm, the researcher is not concerned with the origin or destination of the subject under observation, but rather, through observation and reasoning, with the discovery of the laws that govern the phenomena surrounding the subject. The ontological assumption of positivism is based on realism – i.e. reality is objective and can be defined through observing its measurable properties that are unrelated to the researcher and his instruments (Myers & Avison, 1997:241). This assumption results in facts being investigated within the positivist paradigm as opposed to the values associated with those facts. The aim in positivism is to measure the impact that particular variables have on a situation. 1.3.3 Interpretivism The underlying ontological assumption of interpretivism is that individuals establish and assign their own personal meanings to their surroundings and that they accordingly justify their actions within their environment (Flowers, 2009:3). According to Flowers (2009:3), interpretivists believe that meaning is constantly reconstructed over time through different experiences. This continuous reconstruction results in many different interpretations being conceived by different individuals. The ontological assumption of relativism applies within the interpretivism paradigm, which means that each individual experiences and interprets an object or situation in their own manner. Interpretivists therefore believe that there are multiple realities and that one has to understand the reality (or knowledge) relative to the person who perceived it (Denzin & Lincoln, 2003:3). This will enable the researcher to correctly interpret an individual's meanings and subsequently positively contribute to the building of theory. In the interpretivism paradigm the aim is to understand a phenomenon from an individual's or group's perspective (Crossan, 2003:54). The epistemological assumption of interpretivism assumes that the researcher cannot detach himself from what he knows. It also assumes that the researcher and the object of investigation are linked through how the researcher understands the world around him which, in turn, is a result of how he understands himself and those around him (Flowers, 2009:3). It is therefore imperative for the researcher to uncover and understand the values and contextual factors that have an influence on the interpretations made by different individuals (Flowers, 2009:3). 1.3.4 Critical social research theory The underlying ontological assumption of

> **critical social research** theory **is that** there **is** always a set **of social** **30**

associations between two parties where one party is oppressive of the other (Harvey, 1990:2). The epistemological assumptions of critical social research delve into historically specific, oppressive, social structures in an attempt to uncover any underlying facts (Harvey, 1990:3). The aim of critical social research is to emancipate the oppressed party and in doing so bring about a change in the problem environment (Checkland, 1997:670). 1.3.5 Design science

> **research Vaishnavi and Kuechler (2004)** state that **the** epistemological assumption of **design** science **research** **157**

is that a researcher can be certain of the authenticity of a certain fact and further understand it through the process of construction/circumscription. That is to say, an artefact is created and information is only

considered reliable when the artefact functions in a predictable manner. Predictable functionality is acquired through iterative stages of development. According to

**Vaishnavi and Kuechler (2004), the** ontological assumption **of design** science **research** 75

is that reality exists in different 'world-states'. Although this assumption may seem to correlate with the interpretivist paradigm, it should not be confused with the idea of relativism. Unlike the interpretivist paradigm,

**design science researchers believe in a single, underlying physical reality that** 20

remains constant and serves to limit the amount of different world-states. Flowing from the epistemological assumptions, the aim of design science research is to create an innovative and predictably functioning artefact. 1.3.6 Mixed methods The core concept of mixed methods is to make use of more than one methodology (or parts of different methodologies) that exist within different paradigms in order to conduct a research study (or single intervention) that encompasses an array of research aspects (Mingers & Brocklesby, 1997:491). Table 1.1 gives an overview of a few possibilities of mixed methods research. Table 1.1: Different combinations of mixed methods quoted from Mingers and Brocklesby (1997:491). Name Description Multi-paradigm

**Example Methodological isolationism Using only one methodology** , or techniques **from only one paradigm Single Soft systems methodology** (SSM **)only;** hard **operational research** (OR) techniques **only Methodology enhancement Enhancing a methodology with techniques from another Single Cognitive Mapping used in** SSM **Methodology** 8

**selection Selecting whole methodologies as appropriate to** a **particular situation Multiple** 8

**Jackson Systems Development (JSD) used in SSM** 27

Methodology combination

**Combining whole methodologies in an** intervention **Multiple Using Interactive Planning and** 8

VSM

**Multimethodology Partitioning methodologies and combining parts** Multiple **Using Cognitive Mapping** 8

and Systems Dynamics For the purposes of this study, methodology enhancement is used. The overall paradigm and methodology of the study is critical social research theory with techniques from different paradigms being incorporated within the various phases of the research study structure. The

**mixed methods approach was** selected **for this study because** 79

of the following attractive attributes (Mingers & Brocklesby, 1997:492): ? The mixed methods approach allows research to be conducted on complex, real-world problems due to the freedom to combine techniques from different paradigms

**in order to focus** attention **on the** different aspects **of the research** 118

environment. ? An intervention often takes the form of a process rather than a single event. This process consists of different phases that contain their own unique problems and tasks. The combination of

methodologies that are useful in each unique phase of the overall process is desirable. Research methodology concepts

> **will be discussed in** further **detail in Chapter 2. 1.** 4 **Research** methodology **In this** 95

section, more insight will be given into the selected research methodologies that are applied in this study. 1.4.1 Critical research Myers and Klein (2011:24) propose a set of general guidelines that serve to summarise the key concepts of critical research by combining ideas derived from philosophical literature. The guidelines were compiled to help the critical researcher by summarising the fundamental factors of critical research. Table 1.2 summarises the set of

> **principles for critical research** as proposed by **Myers and Klein (2011:** 26

25). Table 1.2: A proposed set of

> **principles for critical research** quoted from **Myers and Klein (2011:** 26

25). The Element of Critique

> **1. The principle of using core concepts from critical social theorists** 23

This principle suggests that critical researchers should organize their

> **data collection and analysis around core concepts and ideas from one or more critical theorists.** 10

Example: Ngwenyama and Lee (1997:145) use core concepts from Habermas to critique information richness theory. 2. The principle of

> **taking a value position** Critical theorists **advocate values such as open democracy, equal opportunity, or discursive ethics.** 10

These values drive or provide the basis for principles 4 through 6. Example: Adam (2005) looks at how ethics may be more effectively integrated into critical IS research.

> **3. The principle of revealing and challenging prevailing beliefs and social practices** 23

This principle suggests

> **that critical researchers should identify important beliefs and social practices and challenge them with potentially conflicting arguments and evidence.** 31

Example: Doolin (2004:343) considers how a medical information system was supposed to help administrators to ensure efficiency and financial viability, but he challenges the underlying beliefs and assumptions of the system using concepts from Foucault. The

> **Element of Transformation** 4. **The principle of individual emancipation** 52

Alvesson and Willmott (1992:432) say that

> **all critical** social **theory is** oriented toward **facilitating the realization of human needs and potential, critical self-reflection, and** associated **self-transformation.** 10

Example: Kanungo (2004:407) shows how a field labourer in an Indian village was able to receive credit and training using the data available in the local knowledge centre to improve her standard of living. 5. The principle of improvements in

**society This principle suggests that improvements in society are possible. The goal is not just to reveal the current forms of domination, but to suggest how unwarranted uses of power might be overcome** 24

(although the critical theorist should not assume any special position of authority). Most critical theorists assume that social improvements are possible, although to very differing degrees. Example: Kvasny and Keil (2006:23) make recommendations with regard to how the provision of social services (using IT) for historically disadvantaged groups might be improved.

**6. The principle of improvements in social theories** 23

All critical theorists believe that our

**theories are fallible and** that **improvements in** social **theories are possible.** 10

Critical researchers entertain the possibility of competing truth claims arising from alternative theoretical categories, which can guide critical researchers in their analyses and interventions. Example: Habermas modified his ideas in response to debates with Foucault and Gadamer. Conversely, Foucault and Gadamer modified their positions. The method in which these principles are incorporated into this study is shown in Chapter 2. 1.4.2 Interpretive methods Interpretive field research is used to collect data during the Diagnosing and Evaluating phases of this action research study.

**Klein and Myers (1999:72) proposed principles for interpretive research** 58

in an information systems environment. Table 1.3 gives a summary of the aforementioned principles that will be used in this study. Table 1.3: Proposed

**principles for interpretive field research** quoted from **Klein and Myers (1999:72).** 45

**1. The fundamental principle of the hermeneutic circle This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles. 2. The principle of contextualization Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged. 3. The principle of interaction between the researchers and the subjects Requires critical reflection on how the research materials (or**"data") **were socially constructed through the interaction between the researchers and participants. 4. The principle of abstraction and generalization Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action. 5. The principle of dialogical reasoning Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings** ("the story which the data tell") **with subsequent cycles of revision. 6. The principle of multiple interpretations Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same** 2

**sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it. 7. The principle of suspicion Requires sensitivity to possible**"biases" **and systematic**"distortions" **in the narratives collected from the participants. The**

method in which these guidelines are incorporated into this study is shown in Chapter 2. 1.4.3

**Design science research methodology** The **design science research** methodology **is** used within **the** 132

Action Planning and Action Taking phases of the action research cycle adopted in this study. The digital graphic novel is created using this methodology.

**Hevner et al. (2004:** 83) propose seven **guidelines for design science in information systems research.** 20

These guidelines serve to clarify the requirements for successful design science research. These are incorporated into the study

**in order to guide the** design **process of the** 66

digital graphic novel during the Action Planning and Action Taking phases of the action research study. Table 1.4 summarises the

**guidelines for design-science** research **in** information systems as **proposed by Hevner et al. (2004:** 103

83). Table 1.4:

**Guidelines for design-science research in information systems** 42

quoted from

**Hevner et al. (2004:** 83). **Guideline 1: Design as an** Artefact **Design-science research must produce a viable** artefact **in the form of a construct, a model, a method, or an instantiation. Guideline 2: Problem Relevance The objective of design-science research is to develop technology-based solutions to important and relevant business problems. Guideline 3: Design Evaluation The utility, quality, and efficacy of a design** artefact **must be rigorously demonstrated via well-executed evaluation methods. Guideline 4: Research Contributions Effective design-science research must provide clear and verifiable contributions in the areas of the design** artefact, **design foundations, and/or design methodologies. Guideline 5: Research Rigor Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design** artefact. **Guideline 6: Design as a Search Process The search for an effective** artefact **requires utilizing available means to reach desired ends while satisfying laws in the problem environment. Guideline 7: Communication of Research Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences. The** 6

method in which these principles are incorporated into this study is shown in Chapter 2. 1.5 Research methods Research methods are a systematic way of uncovering new knowledge about a particular topic. The structure of a research method is determined by both the assumptions and paradigms discussed in previous sections as well as the general principles given in the preceding sections. The following

**section provides a brief summary of the** research methods **that** will **be** 133

employed in this study. 1.5.1 Action research Blum (1955:1) defines

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| action research as a simple two-stage process: ? Diagnostic Stage | 22 |

– In this

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| stage, the researcher and the subjects of the research | 11 |

work in unison in order to evaluate the social situation. Once this is done, theories regarding the

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| nature of the research domain are then formulated. ? Therapeutic Stage – Change experiments are conducted in this stage by introducing changes and | 13 |

studying their results.

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| Baskerville (1999:6) distinguishes four characteristics of information systems action research. These are: ? ? Action research | 11 |

seeks to increase understanding about

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| an immediate social situation. Emphasis is placed on the complex and varying quality of the social situation within the information systems domain. Action research aids in | 11 |

increasing scientific knowledge while assisting in practical problem solving. In doing so, two significant characteristics of the process is produced, namely: o

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| Highly interpretive assumptions are made about the observation. o The researcher intervenes within the problem environment. ? Action research is | 11 |

a collaborative effort that serves to enhance the capabilities of the relevant actors. A participatory type of observation is required within this characteristic. Enhancing capabilities is relative to the previous capabilities of both the subjects and the researcher and is an inevitable result of collaboration. The extent

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| to which this characteristic is achieved, and the balance between the actors, will depend on the setting | 11 |

of the social situation. ? Action research is largely applicable in order to understand the change processes within social systems.

| | |
|---|---|
| According to Baskerville and Wood-Harper (1996) the model domain of the action research method is | 28 |

a social setting that exhibits the following features: ? ? Active involvement by the researcher, from which, both the researcher and organization is expected to benefit. Immediate application of knowledge acquired where there is not a sense of an observer that is detached from the situation, but rather a sense of an active participant who seeks to make use of

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| any new knowledge that is based on an explicit, clear conceptual framework. ? Linking of | 53 |

theory and practice through research which is typically cyclical. Figure 1.1 illustrates the five iterative phases of action research. The five iterative phases of action research are (Baskerville, 1999:14): ? ? Diagnosing –

| | |
|---|---|
| identification of the primary problems are the underlying cause for the | 29 |

organization's desire for change. Action Planning – involves

collaboration between researchers and practitioners in order to 51

determine which actions should serve to

relieve or improve the primary problems identified in the diagnosing stage. 28
? Action Taking– implementation of the planned action

takes place here with

researchers and practitioners collaborating in the active intervention into the client organization by causing certain changes to be made. ? ? Evaluating– outcomes from the action-taking phase are evaluated by the researchers and practitioners. 22

Specifying Learning – knowledge gained in this phase is provided to others. Figure 1.1: The five iterative phases of action research (Baskerville, 1999:14). This study incorporates the five phases of action research.

Action research is discussed in detail in Chapter 150

2. 1.5.2 Interpretive research Interpretive

data collection and analysis is used within the 175

Diagnosing and Evaluating phase of the action research cycle. 1.5.2.1 Interpretive data collection In general,

interpretive studies aim to understand phenomena by interpreting the meanings that individuals assign to them 55

(Myers 1994:245). This can be done

through the collection and analysis of qualitative data. Qualitative data 76

collection methods include (Maree, 2007:82): ? Documents – these include both unpublished and published documents, faxes, emails, letters, company reports, or any other document that is related to the study ? ? Observation – this is done by documenting a person, event, or object without questioning or interacting with them Interviewing – essentially a two-way conversation between the researcher and a participant where the researcher is able to ask questions that are of relevance to the study ? Focus groups – an interview strategy where the researcher interviews a group of participants with the assumption that communicating within a group will increase the range of responses while also serving to reawaken dormant memories and release personal inhibitions

Interviews and focus groups are employed in the data collection during 39
the

Diagnosing and Evaluating phases of the action research cycle adopted in this study. Fontana and Frey (2000:363) describe four types of qualitative interviews: ? Structured interviews – In this form of interview an entire script is prepared beforehand. These types of interviews are generally found within a survey environment in which the

interviews are not necessarily conducted by the researcher. 13

It is important to note that there is no room for improvisation when conducting this type of interview. ? Semi-structured interviews – This form of interview makes use of an incomplete script. This means that the researcher may have formulated a few questions before the interview,

**but there is room for improvisation.** In this case, **the interviewer is the researcher or** a member **of the research team.** 13

? Unstructured interviews – Unstructured interviews are far less formal than the aforementioned types of interviews. No specific questions need to be asked and the interview takes on a more conversational tone. Interviewees in unstructured interviews are free to answer as openly or abruptly as they like. ? Group interviews – In a group interview, one or more interviewers interview two or more participants. Group interviews may be structured or unstructured. According to Kitzinger (1995:299), a focus group is

**a form of group interview** aimed at capitalizing **on** the interactions **between participants in order to generate data.** 47

**Chapter 1: Introduction to the Study** | 16 Therefore, instead **of the** 7

researcher being the only person asking questions, the participants are allowed to communicate between each other by asking questions, commenting on another individual's point of view and exchanging stories. The core idea behind the focus group centres on the fact that group dynamics may assist individuals to further explore, clarify and justify their point of view in a manner that cannot be achieved within a one on one interview setting. Kitzinger (1995:299) further states that group discussion is particularly fitting in instances where the interviewer has open questions and seeks to isolate the issues of importance of each of the participants in their own words by encouraging participants to generate their own questions amongst themselves and allowing them to pursue their own priorities. Once the data collection process is complete, the gathered data is then analysed in order to elicit meaning from it. 1.5.2.2 Interpretive data analysis Once

**data has been** collected, **it** must **be analysed in order to** be **of** 59

any real value to the study. Qualitative data analysis methods include (Maree, 2007:101): ? ? Hermeneutics: This method enables the researcher to understand the data by providing a philosophical look of human understanding. Content analysis: This method involves the classification and summarisation of the data where similarities and differences are found within the content that either confirms or denies theory. ? ? ? Conversation analysis: A researcher employing this method focuses on the language, structure and patterns found within a conversation. Discourse analysis: This technique centres on the meanings of spoken and written words and why those meanings are attached to them. Narrative analysis: An approach that views the data as a story and looks for chronology, stories within the data, sequences, as well as narrative and temporal themes. Content analysis is used to analyse the data gathered

**for this study. Table 1.** 5 provides **a summary of the** 64

content analysis process that is adopted in

**this study. Table 1.** 5: **A summary of the** 64

content analysis process as summarised from Zhang and Wildemuth (2009:3). 1. Prepare the Data Before analysis can start, the

**data needs to be transformed into written text.** 72

When transcribing interviews, the following questions need to be answered (Schilling, 2006:30): ? ? ?

**Should all the questions of the interviewer or only the main questions from the interview be transcribed? Should the** verbalisations **be transcribed literally or only in a summary? Should observations during the interview (e.g.** 12

audible behaviours)

**be transcribed? 2. Define the unit of analysis The unit of analysis is the** fundamental **unit of text** that will **be classified during** the **content analysis** 25

process. **In qualitative content analysis, individual themes are used** as **the unit of analysis**

instead of words, sentences, or paragraphs. 3. Develop

**categories and a coding scheme** These **can be derived from the data,** theories or **previous related studies.** 4. Test your **coding** — 12

**on a sample of text The best** way to **test the** consistency **and** clarity **of category definitions is to code a sample of** your **data.** — 16

**5. Code all the text** Once **sufficient consistency** is **achieved, the coding rules can be applied to the** remainder **of** the prepared **text. 6. Assess** your **coding consistency** Once **the** — 16

entire data set has been coded, it is important

**to recheck the consistency of** the **coding.** This **is** due **to** the fact **that** — 12

human coders are more likely to make errors as the coding progresses due to fatigue. 7.

**Draw conclusions from the** coded **data** Sense **is** made **of the** — 80

identified themes and their properties. During this stage, inferences will be made and meaning will be reconstructed from the derived data. 8. Report your method and findings Report on your decisions, coding practices, and methods of establishing trustworthiness. Present findings of patterns, themes or categories important to social reality. 1.5.3

**Design science research Peffers et al. (2006:** — 176

89) propose

**a process model** of **design science research** that is comprised **of six activities: 1. Problem identification and motivation** In this activity, **the** — 19

researcher

**defines the** particular **research problem and** substantiates **the** significance **of** the proposed **solution.** — 43

This helps to impel the researcher and readers to search for the solution and accept its results while also assisting the readers

**to understand the reasoning** of **the researcher** in **understanding the problem.** — 135

To complete this activity, the researcher must know what the problem is and the value of the solution to the problem. 2. Objectives of

**a solution The objectives of** the **solution should be** rationally **inferred from the problem** — 19

statement. For this activity, the researcher will once again need to know what the problem is as well as what the current resolutions to the problem are and how efficient they are.

**3. Design and development The development of the** 36

artefact takes place within this activity. During this activity, the desired functionality of the artefact is determined along with its design and architecture. Once the aforementioned are established, the creation of the artefact can commence. In this activity, the researcher will need to be familiar with theory surrounding the research problem that can be used in order to form a solution. 4. Demonstration The researcher demonstrates how effectively the created artefact solves the research problem. To achieve this, a case study, simulation, experiment, etc. may be conducted. 5.

**Evaluation The** degree **to which the** created **artefact solves the** 73

research problem is measured. This is achieved by

**comparing the objectives of** the **solution to the actual** monitored **results from the** application **of the artefact in the demonstration** 19

activity. There are many ways to conduct an evaluation, these include surveys, user feedback and satisfaction questionnaires. The 19 |

**Chapter 1: Introduction to the Study** results **of the** evaluation phase **will** 7

determine whether is it necessary to conduct another iteration of the design science research

**process in order to solve the** identified **research problem.** 6. Communication Once **the** 63

artefact has been confirmed to solve the research problem, the researcher should communicate the findings. This is usually done by explaining the research

**problem and its** significance, **the artefact** and **its** innovativeness **and** effectiveness, **the** objectivity **of its design,** as well as **its** usefulness **to** 36

others. Figure 1.2 provides a graphical representation

**of the process** model of **design science research** as proposed **by** Peffers **et al.** (2006:89). **Figure 1.** 105

2: Graphical representation of the process

**model of design** science **research** as **proposed by** Peffers **et al.** 38

(2006:89). 1.6

**Problem statement and motivation for** the **study** According to **the** founders **of** 85

the Mandela27 project, little is known in the European Union about historic cultural events in South African and vice versa, although most people are familiar with the Apartheid regime that inspired many of the aforementioned cultural events. The Mandela27 project aims to promote intercultural dialogue amongst the European Union and South Africa. The created digital graphic novel should inform young adults about the conditions of prison life during the time of Nelson Mandela's incarceration in a medium that they find engaging and entertaining. The

**aim of the study is to develop** guidelines for **the** 159

design of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human- computer interaction principles. A digital graphic novel is developed to portray the experiences of

political prisoners in Robben Island Prison from 1960 – 1980 to a target audience of young adults between the ages of 16-25. Graphic novels can serve as an exciting medium that meets the high need of stimulation that is preferred by generations that grew up surrounded by television and the Internet (Short & Reeves, 2009:417). These individuals are now accustomed to receiving a great deal of both visual and verbal stimulation (Wolf, 1996:124). According to Tabachnick (2007:28), the graphic novel is also well suited to the contemporary age due to its unique and comforting combination of the qualities of both book and screen. It is imperative to ensure that accurate data is collected with regard to the recollection of events in Robben Island Prison. Critical social heuristics will be useful in guiding the study and providing a reliable means of ensuring that the needs of both those involved (ex-political prisoners) and affected (target audience) are met. It is also important to ensure that the developed digital graphic novel is properly designed and portrays the emotions associated with the emotional social phenomenon. A literature review of digital graphic novels, human-computer interaction and emotion will help to ensure that the aforementioned needs are met. The

**research question for this study is as follows: What** 126

guidelines should be followed in order to design a digital graphic novel portraying emotional social phenomena by using critical systems heuristics and human-computer interaction principles? 1.7

**Objectives of the study The following** research **objectives have been formulated** for **the** 21

**study: 1.** 7 **.1 Primary objective The primary objective of this study is to develop** 21

guidelines for the design of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles. A digital graphic novel is developed to portray the experiences of political prisoners in Robben Island Prison from 1960 - 1990. 1.7.2 Secondary

**objectives In order to achieve the primary objective, the following objectives** have been **formulated for the study** 21

according to the phases of action research: 1. Diagnosing: a. To understand how critical systems heuristics can guide the process of understanding of the experiences of the ex-political prisoners (Chapter 3). b. To understand the experiences of the ex-political prisoners who were incarcerated on Robben Island (Chapter 7). 2. Action Planning: To plan the first version of the digital graphic novel. a. To research the digital graphic novel genre and propose guidelines for creating a digital graphic novel portraying emotional social phenomena (Chapter 4). b. To study human-computer interaction (HCI) principles and further enrich proposed guidelines for creating a digital graphic novel portraying emotional social phenomena (Chapter 5). c. To research emotion and further enrich proposed guidelines for creating a digital graphic novel portraying emotional social phenomena (Chapter 6). 3. Action Taking: To incorporate the proposed guidelines in the creation of a digital graphic novel that portrays the experiences of the ex-political prisoners of Robben Island Prison while serving as an engaging medium for the target audience (Chapter 8). 4. Evaluating: To interpret the reactions of South African members of the target audience toward the developed digital graphic novel in order to further refine it (Chapter 9). 5. Specifying Learning: To develop guidelines for the design of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles (Chapter 10). 1.8 Research design and methodology The following section provides an overview of the

**research design and methodology** employed **in this study.** 1.8 **.1** Aspects of **research** methodology **used** 32

in this study Critical social research, using action research is used within this study. Interpretive research methods are used in the Diagnosing and Evaluating phases of the action research project. For the design of the digital graphic novel, design science research are applied within the Action Planning and Action Taking phase of the action research cycle employed in this study. 1.8.2 Research plan for this study This study is conducted as per the five phases of the action research cycle. Each phase makes use of different

**research methods in order to achieve** its purpose. **The** purpose **of** 71

each phase of the study is as follows: ? Diagnosing o To determine what are the core elements that the ex-political prisoners found important to relay in their stories about the emotional social phenomenon they experienced. o This is done through conducting semi-structured focus groups and an interview with

ex-political prisoners. Literature studies are performed

**on the** topic **of critical systems heuristics in** order **to** further understand **the** **61**

data collected through interpretive methods. ? Action Planning o A literature study of digital graphic novels is performed to help guide the planning and design of the digital graphic novel. o Guidelines for the creation of a digital graphic novel are developed. o A literature study of HCI principles is performed to help guide the planning and design of the digital graphic novel. o Guidelines for using HCI principles in the creation of a digital graphic novel portraying emotional social phenomena are developed. o A literature study of emotion is performed to help guide the planning and design of the digital graphic novel. o Guidelines for the incorporation of emotion in the creation of a digital graphic novel portraying emotional social phenomena are developed. o To plan and design the layout of a digital graphic novel that portrays an emotional social phenomenon. ? Action Taking o To create a digital graphic novel that portrays an emotional social phenomenon according to the proposed guidelines. o

**Design science research is** incorporated **in the** creation **of the** **170**

digital graphic novel. ? Evaluation o To determine the success of the digital graphic novel that portrays an emotional social phenomenon among youth. o Interpretive methods in the form of semi-structured focus groups with members of the target audience is used to determine the success of the digital graphic novel. This phase is combined with the evaluation phase in design science research section of this study. ? Specifying Learning o To specify guidelines for using critical systems heuristics and human- computer interaction principles to create a digital graphic novel that portrays emotional social phenomena. The research structure of this study can be represented graphically

**as illustrated in Figure** 1 **.3. Figure** 1 **.3: An** adaptation **of the** action **research** **104**

cycle (Baskerville, 1999:14) and the

**design science research process (Peffers et al., 2006:** 93) to represent **the** research structure **of** **15**

this study. 1.8.3 Rigor and evaluation of method This study will employ the

**five principles for validation** of **action research** **178**

as prescribed by Heikkinen et al. (2012:8):

**1. Principle of historical continuity** a. **Analysis of the history of action: how has the action evolved historically?** b. Employment: **how logically and coherently does the narrative proceed? 2. Principle of reflexivity** a. **Subjective adequacy: what is the** nature of the **researcher's relationship with his/her object of research?** b. **Ontologic and epistemologic presumptions: what are the researcher's presumptions of knowledge and reality?** c. **Transparency: how does the researcher describe his/her material and methods? 3. Principle of dialectics** a. **Dialogue: how has the researcher's insight developed in dialogue with others?** b. **Polyphony: how does the report present different voices and interpretations?** c. **Authenticity: how authentic and genuine are the protagonists of the narrative? 4. Principle of workability** and ethics a. **Pragmatic quality: how well does the research succeed in creating workable practices?** b. Criticalness: **what kind of discussion does the research provoke?** c. **Ethics: how are ethical problems dealt with?** d. **Empowerment: does the research make people believe in their own capabilities and possibilities to act and thereby encourage new practices and actions? 5. Principle of evocativeness** a. **Evocativeness: how well does the research narrative evoke mental images, memories or emotions related to the theme?** **3**

Evaluation of the critical research application of this study will be conducted by determining whether the principles of Klein and Meyers (1999:72) and Myers and Klein (2011:25) have been met. This will be reflected on in Chapter 10. 1

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| .8.4 Contribution of the study The aim of this study is to develop guidelines for design | 21 |

of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human computer interaction principles. No such guidelines could be found in literature. Since graphic novels appeal to young people, the researcher believes that these guidelines can help other designers of graphic novels. 1.9 Ethical considerations Ethical considerations for this study are: ? Ensuring voluntary participation of all participants ? Acquiring permission to use participant feedback ? Ensuring the confidentiality of the ex-political-prisoners ? Gaining permission to interview ex-political-prisoners of Robben Island The development of the digital graphic novel falls within the scope of the Mandela27 project as a whole, which is part-funded by the EU and has received the necessary ethical clearance pertaining to all project-related content. This study was also granted ethical clearance by the ethics committee of the

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| Faculty of Economic Sciences and IT in the North-West University: Vaal Triangle Campus. | 99 |

1.10 Chapter classification The study

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| consists of the following chapters: Chapter 1: Introduction and motivation of the | 51 |

study – The context and scope of this study is introduced

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|---|---|
| in this chapter along with the problem statement, motivation and objectives of the study. | 30 |

Chapter

| | |
|---|---|
| 2: Research methodology – The selected research methodology for this study is | 31 |

discussed in this chapter. 27 | Chapter 1: Introduction to the Study Chapter 3: Critical systems heuristics – Systems thinking,

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|---|---|
| critical social theory and critical systems | 180 |

heuristics is discussed in this chapter. Chapter 4: Digital

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|---|---|
| graphic novels – The context of digital graphic novels within the research structure of | 166 |

this study is discussed in this chapter. An overview of digital graphic novels is also presented along with design rules, benefits and guidelines for creating digital graphic novels. Proposed guidelines for creating digital graphic novels are

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| presented at the end of this chapter. Chapter 5: | 50 |

Human-computer interaction – Human-computer interaction is discussed in this chapter. Human-computer interaction enriched guidelines for creating digital graphic novels are proposed at the end of this chapter. Chapter 6: Emotion – Emotion is discussed in this chapter. The discussion will include topics such as emotion and sight, emotion and sound, emotion and HCI, and emotion in digital graphic novels. Emotion-enriched guidelines for creating digital graphic novels portraying emotional social phenomena are proposed

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|---|---|
| at the end of this chapter. Chapter 7: Diagnosing – The | 50 |

process followed in the Diagnosis phase of this study is reported on this this chapter. Themes identified as important experiences of the ex- political prisoners of Robben Island Prison are presented in this chapter. Chapter 8: Action planning and action taking – In this chapter, the proposed set of guidelines (Chapter 6) are combined with answers to Ulrich's 12 boundary questions (Chapter 7) and the identified Diagnosis themes (Chapter 7) in order to create a digital graphic novel. Chapter 9: Evaluation – In this chapter, the created digital graphic novel is demonstrated and evaluated in focus groups

**conducted with members of the target audience.** After **each** 149

evaluation, proposed improvements are incorporated into the digital graphic novel. Screenshots of the completed digital graphic novel are presented in this chapter along with a discussion of how the digital graphic novel is implemented. Chapter 10: Specifying learning – The final version of the proposed guidelines for creating digital graphic novels is presented in

**this chapter. The problem statement and** objectives **of the study** 20

are also addressed in this chapter.

**2 Chapter Two: Research Methodology 2.1 Introduction The** aim **of this study is to** 21

formulate a set of guidelines to aid in the development of digital graphic novels that will be used to portray emotional social phenomena. Critical systems heuristics (CSH) and human-computer interaction (HCI) principles will be used in the formulation of these guidelines. The research process will be governed by a framework of thinking which is embodied within a research methodology. This chapter seeks to inform the reader about the selected research methodology

**in order to** assist **the reader** in understanding **the structure of** 69

the study. In their depiction

**of the** action **research process** they used **to develop the** 85

soft systems methodology, Checkland and Holwell (1998:13) give an illustration of the relationship between a

**framework of ideas (F)** or paradigm, the **methodology (M)** used **and** the **area of application (A).** 17

Figure 2.1 illustrates the elements that Checkland and Holwell (1998:13) find relevant to any piece of research. Specific ideas within the framework of thinking are incorporated in the methodology in order to examine an area of concern. Specifying learning is key to any research process and, as indicated, it occurs on all three aspects (F, M and A). 29 | Chapter 2: Research Methodology Figure 2

**.1: Elements relevant to any piece of research (Checkland & Holwell, 1998:** 13)1. **In this** chapter, **the** 89

ontological and epistemological assumptions of each paradigm or framework of ideas ("F" in Figure 2.1) are investigated (Section 2.3). By contrasting the different ontological and epistemological assumptions of each paradigm, an informed decision is then made regarding which paradigm to incorporate within the study. The methodological guidelines ("M" in Figure 2.1) of the chosen paradigm are then explored in order to study guidelines that will direct the research process of this study (Section 2.4). Once the guidelines have been discussed, the practical application of the research paradigm (part of "A" on Figure 2.1) will be investigated (Section 2.5). The chosen research paradigm guides the practical manner in which the study will participate in the research process.

**Data collection and** data **analysis** methods **will** then **be** investigated **in the** 163

context of the practical application of the research process. 1 Checkland intended for his 'rich pictures' to be displayed as is. Therefore, they have not been altered to fit into the format of the other images in this

dissertation.

**Chapter 2: Research Methodology** | 30 Finally, **the** research plan **of the** **54**

study in terms of the philosophical, methodological, and practical aspects is illustrated in Section 2.6. As a precursor to the topics of interest within this chapter, the definition and significance of research needs to be understood. This corresponds to the “Yields learning about” part in Figure 2.1 and is presented in Section 2.2. Creswell (2012:3) defines research as “a process of steps used to collect and analyse information to increase our understanding of a topic or issue”. He further states that research consists of three steps, namely: ? The posing of a question. ? The collection of data in order to resolve the question. ? The communication of an answer to the question. Creswell (2012:4) further provides three reasons that substantiate the significance of research. These are: ? Research contributes towards our current knowledge: This means that research adds to already existing knowledge about a specific research problem, which enables us to form a deeper understanding of problem environments. ? Research improves practice: Through the review of past research results and knowledge generated by previous studies, researchers can improve the current form of practice

**in order to** offer **a** more efficient **solution to a problem.** **20**

? Research informs policy debates: Research results may influence policy makers to incorporate various systems or artefacts into their environment. For example, the proven efficacy of digital graphic novels in a classroom may influence school committee members to include them in an English or history class. Defining a research process before conducting a study enables the researcher to map out the entire study (Myers, 2008:19). This is due to the fact that the research process is comprised of the following (Myers, 2008:19): ?

**Philosophical assumptions ? Research method ? Data collection techniques ? Data analysis** **65**

techniques 31 | Chapter 2: Research Methodology ? How the study is written up ? How the findings are published In addition, simply providing an answer to a research question does not suffice in terms of academic research (Oates, 2006:32). Oates (2006:32) further states that in order for a research study to be recognised as having contributed to the current knowledge base, the findings and processes will first need to be scrutinised by other academics. In order to convince other academics that the researcher is capable of conducting research and that the research project is viable, the research process should be clearly defined (Myers, 2008:20). 2.2 Research paradigms in information systems This section will examine paradigms or frameworks of ideas (‘F’ in Figure 2.1). Kuhn (1970:23) defines a paradigm as “an accepted model or pattern”. Adapting from Guba and Lincoln (1994:107), a research

**paradigm can be defined as a set of** beliefs **that guide the** **108**

research process. Myers (1997:244) identifies three research paradigms:

**positivist, interpretive, and critical** social theory. **Each of the** aforementioned **paradigms has** its **own** **13**

underlying epistemological assumptions, ontological assumptions, and aims. Epistemological assumptions refer to the nature of knowledge, while

**ontological assumptions refer to the nature of reality** **77**

(Flowers, 2009:1).

**Vaishnavi and Kuechler** (2004) state **that design** science **research also has** **38**

its own metaphysical assumptions and therefore will be treated as a paradigm of its own for the purposes of this study. 2.2.1 Positivism In the positivism paradigm, the ontological assumption of positivism is based on realism – i.e. reality is objective and can be defined through observing its measurable properties that are unrelated to the researcher and his instruments (Myers & Avison, 1997:241). This assumption results in facts being investigated within the positivist paradigm as opposed to the values associated with those facts. The epistemological assumption is that reality is interpreted as being everything that can be sensed through

smell, taste, touch, sound, and sight. Comte (1868:4) states that in the positivism paradigm, the researcher is not concerned with the origin or destination of the subject under observation, but rather, through observation and reasoning, with the discovery

**Chapter 2: Research Methodology** | 32 **of the** laws that govern **the** phenomena surrounding **the** **147**

subject. The aim, therefore, in positivism is to measure the impact that particular variables have on a situation. 2.2.2 Interpretivism The underlying ontological assumption of interpretivism is that individuals establish and assign their own personal meanings to their surroundings and that they accordingly justify their actions within their environment (Flowers, 2009:3). According to Flowers (2009:3), interpretivists believe that meaning is constantly reconstructed over time through different experiences. This continuous reconstruction results in many different interpretations being conceived by different individuals. The ontological assumption of relativism applies within the interpretivism paradigm, which means that each individual experiences and interprets an object or situation in their own manner. Interpretivists therefore believe that there are multiple realities and that one has to understand the reality (or knowledge) relative to the person who perceived it (Denzin & Lincoln, 2003:3). This will enable the researcher to correctly interpret an individual's meanings and subsequently positively contribute to the building of theory. In the interpretivism paradigm the aim is to understand a phenomenon from an individual or group perspective (Crossan, 2003:54). The epistemological assumption of interpretivism assumes that the researcher cannot detach himself from what he knows. It also assumes that the researcher and the object of investigation are linked through how the researcher understands the world around him, which, in turn, is a result of how he understands himself and those around him (Flowers, 2009:3). It is therefore imperative for the researcher to uncover and understand the values and contextual factors that influence the interpretations made by different individuals (Flowers, 2009:3). 2.2.3 Critical social research theory The underlying ontological assumption of

**critical social research** theory **is that** there **is** always a set **of social** **30**

associations between two parties where one party is oppressive of the other (Harvey, 1990:2). The epistemological assumptions of critical social research delve into historically specific, oppressive, social structures in an attempt to uncover any underlying facts (Harvey, 1990:3). The aim of critical social research is to emancipate the oppressed party and in doing so, to bring about a change in the problem environment (Checkland, 1997:670). 2.2.4 Design science research According to

**Vaishnavi and Kuechler (2004), the** ontological assumption **of design** science **research** **75**

is that reality exists in different 'world-states'. Although this assumption may seem to correlate with the interpretivist paradigm, it should not be confused with the idea of relativism. Unlike the interpretivist paradigm,

**design science researchers believe in a single, underlying physical reality** **20**

which remains constant and serves to limit the number of different world-states. Vaishnavi and Kuechler (2004) state that the epistemological assumption of design science research is that a researcher can be certain of the authenticity of a certain fact and further understand it through the process of construction/circumscription. That is to say, an artefact is created and information is only considered reliable when the artefact functions in a predictable manner. Predictable functionality is acquired through iterative stages of development. Flowing from the epistemological assumptions, the aim of design science research is to create an innovative and predictably functioning artefact. 2.2.5 Mixed methods The core concept of mixed methods is to make use of more than one methodology (or parts of different methodologies) that exist within different paradigms in order to conduct a research study (or single intervention) that encompasses an array of research aspects (Mingers & Brocklesby, 1997:491).

**Table 2.1 gives an overview of a** few possibilities **of** **83**

mixed methods research. Table 2.1: Different combinations of mixed methods quoted from Mingers and Brocklesby (1997:491). Name Description Multi-paradigm

**Example Methodological isolationism Using only one methodology,** or techniques **from only one paradigm Single Soft systems methodology** (SSM **)only;** hard **operational research** (OR) techniques **only Methodology** **8**

enhancement Enhancing a methodology with techniques from another Single Cognitive Mapping used in SSM Methodology

selection Selecting whole methodologies as appropriate to a particular situation Multiple 8

Jackson Systems Development (JSD) used in SSM 27

Methodology combination

Combining whole methodologies in an intervention Multiple Using Interactive Planning and 8

VSM

Multimethodology Partitioning methodologies and combining parts Multiple Using Cognitive Mapping 8

and Systems Dynamics For the purposes of this study, methodology enhancement will be used. The overall paradigm and methodology of the study will be critical social research theory with techniques from different paradigms being incorporated within the various phases of the research study structure (see Figure 2.2). The

mixed methods approach was selected for this study because 79

of the following attractive attributes (Mingers & Brocklesby, 1997:492): ? The mixed methods approach allows research to be conducted on complex, real-world problems due to the freedom to combine techniques from different paradigms in order

to focus attention on the different aspects of the research environment. 154

? An intervention often takes the form of a process rather than a single event. This process consists of different phases that contain their own unique problems and tasks. The combination of methodologies that are useful in each unique phase of the overall process is desirable. The feasibility of mixed methods can be determined through discussion of three problem areas (Mingers & Brocklesby, 1997:495): ? Philosophical feasibility – the thesis of paradigm incommensurability states that because the fundamental assumptions of each paradigm differ, the researcher should choose the specific rules under which to practice the techniques adopted from other paradigms. In other words, the researcher must commit to a

single paradigm, although the sequential movement from one paradigm to another within the 27

different phases of the research is regarded as permissible. Techniques are not determined by paradigms and can be detached from their associated paradigms

in order to assist in different types of research. Provided that the 161

researcher is aware of the implications of using different methods or paradigms within the overall paradigm, the use of the mixed methods approach would appear to have a great advantage. ? Cultural feasibility – this problem area can be seen as an issue for two reasons. Firstly, a methodology's preferences are not randomly dispersed. They are a reflection of the physical, environmental, and institutional confines

in which communities of individuals who are like-minded tend to 27

gather. The level of comfort that an individual experiences within a specific paradigm is likely to depend on the personal beliefs, worldviews, values, cognitive style, and personality of the individual. Secondly, the basic assumptions that an individual has about the world around them, as well as their values and beliefs,

are gradually formed through long periods of social and cultural exposure. This may also lead to further difficulty in an individual's shift from one paradigm to another. Bearing the aforementioned in mind,

> **if we** agree **that each paradigm** has **its** specific **set of** both implicit **and** explicit **operational premises,** 27

we will have to concede that operating between different paradigms is not a simple, straightforward affair. ? Cognitive feasibility – cognition can be viewed as the mental process of handling data. Studies have been conducted to observe the relationship between different data handling preferences, personality types, and research preferences. These studies have shown a correlation between methods contained in specific paradigms and certain personality types. For example, a more analytical researcher may prefer to work with accurate, exact, and consistent data. This researcher will prefer to work with quantitative data and methods. On the other hand, a more 'humanist' researcher would prefer to interact with others and make use of personalised, explanatory accounts. This researcher would prefer to work with qualitative data and methods. This implies that a researcher may need to do more than merely learn about a new paradigm, but also be actively involved an all available opportunities to develop experience and practice in the new, unfamiliar techniques that accompany a new paradigm. To summarise and conclude the discussion on multimethodology, we can view the concept of multimethodology as an approach for linking parts of different methodologies that may be from different paradigms (Mingers & Brocklesby, 1997:503). In order to do this, different methodologies should be researched in order to identify where valuable links can be created, bearing in mind that

> **moving a technique from one methodology** (perhaps even **paradigm) to another** may result in **its context and interpretation** being **changed** 27

(Mingers & Brocklesby, 1997:504). 2.2.6 Paradigms appropriate for

> **this study The purpose of this study is to** develop guidelines for **the** design **of** 106

digital graphic novels portraying emotional social phenomena. Within this study, two oppressed parties have been identified – ex-political prisoners and students who have to learn about emotional social phenomena. Ex-political prisoners need to be emancipated through having their stories told, while students need to be emancipated through the provision of an immersive and engaging medium that will enable them to learn about the stories of the ex-political prisoners. Although positivism (scientific method) can be used to produce highly accurate research results in an empirical study, the method cannot be applied to a human situation as change is the only constant (Checkland & Holwell, 1998:11). Similarly, due to the epistemological assumption of relativism, interpretivism will also not be used to govern this study, as change and intervention play a crucial part in this research process. This means that, unlike in interpretivism, the researcher focuses on intervention rather than on only understanding the problem. The design science research method is also adopted in this study because of the need to create a digital graphic novel.

> **Design science requires the creation of an artefact** that introduces **a** 117

new and innovative solution to a real-world problem (Gregor & Hevner, 2013:337). This requirement is fulfilled within this study, as one of the outputs 37 | Chapter 2: Research Methodology will be a digital graphic novel that portrays emotional social phenomena. The digital graphic novel will solve the problem of ex-political prisoners not having their stories told as well as the problem of portraying the experiences of the ex-political prisoners in a manner that is immersive and engaging. This paradigm will only be adopted within the critical social research theory paradigm during certain phases of the research process. Therefore, the critical social theory paradigm will govern this study. In addition, within the critical social theory paradigm, it is assumed that all problem statements, alternative problem solutions, and the reflection and assessment of results will be dependent on the prior beliefs of those involved pertaining to the 'whole system' that is under study (Ulrich, 2005:1). This assumption is crucial to the gathering of authentic, reliable information surrounding sensitive topics of emotional social phenomena such as the experiences of the political prisoners. Critical social theory has a pragmatic nature (Ulrich, 2007:1111). This means that different methods from different paradigms can be incorporated during critical social theory research. In this study, the action research process will be used to implement the critical social theory research paradigm (see Section 2.4). The

> **five phases of action research** are diagnosing, **action planning, action taking, evaluation, and specifying learning** 22

(Baskerville, 1999:14). Within the five phases of action research, various methods will be used to perform the research, namely: 1. Diagnosing – Critical social research using interpretive methods 2. Action Planning – Design science research methods 3. Action Taking – Design science research methods 4. Evaluation – Interpretive methods 5. Specifying Learning – Critical social research The interaction between these phases can be better understood when represented in a diagram (see Figure 2.2). Figure 2.2: An adaptation of the action research cycle (Baskerville, 1999:14) and the

**design science research process (Peffers et al., 2006:** 93) to represent **the** research structure **of** **15**

this study. The finalisation of the philosophical assumptions of the study now allow for the investigation of the methodological principles that will be applied as a result. 2.3 Methodology: General guidelines As illustrated in Figure 2.1, the chosen paradigm (F) informs the methodology (M) employed within the research process. Creswell (2003:5) defines a methodology as a strategy that is used to associate methods with outcomes. This section provides the general guidelines for conducting critical social theory research and

**design science research. These** guidelines **will be** **177**

reflected on in Chapter 10 for self-evaluation of the work conducted. 2.3.1 Critical social theory research methodology Harvey (1990:19) provides a summary of the following critical social theory research principles: 1. Critical social research seeks to uncover the underlying assumptions of the individuals participating in the research. These assumptions are normally overlooked in other paradigms, but through the unveiling and interpretation of these assumptions, the researcher is able to understand their origins and how they affect an individual's worldview (Harvey, 1990:20). Within the critical social research theory paradigm, the key methodological factor is the need to uncover the ever-present underlying selectivity of claims made by the individuals within a problem environment (Ulrich, 2005). 2. The principle of totality is applied within critical social research theory due to the fundamental belief that social phenomena do not exist as entities on their own but are rather interrelated to form a greater whole. As a result, a social phenomenon should not be studied as an isolated event, but rather as a subsection of a greater system. 3. Essence is regarded as the principal concept that enables the process of deconstruction to take place. In other words, what does an individual really mean when he makes a statement and how can that be used to further understand his worldview? 4. Critical researchers are more concerned with actions that bring about change in a problem environment as opposed to the actions of the individuals within that problem environment. 5. It is the role of the researcher to reveal the nature of ideologies present within a problem environment. This is achieved by identifying the essence of a social interaction and then removing it from the underlying framework by the process of dialectical deconstruction and reconstruction. 6. Critical social researchers are of the opinion that the structure of a problem environment

**is greater than the sum of its** component **parts. These** **127**

interrelated and interdependent components can only be understood by viewing them in terms of the entire structure as a whole. 7. When conducting critical research, more emphasis is placed on the situations surrounding historical facts, rather than the facts themselves. In addition, the circumstance of the researcher is also taken into account. 8. When faced with a problem situation, the researcher attempts to break down the circumstance into its key elements. By doing so, the researcher is able to better study the interrelations between the elements, and thus uncover the overall structure of the situation. Once this is achieved, the researcher attempts to reconstruct the

**situation in order to identify the** ideology and **oppressive** structure **that** needs **to** **23**

be changed and so result in a change in the problem environment. Myers and Klein (2011:24) also propose a set of general guidelines that serve to summarise the key concepts of critical research by combining ideas derived from philosophical literature. The guidelines were compiled to help the critical researcher by summarising the fundamental factors of critical research. Because critical research will be used as the overall paradigm of the study, Table 2.1 summarises the proposed

**set of principles for critical research.** **24**

Table 2.2: A proposed set of

**principles for critical research** quoted from **Myers and Klein (2011:** **26**

25). The Element of Critique 7. The

| | |
|---|---|
| **principle of using core concepts from critical social theorists** | **26** |

This principle suggests that critical researchers should organize their

| | |
|---|---|
| **data collection and analysis around core concepts and ideas from one or more critical theorists.** | **10** |

Example: Ngwenyama and Lee (1997:145) use core concepts from Habermas to critique information richness theory. 8. The principle of

| | |
|---|---|
| **taking a value position** Critical theorists **advocate values such as open democracy, equal opportunity, or discursive ethics.** | **10** |

These values drive or provide the basis for principles 4 through 6. Example: Adam (2005) examines how ethics may be more effectively integrated into critical IS research. 9. The

| | |
|---|---|
| **principle of revealing and challenging prevailing beliefs and social practices** | **23** |

This principle suggests

| | |
|---|---|
| **that critical researchers should identify important beliefs and social practices and challenge them with potentially conflicting arguments and evidence.** | **31** |

Example: Doolin (2004:343) considers how a medical information system was supposed to help administrators to ensure efficiency and financial viability, but he challenges the underlying beliefs and assumptions of the system using concepts from Foucault. The

| | |
|---|---|
| **Element of Transformation** 10. **The principle of individual emancipation** | **52** |

Alvesson and Willmott (1992:432) state that

| | |
|---|---|
| **all critical** social **theory is** oriented toward **facilitating the realization of human needs and potential, critical self-reflection, and** associated **self-transformation.** | **10** |

Example: Kanungo (2004:407) demonstrates how a field labourer in an Indian village was able to receive credit and training using the data available in the local knowledge centre to improve her standard of living. 11. The principle of improvements in

| | |
|---|---|
| **society This principle suggests that improvements in society are possible. The goal is not just to reveal the current forms of domination, but to suggest how unwarranted uses of power might be overcome** | **24** |

(although the critical theorist should not assume any special position of authority). Most critical theorists assume that social improvements are possible, although to very differing degrees. Example: Kvasny and Keil (2006:23) make recommendations with regard to how the provision of social services (using IT) for historically disadvantaged groups might be improved. 12. The principle of improvements in social theories All critical theorists believe that our

| | |
|---|---|
| **theories are fallible and** that **improvements in** social **theories are possible.** | **10** |

Critical researchers entertain the possibility of competing truth claims arising from alternative theoretical categories, which can guide critical researchers in their analyses and interventions. Example: Habermas modified his ideas in response to debates with Foucault and Gadamer. Conversely, Foucault and Gadamer modified their positions. Within the field of critical social theory, critical systems heuristics (CSH) is defined as “a critical methodology for identifying and debating boundary judgments” (Ulrich, 2002:73) and as such, will be adopted in this study. However, Chapter 3 is dedicated to this subject and therefore, it will not be covered here. 2.3.2 Interpretive research methodology Interpretive field research will be used to gather data for this study as indicated on Figure 2.2 during the diagnosis and evaluation phases of this action research study.

**Klein and Myers (1999:72) proposed principles for interpretive research** 58

in an information systems environment. Table 2.3 gives a summary of the aforementioned principles that will be used in this

**study. Table 2.** 3: Proposed **principles for interpretive field research** 50

quoted from

**Klein and Myers (1999:** 72). Principle Description **The fundamental principle of the hermeneutic circle This principle suggests that all human understanding is achieved by** iterating **between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles. The principle of contextualization Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged. The principle of interaction between the researchers and the subjects Requires critical reflection on how the research materials (or**“data”) **were socially constructed through** the **interaction between the researchers and participants. The principle of abstraction and generalization Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action. The principle of dialogical reasoning Requires sensitivity to possible contradictions between the theoretical** preconceptions **guiding the research** design **and actual findings** (“the story which the data tell”) **with subsequent cycles of revision. The principle of multiple interpretations Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell** it **as they saw it. The principle of suspicion Requires sensitivity to possible**“biases” **and systematic**“distortions” **in the narratives collected from the participants. 2.3.** 1

3 Design science research methodology The

**design science research** methodology **will be used** within **the** action-taking phase **of the** 4

action research cycle as depicted in Figure 2.2. The digital graphic novel will be created using this methodology.

**Hevner et al. (2004:** 83) propose seven **guidelines for design science in information systems research.** 20

These guidelines serve to clarify the requirements for successful design science research. These will be incorporated into the study

in order to guide the design process of the 17

digital graphic novel during the action planning and action taking phases of the AR project, as illustrated in Figure 2.2. Table 2.4 summarises the design science research guidelines that will be further, discussed in Chapter 6. Table 2.4:

Guidelines for design-science research in information systems quoted from Hevner et al. 49

(2004:83). Guideline

Description Guideline 1: Design as an Artefact Design-science research must produce a viable artefact in the form of a construct, a model, a method, or an instantiation. Guideline 2: Problem Relevance The objective of design-science research is to develop technology-based solutions to important and relevant business problems. Guideline 3: Design Evaluation The utility, quality, and efficacy of a design artefact must be rigorously demonstrated via well-executed evaluation methods. Guideline 4: Research Contributions Effective design-science research must provide clear and verifiable contributions in the areas of the design artefact, design foundations, and/or design methodologies. Guideline 5: Research Rigor Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artefact. Guideline 6: Design as a Search Process The search for an effective artefact requires utilizing available means to reach desired ends while satisfying laws in the problem environment. Guideline 7: Communication of Research Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences. 5

As mentioned in guideline 3,

evaluation is an integral component of the design science research process 145

because it serves to provide feedback that is essential to the following iterations of artefact construction

(Hevner et al., 2004: 85). It is important to conduct a thorough evaluation 141

during each iteration in order to ensure that problems areas in the current iteration are addressed.

Table 2.5 summarises the design evaluation methods 83

as proposed

by Hevner et al. (2004: 86). Table 2.5: Design Evaluation Methods quoted from Hevner et al. (2004: 21

86).

1. Observational Case Study: Study artefact in depth in business environment. Field Study: Monitor use of artefact in multiple projects. 2. Analytical Static Analysis: Examine structure of artefact for static qualities (e.g., complexity). Architecture Analysis: Study fit of artefact into technical IS architecture. Optimization: Demonstrate inherent optimal properties of artefact or provide optimality bounds on artefact behaviour. Dynamic 4

**Analysis: Study artefact in use for dynamic qualities (e.g. performance). 3. Experimental Controlled Experiment: Study artefact in controlled environment for qualities (e.g., usability). Simulation – Execute artefact with artificial data. 4. Testing Functional (Black Box) Testing: Execute artefact interfaces to discover failures and identify defects. Structural (White Box) Testing: Perform coverage testing of some metric (e.g., execution paths) in the artefact implementation. 5. Descriptive Informed Argument: Use information from the knowledge base (e.g., relevant research) to build a convincing argument for the artefact's utility. Scenarios: Construct detailed scenarios around the artefact to demonstrate its utility. The** aforementioned principles **will be** applied to **this** research **study.**

**2.3.4 Research methodology** principles applied **in this study This section** **32**

provides a summary of the manner in which each set of guidelines is incorporated within the study. Table 2.6: An application of principles for critical research proposed by

**Myers and Klein (2011:** 25). **Principle Application** within **this study The** **23**
Element **of**

Critique The

**principle of using core concepts from critical social theorists** **26**

The core concepts of Werner Ulrich's Critical Systems Heuristics (Ulrich, 2005) will be adopted in this study. The

**principle of taking a value position** The researcher **is** of the position **that** **23**

youth will be more inclined to read about emotional social phenomena if they are presented in a digital graphic novel format. The researcher is also of the position that the ex- political prisoners will benefit more by having their stories told in the form of a digital graphic novel. The principle of revealing and It is often believed that content of a serious nature challenging prevailing beliefs and should be relayed in a 'serious' form of social practices communication and that digital graphic novels are This principle suggests that critical for entertainment purposes alone. However, young researchers should identify people have admitted that they would be far more important beliefs and social inclined to learn about emotional social phenomena practices and challenge them with if it were presented in the form of a digital graphic potentially conflicting arguments novel. Also, serious topics such as the Holocaust, and evidence. were successfully discussed through the use of a graphic novel such as Maus: A Survivor's Tale (Spiegelman, 2005). The

**Element of Transformation The principle of individual emancipation** **52**

Ex-political prisoners will be emancipated through telling their stories to others. Young adults will also be emancipated by being given the opportunity to learn through an immersive medium. The aforementioned applies to all the individual ex- political prisoners who were interviewed, as well as the individual young adults who individually interacted with the digital graphic novel. The principle of improvements in society Allowing the ex-political prisoners to have their stories told while providing young people with an immersive and engaging medium through which to learn about them contributes towards historical awareness. It is important for a society to be aware of its history for many reasons including economic development (Nunn, 2009:88). Young people were presented with a fun, immersive medium through which to learn about emotional social phenomena such as political prisoners. The principle of improvements in social theories This study demonstrates that critical systems heuristics can be beneficial to the development of a digital graphic novel that portrays emotional social phenomena. Table 2.7: An application of

**principles for interpretive field research** proposed by **Klein and Myers (1999:72).** Principle Description **The fundamental principle of the hermeneutic circle** **45**

When interpreting an interview or focus group, understanding the whole will take place through

understanding the parts, and vice versa. The answer will be analysed in terms of: ? The question ? The entire interview ? The answers of the other participants The principle of contextualization A generalised social and historical background of the ex-political prisoners of Robben Island Prison will be provided. The selection of the participants of the focus groups within the evaluation phase of the action research cycle will be explained. The history of the researcher to the study will be provided in order to aid the audience in understanding the interpretations of the researcher. The

> **principle of interaction between the researchers and the** participants Methods used **to** construct **the** **109**

data obtained in this study will be discussed, as well as the character of the interactions

> **between the researcher and** the **participants. The principle of abstraction and generalisation** **102**

Content analysis will be used in the interpretation, abstraction and generalisation of coded data

> **in the** diagnosing **phase of the action research cycle.** **34**

Content analysis will be used in the interpretation, abstraction and generalisation of data

> **in the** evaluating **phase of the action research cycle.** **34**

The principle of dialogical reasoning The interplay between the existing theory and findings obtained in the analysis of the focus groups will be a key factor in establishing the principles for the development of the digital graphic novel portraying emotional social phenomena. The principle of multiple interpretations The data will be analysed twice and enough evidence will be provided for auditing purposes. The principle of suspicion It will be accepted that all answers are a representation of the specific prisoner's reality that serves as a message that he would like to convey. Table 2.8: An application of

> **Hevner et al. (2004:** 83) guidelines for **design-science research** in information systems. **Guideline** Description **Guideline 1: Design as an Artefact** **87**

A digital graphic novel portraying emotional social phenomena will be created. Guideline 2: Problem Relevance Ex-political prisoners of Robben Island Prison wish to have their stories told to the youth. Young people desire a more immersive and engaging medium through which to learn about emotional social phenomena such as Apartheid.

> **Guideline 3: Design Evaluation The utility, quality, and efficacy of a design artefact must be rigorously demonstrated via well-executed evaluation methods. Guideline 4: Research Contributions** **46**

Guidelines will be developed for developing digital graphic novels about emotional social phenomena through the use of critical systems heuristics and human-computer interaction principles. Guideline 5: Research Rigor The design evaluation methods summarised in 2.5 will be used

> **in the** development **and evaluation of the artefact. Guideline 6: Design as a Search Process** **48**

HCI principles will be incorporated within the design and creation of the artefact. This will ensure that an effective artefact will be produced

> **while satisfying the laws** within **the problem environment. Guideline 7: Communication of Research** **100**

The

> **findings of the** research **study will be** communicated **in the** form of guidelines **that**

summarise the core findings of 30

the study. The identification of methodological guidelines will guide the researcher during the practical stage of the research process. 2.4 Research methods The following section addresses the practical guidelines of critical social theory research (action research), interpretive research and design science research (see Figure 2.2). Action research is a research method of critical social theory research and will therefore be conducted during this study (Myers, 2008:61). 2.4.1 Critical social theory research method - Action research

Kurt Lewin developed action research while he was at the Research Center for Group Dynamics (University of Michigan) 84

(Myers, 2008:57). His main aim when developing the research method was to apply social psychology theories to real-world problems. Once the theory was applied to the problem situation, learning took place from the experience and the body of knowledge was improved upon by either adapting existing theory or by proposing new theory (Myers, 2008:57). Blum (1955:1) defines

action research as a simple two-stage process: ? Diagnostic Stage 22

– In this

stage, the researcher and the subjects of the research 11

work in unison in order to evaluate the social situation. Once this is done, theories regarding the

nature of the research domain are then formulated. ? Therapeutic Stage – Change experiments are conducted in this stage by introducing changes and 13

studying their results.

Baskerville (1999:6) distinguishes four characteristics of information systems action research. These are: ? Action research 11

seeks to increase understanding about

an immediate social situation. Emphasis is placed on the complex and varying quality of the social situation within the information systems domain. ? Action research aids in 11

increasing scientific knowledge while assisting in practical problem solving. In doing so, two significant characteristics of the process is produced, namely: o

Highly interpretive assumptions are made about the observation. o The researcher intervenes within the problem environment. ? Action research is 11

a collaborative effort that serves to enhance the capabilities of the relevant actors. A participatory type of observation is required within this characteristic. Enhancing capabilities is relative to the previous capabilities of both the subjects and the researcher and is an inevitable result of collaboration. The extent

to which this characteristic is achieved, and the balance between the actors, will depend on the setting 29

of the social situation. ? Action research is largely applicable in order to understand the change processes within social systems. Chapter 2: Research Methodology | 50

According to Baskerville and Wood-Harper (1996), the model domain of 28

**the** action research **method is**

a social setting that exhibits the following features: ? Active involvement by the researcher, from which, both the researcher and organization is expected to benefit. ? Immediate application of knowledge acquired where there is not a sense of an observer that is detached from the situation, but rather a sense of an active participant who seeks to make use of

**any new knowledge** that is **based on an explicit, clear conceptual framework.** ? Linking **of** **53**

theory and practice through research which is typically cyclical. Figure 2.3 illustrates the five iterative phases of action research. The five iterative phases of action research are (Baskerville, 1999:14): ? Diagnosing –

**identification of the primary problems are the underlying** cause for **the organization's desire for change.** ? Action Planning – **involves** **29**

**collaboration between researchers and practitioners in order to** **51**

determine which actions should serve to

**relieve or improve the primary problems** identified in **the** diagnosing stage. ? **Action Taking**– implementation of **the planned action** **28**

takes place here with

**researchers and practitioners** collaborating **in the active intervention into the client** organization by **causing certain changes to be made. ? Evaluating**– outcomes from **the** action-taking phase **are** evaluated by **the researchers and practitioners.** **22**

? Specifying Learning – knowledge gained in this phase is provided to others. Figure 2.3: The five iterative phases of action research (Baskerville, 1999:14). Although not represented in Figure 2.3, Baskerville (1999:11) believes that the researcher "must impose a clear, mutually agreed theoretical framework on the situation, in order for explicit, general lessons to emerge from the research". Checkland and Holwell (1998:13) explicitly illustrate this in Figure 2.4 (F). Baskerville (1999:11) further characterises the

**ideal domain of the action research method** as being **a social setting** that **is** **29**

comprised of the following: 1. An actively involved research who anticipates benefits for the organisation and the researcher himself. 2. Acquired knowledge that can be applied immediately that brings out a sense of the researcher being an active participant who seeks to make use of any new knowledge that is founded on a clear and explicit

**conceptual framework. 3. Research is a** (typically) **cyclical process** **28**

that serves to link both theory and practice. Chapter 2: Research Methodology | 52 Within the action research cycle, changes in the

**framework of ideas, methodology, and area of concern** **65**

can be anticipated. The tendency to change the

**framework of ideas, methodology, and area of** concern in **the** **17**

study in which the researcher becomes immersed in real-life social situations results in the most significant principle of

action research (Checkland & Holwell, 1998: 13 ).The action research cycles as 62

illustrated by Checkland and Holwell (1998:13) is shown in Figure 2.4. Although the figure was discussed in the introduction of the chapter, it will now be discussed from an action research perspective.

Figure 2. 4: Elements relevant to any piece of research (Checkland & Holwell, 1998: 33

13)2 Figure 2.5 depicts a picture by Checkland and Holwell (1998:15) illustrating the action research process in human situations. The action research process in human situations according to Checkland and Holwell is as follows (Checkland & Holwell, 1998:14): 1. The researcher who is interested in a specific theme declares his framework of ideas and methodology. 2. The researcher becomes involved as both a researcher and a participant in an environment in which his themes are of relevance. 2 Checkland intended for his 'rich pictures' to be displayed as is. Therefore, they have not been altered to fit into the format of the other images in this dissertation. 3. The researcher then works to affect change and bring about improvement in the environment. The degree of improvement is defined by others within the environment. 4. The researcher then reflects on the involvement phase. This is done by examining the situation with regard to the selected framework of ideas and methodology. Actions in earlier phases may need to be refined or redefined in context of the framework of ideas and methodology. Due to the evolutionary nature of real-world situations, it is the duty of the researcher to determine a break point from the situation where the action research cycle is terminated and the findings are reported. Figure 2.5: Cycle of action research in human situations (Checkland & Holwell, 1998:15)3 3 Checkland intended for his 'rich pictures' to be displayed as is. Therefore, they have not been altered to fit into the format of the other images in this dissertation. The reference to Figure 2 on the figure refers to Figure 2.3. Chapter 2: Research Methodology | 54 2.4.2 Action research applied in this study This study will be conducted as per the

five phases of the action research cycle. As demonstrated in Figure 2 .2. 32

Each phase will make use of different

research methods in order to achieve its purpose. The purpose of 71

each phase of the study is as follows: ? Diagnosing o To determine what are the core elements that the ex-political prisoners found important to relay in their stories about the emotional social phenomenon that they experienced. o This will be done through conducting semi-structured focus groups and an interview with ex-political prisoners. Literature studies will be performed

on the topic of critical systems heuristics in order to further understand the 61

data that is collected through interpretive methods. ? Action Planning o A literature study of digital graphic novels will be performed to help guide the planning and design of the digital graphic novel. o Guidelines for the creation of a digital graphic novel will be developed. o A literature study of HCI principles will be performed to help guide the planning and design of the digital graphic novel. o Guidelines for using HCI principles in the creation of a digital graphic novel portraying emotional social phenomena will be developed. o A literature study of emotion and emotional social phenomena will be performed to help guide the planning and design of the digital graphic novel. o Guidelines for the incorporation of emotion in the creation of a digital graphic novel portraying emotional social phenomena will be developed. o To plan and design the layout of a digital graphic novel that portrays an emotional social phenomenon ? Action Taking o To create a digital graphic novel that portrays an emotional social phenomenon according to the proposed guidelines. o

Design science research will be incorporated in the creation of the 56

digital graphic novel. ? Evaluation 55 |

Chapter 2: Research Methodology o To determine the success of the 54

digital graphic novel that portrays an emotional social phenomenon among youth. o Interpretive methods in the form of semi-structured focus groups with members of the target audience will be used to determine the success of the digital graphic novel. This phase will be combined with the evaluation phase in design science research section of this study. ? Specifying Learning o To specify guidelines for using critical

systems heuristics and human- computer interaction principles to create a digital graphic novel that portrays emotional social phenomena. 2.4.3 Interpretive research methods As indicated in the previous section and Figure 2.2, interpretive interviews are used in the diagnosing and evaluating phases of the action research project. Before establishing

**data collection and analysis methods,** is important **to** establish **the** difference between **the** **70**

two types of data, namely – quantitative or qualitative. Quantitative data is commonly derived from research questions that have been developed according to something of a predictive and affirmative nature (Ellis & Levy, 2009:330). Examples of quantitative research questions are: ? To what extent does the visual appeal of a website affect its number of hits? ? Does the use of voice recognition software occur more amongst females than males? ? To what degree does a slow network connection affect the productivity of staff? Qualitative data is generally derived from research questions that are determined by a more exploratory and interpretive nature (Ellis & Levy, 2009:330). Examples of qualitative research questions are: ? How do older users define user-friendliness as opposed to younger users? ? Why does the addition of movement to static images enhance immersion? ? What aspects of a webpage are of most value to users?

**Due to the** interpretive and **exploratory nature of this study,** **138**

qualitative data will be used. The interpretive research process starts by collecting data, followed by a cycle of data analysis and data collection until a theory is developed that fits all the available data. Over the years, grounded theory has evolved into a classical

**method for** qualitative **data collection and analysis** in interpretive research. **It is** **152**

explained here to provide

**a description of the** interpretive **research process.** Grounded theory can **be** defined **as** **169**

a methodology that is used for the creation of

**theory that is grounded in data** that is collected **and** examined **(Strauss & Corbin, 1994:** **113**

273). Within grounded theory, comparative analysis is used to generate theory through verifying properties using accurate evidence (Glaser & Strauss, 2009:28). Theory is developed within the grounded theory methodology through the

**back-and- forth** of **data collection and analysis in** **39**

the comparative analysis method (Strauss & Corbin, 1994:273). Maree (2007:78) summarises Glaser and Strauss' steps for generating grounded theory as follows: 1. Data collection: This is achieved through

**social interaction in the form of** participant interviews **and** observation, field studies, **and** **155**

focus groups. 2. Data analysis: Comparative analysis is constantly performed through the process of coding and categorising data gathered from the data collection step in order to reveal core ideas. 3. Delimiting of theory: Continuous process of confirming and disconfirming concepts relevant to the core ideas until there is no new data that is revealed. 4. The definition of theory: When a theory has been reached, the testing of the theory is not necessary to prove its validity.

**Data collection and data analysis** are key aspects **of the** interpretive **research process** **62**

and are discussed in the following sections. 2.4.4 Data Collection In general,

**interpretive studies** aim **to understand phenomena** by interpreting **the meanings that** individuals **assign to them** 55

(Myers 1994:245). This can be done

**through the collection and analysis of qualitative** data. Qualitative **data** 76

collection methods include (Maree, 2007:82): ? Documents – these include both unpublished and published documents, faxes, emails, letters, company reports, or any other document that is related to the study ? ? Observation – this is done by documenting a person, event, or object without questioning or interacting with them Interviewing – essentially a two-way conversation between the researcher and a participant where the researcher is able to ask questions that are of relevance to the study ? Focus groups – an interview strategy where the researcher interviews a group of participants with the assumption that communicating within a group will increase the range of responses while also serving to reawaken dormant memories and release personal inhibitions

**Interviews and focus groups** will be employed **in** the **data collection** during **the** 39

diagnosis and evaluation

**phases of the** action **research cycle as** indicated on **Figure** 2 **.2.** 32

Fontana and Frey (2000:363) describe four types of qualitative interviews: ? Structured interviews – In this form of interview, an entire script is prepared beforehand. These types of interviews are generally found within a survey environment in which the

**interviews are not necessarily conducted by the researcher.** 13

It is important to note that there is no room for improvisation when conducting this type of interview. ? Semi-structured interviews – This form of interview makes use of an incomplete script. This means that the researcher may have formulated a few questions before the interview,

**but there is room for improvisation.** In this case, **the interviewer is the researcher or** a member **of the research team.** 13

? Unstructured interviews – Unstructured interviews are far less formal than the aforementioned types of interviews. There are no specific questions that need to be asked and the interview takes on a more conversational tone. Interviewees in unstructured interviews are free to answer as openly or abruptly as they like. ? Group interviews – In a group interview, one or more interviewers interview two or more participants. Group interviews may be structured or unstructured. Maree (2007:88) provides keys to conducting a successful interview: ? Find an individual who possesses the most knowledge of the research area of concern in

**order to ensure the quality of the** information. ? **The** 140

participant should be enlightened as to what the aim of the interview is as well as how the information provided will be used. The participant should also confirm that he or she is participating in the interview voluntarily and that the information provided is true. ? It is important to structure the interview questions in an appropriate manner. For example, the use of questions with a ‘yes’ or ‘no’ answer should be avoided. ? The interview should not be too long. ? The interviewer should refrain from asking leading questions. ? The number of questions asked should be kept to a minimum. Instead, probing and clarification should be used in order to ensure that the participant’s understanding and perception are correctly interpreted. ? Include a variety of different questions that range from experience questions to value questions and opinion questions, etc. ? The interviewer should not dominate the discussion. ? The interviewer should not judge, criticise, argue or disagree with the participant. ? The interviewer should listen intently. ? The interviewer should be aware of his or her body language as well as that of the participants. Non-verbal cues such as maintaining eye contact and maintaining good posture are also of importance. According to Kitzinger (1995:299), a focus group is

**a form of group interview** aimed at capitalizing **on** the interactions **between**

participants in order to generate data. 47

Therefore, instead of the researcher being the only person asking questions, the participants are allowed to communicate between each other by asking questions, commenting on another individual's point of view and exchanging stories. The core idea behind the focus group centres on the fact that group dynamics may assist individuals to further explore, clarify and justify their point of view in a manner that cannot be achieved within a one on one interview setting. Kitzinger (1995:299) further states that group discussion is particularly fitting in instances where the interviewer has open questions and seeks to isolate the issues of importance of each of the 59 | Chapter 2: Research Methodology participants in their own words by encouraging participants to generate their own question amongst themselves and allowing them to pursue their own priorities. Once the data collection process has been completed, the gathered data will then need to be analysed in order to illicit meaning from it. 2.4.5 Data Analysis Once

data has been collected, it must be analysed in order to be of 59

any real value to the study. Qualitative data analysis methods include (Maree, 2007:101): ? Hermeneutics: This method enables the researcher to understand the data by providing a philosophical look of human understanding. ? Content analysis: This method involves the classification and summarisation of the data where similarities and differences are found within the content that either confirms or denies theory. ? Conversation analysis: A researcher employing this method focuses on the language, structure and patterns found within a conversation. ? Discourse analysis: This technique centres on the meanings of spoken and written words and why those meanings are attached to them. ? Narrative analysis: An approach that views the data as a story and looks for chronology, stories within the data, sequences, as well as narrative and temporal themes. Content analysis will

be used to analyse the data gathered for this study 123

Table 2. 9 provides a summary of the content analysis process that 34

will be adopted

in this study. Table 2. 9: A summary of the content analysis 167

process as summarised from Zhang and Wildemuth (2009:3). 1. Prepare the Data Before analysis can start, the

data needs to be transformed into written text. 72

When transcribing interviews, the following questions need to be answered (Schilling, 2006:30): ?

Should all the questions of the interviewer or only the main questions from the interview be transcribed? ? Should the verbalisations be transcribed literally or only in a summary? ? Should observations during the interview (e.g. 12

audible behaviours)

be transcribed? 2. Define the unit of analysis The unit of analysis is the fundamental unit of text that will be classified during the content analysis process. In qualitative content analysis, individual themes are used as the unit of analysis 25

instead of words, sentences, or paragraphs. 3. Develop

categories and a coding scheme These can be derived from the data, theories or previous related studies. 4. Test your coding 12

on a sample of text The best way to test the consistency and clarity of category

definitions is to code a sample of your data. 16

5. Code all the text Once sufficient consistency is achieved, the coding rules can be applied to the remainder of the prepared text. 6. Assess your coding consistency Once the 16

entire data set has been coded,

it is important to recheck the consistency of the coding. 124

This is because human coders are more likely to make errors as the coding progresses due to fatigue. 7.

Draw conclusions from the coded data Sense is made of the 80

identified themes and their properties. During this stage, inferences will be made and meaning will be reconstructed from the derived data. 8. Report your method and findings Report on your decisions, coding practices, and methods of establishing trustworthiness. Present findings of patterns, themes or categories important to social reality. Hsieh and Shannon (2005:1279) discuss three different approaches of

content analysis: conventional, directed and summative. The conventional approach to content analysis 128

is generally incorporated into studies which aim to describe a phenomenon (Hsieh & Shannon, 2005:1279). This approach is well suited to studies in which existing research literature or theory is limited (Hsieh & Shannon, 2005:1279). In the

conventional approach to content analysis, researchers avoid the use of 93

predetermined categories and rather allow

categories to flow from the data 93

instead (Kondracki & Wellman, 2002:224). The researcher approaches coding

by making notes the first thoughts, impressions and initial analysis. 125

In doing so, labels for codes begin to emerge that reflect one key thought (Hsieh & Shannon, 2005:1279). These form part of the initial coding scheme. The identified codes are then grouped

into categories based on how they are linked or related 18

(Hsieh & Shannon, 2005:1279). The

directed approach to content analysis is used when there is existing theory or research surrounding a phenomenon 94

(Hsieh & Shannon, 2005:1281). This

existing theory or research is either incomplete or in need of further description (Hsieh & Shannon, 2005: 101

1281). Therefore,

the goal of the directed approach to content analysis is to either validate or conceptually extend a theoretical framework or theory 37

description (Hsieh & Shannon, 2005:1281). In the directed approach, researchers make use of existing theories

> **or prior research to identify key concepts or variables** which can form **initial coding categories (Potter & Levine-Donnerstein, 1999:** 37

258). Open-ended questions

> **followed by targeted questions about the predetermined categories** 9

can be used when the data is collected primarily through interviews description (Hsieh & Shannon, 2005:1281). Two coding strategies can be implemented in the directed approach to qualitative content analysis. In the first strategy, the researcher reads

> **the transcript and** highlights **all text that appears to** 9

be related to a specific phenomenon. The researcher then codes all the passages highlighted in the first step

> **using the predetermined codes. Any** highlighted **text that could not be** categorised using **the** 9

predetermined codes will then

> **be given a new code** description **(Hsieh & Shannon,** 18

2005:1282). In the second strategy, the researcher immediately begins coding

> **using the predetermined codes.** All **text that could not be** 9

categorised into codes

> **are identified and** analysed **to determine** whether **they represent a new category or** sub-category **of an existing code** 9

description (Hsieh & Shannon, 2005:1282). When using this strategy, comparisons of code frequencies can be used to meaningfully compare the data. The

> **summative approach to content analysis** begins by **identifying and quantifying certain words or content** within the **text with the** ultimate goal **of understanding** their **contextual use** 9

(Hsieh & Shannon, 2005:1279). The analysis for the appearance of specific words or content within a piece of text is called manifest content analysis. This analysis is quantitative as it counts

> **the frequency of** particular **words or content Kondracki** and **Wellman (2002:** 226). **Summative content analysis** 9

is viewed as qualitative content analysis as it furthers the aforementioned process by including latent content analysis which is the process of discovering the

> **underlying meanings of the** specific **words or content** (Cantazaro, **1988:** 9

437; Hsieh & Shannon, 2005:1283). Data analysis in the

> **summative approach to qualitative content analysis** commences **with** 9

**searches for** the **occurrences of identified words or**

content (Hsieh & Shannon, 2005:1285). The frequency of words or content

**is used to identify patterns in the data and** contextualise **the codes** accordingly **(Morgan, 1993:** 112). This **allows for the context** **9**

to be interpreted according to the words or content with which it is associated (Hsieh & Shannon, 2005:1285). Table 2.10 contrasts the key coding differences between the conventional, direct and summative

**approaches to content analysis** as given by **(Hsieh & Shannon, 2005:1286). Table** **121**

2.10: Key coding differences between conventional, direct and summative approaches (Hsieh & Shannon, 2005:1286). Type of content

**Timing of defining Source of** codes or **analysis Study starts with codes or keywords keywords Conventional content analysis Observation Codes are defined** during **data analysis Codes are derived from data Directed content analysis Theory Codes are defined** before **and during data analysis Codes are derived from theory or relevant research findings Summative content analysis Keywords Keywords are identified before and during data analysis Keywords are derived from interest of** researchers **or review of literature** **18**

The transcripts stemming from the

**interviews and focus groups will be** analysed **and coded.** It is necessary **to** **34**

perform textual analysis on the transcriptions of the focus groups and interviews in order to illicit meaning from them. According to Myers and Avison (1997:241), there are three different modes of textual analysis – narrative and metaphor, semiotics, and hermeneutics. In the narrative and metaphor mode, much like the literary definition of the terms, understanding takes place though the relating of a story and comparison with a different object (Myers & Avison, 1997:241). The identification of patterns in situations or text leads to understanding in the semiotic mode of textual analysis (Myers & Avison, 1997:241). Finally, in hermeneutics, understanding is gained through the interpretation of text. The hermeneutic circle of gaining understanding refers to the dividing text into multiple parts, gaining more understanding of the whole by examining the parts, applying that which learnt to the whole text, examining more of the parts, applying that which is learnt to the whole text. The aforementioned process (hermeneutic circle) is repeated until the entire text is completely analysed. Coding consists of meticulous reading through transcribed data, and dividing that data into significant units (Maree, 2007:105). In essence, within the coding process, the data is marked with symbols, unique identifying names or descriptive words that assist the researcher in segmenting the transcript into sections of unique data units. Data, previous related studies, and theories are used to derive categories and coding schemes that will be applied to the qualitative data (Zhang & Wildemuth, 2009:310). Once these have been derived, the data is then categorised into each of the predefined categories. Table 2.11 provides an example of coded data using the coding method illustrated by Maree (2007:106). It is imperative to ensure that themes and categories do not overlap as this may interfere with the credibility of the coding. Once the data is categorised, assumptions and inferences may be made by reconstructing the meaning of words and phrases as categorised in the coding process. Coding enables the researcher to promptly gather all data that has been associated with a general topic so that they can be compared or contrasted as needed. Table 2.11: Example of a coded transcript using the coding method illustrated by Maree (2007:106). Reflective Notes Note fond recollection of memory Interviewer: Are there any noteworthy events that took place in meal times? Participant 1: People shared amongst them, they just wanted to share amongst themselves...I happened to work in the kitchen, we were instrumental in disseminating the information in the pots...it was called ‘spoed’...it is wrapped in... plastic and put underneath the porridge...that Code Sharing occurred amongst inmates Sharing occurred amongst inmates Information was regularly passed via the kitchen Messages were coded Messages were coded information is decoded so when the warden got the information, he must not be able to can read it. Within a qualitative research study,

**it is important to** ensure **that the** analysis, **findings and conclusions** **115**

are trustworthy. (Maree, 2007:113) summarises important aspects that contribute toward ensuring the reliability of a qualitative research study: ? Use more than one data source: Instead of conducting one focus group, rather conduct a focus group and two individual interviews. Comparing whether the key aspects of each of the sources leads to the same conclusion will result in an additional sense of assurance for the researcher. ? Verify raw data: It is easy to misinterpret information. Once the interviews and focus groups have been completed, submit your transcriptions and notes/memos to the participants in order to ensure that you have collected the correct data. ? Maintain a record of decisions you have taken regarding your

**research: It is important to** keep **a** log **of** your **research** **172**

decisions as this will make it easier for other people to follow your logic throughout the study. This may prove especially useful in assisting others to understand how you came to certain conclusions. ? More than one coder: Acquiring another coder to code the transcripts you are working on may help to validate the categories you find, as well as reveal categories that you may have missed. ? Allow stakeholders to comment on your work: Submit your transcripts, analysis, interpretation, or findings to stakeholders or others who may have an interest in your research. For example, submit your analysis to the interview participants in order to validate whether you have correctly captured what they tried to express. ? Validate and verify your findings: Submit a draft report to participants and ask them to provide feedback. ? ? Control for bias: Engage with others throughout your studies by allowing them to read your work. By doing so, you will receive an objective opinion and can recalibrate your focus accordingly. Avoid generalisation: The aim of a qualitative research is to provide understanding via an individual's perspective or group of individuals' perspectives. As such, do not try to enforce your findings upon the greater population. ? ? Choose your quotes carefully: It is imperative that a researcher does not merely include quotes that substantiate his claim. A researcher should never impose his own interpretation of the text. Maintain confidentiality and anonymity: When conducting interviews and focus groups, some participants may express views that are contrary to the general population. The exposure of these views may carry negative consequences for the participant, and it is therefore very important to protect a participant's identity. Be honest about the limitations of your study. Understanding these limitations may assist readers in understanding how you reached your conclusions. 2.4.6 Interpretive methods

**used in this study In** this diagnosis phase **of** this study, **semi-structured** **151**

focus groups will be used to interact with a historical consultant from the Robben Island Museum and ex-political prisoners who were incarcerated in the general cells in Robben Island Prison. A semi- structured interview will be conducted with an ex-political prisoner who was incarcerated in the single cells in Robben Island Prison. The aforementioned meetings will be conducted in this manner because the prisoner to be interviewed is a maximum- security prisoner on Robben Island, whereas the other prisoners who will take part in the focus group were detained in the general section. The accounts of the ex-political prisoners from the general section and the account of the ex-political prisoner from the maximum-security section may differ slightly and will therefore be dealt with separately. Directed content analysis will be used to analyse the data gathered in this phase. The information gathered from the coding of these

**interviews and focus groups will be** used **to identify** **34**

the core elements of prison-life on Robben Island. These core elements will then be incorporated into the storyline of the digital graphic novel.

**Chapter 2: Research Methodology** | 66 **In the** evaluation phase **of the** **54**

study, focus groups will also be conducted with groups of young people regarding the aesthetic appeal of the digital graphic novel that will be created. Directed content analysis will be used to analyse the data gathered in this phase. The information gathered from the coding of these focus groups will assist in the design and improvement of the digital graphic novel as well as contribute to the formation of guidelines that will be proposed at the end of the study. Once the necessary information is attained, the design and creation of the digital graphic novel will take place. This process will be accomplished through the design science research method. 2.4.7

**Design science research** method **As** indicated **in Figure 2.** 2, design science **research** **162**

methods will be incorporated into the action planning and action taking phases of the study. Therefore, the design science research method will be discussed in detail.

**According to Gregor and Hevner (2013:** 337), within **the** field **of** information

systems (IS) design science research 20

comprises the creation of a variety of socio-technical artefacts. They further state that design science research stems from “an important opportunity, challenging problem, or insightful vision for something innovative in the application environment” (Gregor & Hevner, 2013:343). In order to study the research topic under investigation, the researcher needs to identify what is known about the environment, as well as what existing knowledge can be drawn upon in order to further understand the environment. Knowledge that is known about an environment is called descriptive knowledge (Ω knowledge) and existing knowledge that is drawn upon in order to aid the research process is called prescriptive knowledge (Λ knowledge). Figure 2.6 shows the different forms of descriptive and prescriptive knowledge. Figure 2.6: The design science research knowledge base (Gregor & Hevner, 2013:344). The researcher makes

use of the descriptive knowledge in order to inform the research 17

process – for example, aiding in the development of accurate research questions. While doing this, prescriptive knowledge is also used in the form of examining other design methods or artefacts

that have been developed to solve the research problem in the past. The 43

combination of the two different types of knowledge serves to provide a benchmark against which the study may evaluate the innovativeness of the developed artefact and the knowledge arising from the research (Gregor & Hevner, 2013:343). Figure 2.7 illustrates the roles that both prescriptive and descriptive knowledge play

in the design science research process. 49

Figure 2.7: The roles of knowledge in

design science research as illustrated by Gregor and Hevner (2013: 40

344). As the research process of a specific research topic continues, descriptive and prescriptive knowledge gathered from previous studies gradually evolve through the various design cycles (Gregor & Hevner, 2013:A5). Figure 2.8 illustrates the evolution of knowledge via design cycles. Figure 2.8: The evolution of knowledge in

design science research as depicted by Gregor and Hevner (2013: 40

A5).

Peffers et al. (2006:89) propose a process model of design science research 107

that is comprised of six activities

as illustrated in Figure 2.9. 7. Problem identification and motivation 20

In this activity, the researcher

defines the particular research problem and substantiates the significance of the proposed solution. 43

This helps to impel the researcher and readers to search for the solution and accept its results while also assisting the readers

to understand the reasoning of the researcher in understanding the problem. 19

To complete this activity, the researcher must know what the problem is and the value of the solution to the

problem. 8. Objectives of

**a solution The objectives of** the **solution should be** rationally **inferred from the problem** 19

statement. For this activity, the researcher will once again need to know what the problem is as well as what the current resolutions to the problem are and how efficient they are. 9. Design and development The development of the artefact takes place within this activity. During this activity, the desired functionality of the artefact is determined along with its design and architecture. Once the aforementioned are established, the creation of the artefact can commence. In this activity, the researcher will need to be familiar with theory surrounding the research problem that can be used in order to form a solution. 10. Demonstration The researcher demonstrates how effectively the created artefact solves the research problem. To achieve this, a case study, simulation, experiment, etc. may be conducted. 11.

**Evaluation The** degree **to which the** created **artefact solves the** 73

research problem is measured. This is achieved by

**comparing the objectives of** the **solution to the actual** monitored **results from the** application **of the artefact in the demonstration** 19

activity. There are many ways to conduct an evaluation, these include surveys, user feedback and satisfaction questionnaires. The results of the evaluation phase will determine whether is it necessary to conduct another iteration of the design science research

**process in order to solve the** identified **research problem.** 12. Communication Once **the** 63

artefact has been confirmed to solve the research problem, the researcher should communicate the findings. This is usually done by explaining the research

**problem and its** significance, **the artefact** and **its** innovativeness **and** effectiveness, **the** objectivity **of its design,** as well as **its** usefulness **to** 36

others.

**Figure 2.** 9: **Design science research process model (Peffers et al., 2006:** 15

93). Venable (2006:17) composed an activity framework

**of design science research** that illustrates **the role of theory** building **in** 122

the

**design science research** process **as shown in Figure** 2.10. **Figure** 2.10: **An activity framework for design science research (Venable,** 82

2006:17). According to Venable's framework, theory building forms the central part of

**a design science research process** with **design science** researchers engaging **in** 143

theorising during every activity within the design science research process. 2.4.8

**Design science research method used in this study** 74

This study seeks to utilise theory generated during each activity in order to formulate guidelines for the development of a digital graphic novel used to portray emotional social phenomena. The descriptive knowledge (Ω knowledge)

**that will inform the design and development of** 164

the digital graphic novel will be the guidelines for creating digital graphic novels (presented in Chapter 4). The prescriptive knowledge (Λ knowledge) that will be incorporated in the design and development of the digital graphic novel will be the guidelines isolated from the literature reviews of HCI principles (Chapter 5) and emotion (Chapter 6). The design science research method

**will be applied** to **this study Chapter** 2: **Research Methodology** 168

| 72 within the Action Planning and Action Taking phases of the overall action research cycle. The

**design science research** method **proposed by** Peffers **et al.** (2006:89) **will be** used **in** 114

**this study. The** aforementioned **design science research** method **was** 81

discussed in section 2.5.5. A summary of how each phase will be performed

**is presented in Table 2.** 12. **Table 2.** 12: Implementation **of** design science **research** 131

method adapted

**from Peffers et al. (2006:** 89). **Problem identification and motivation** 81

Short and Reeves (2009:417) believe that a graphic novel provides an appealing teaching and learning medium that caters to the high stimulation needs of generations that grew up surrounded by TV and the Internet, and who are now accustomed to receiving a great deal of both visual and verbal stimulation (Wolf, 1996:124). Part of the Mandela27 project is aimed at making young adults aware of the stories of the ex-political prisoners of Robben Island Prison. Therefore, in order to portray this emotional social phenomenon to young adults, a digital graphic novel will be created. Objectives of a solution The digital graphic novel must serve as an immersive and engaging medium through which young adults can learn about the experiences of ex-political prisoners of Robben Island Prison. Design and development Concepts isolated from a literature review of digital graphic novel design will be implemented

**in the design and development of the** digital graphic **novel.** 67

HCI principles will also be applied in the design and development of the digital graphic novel. Concepts isolated from a literature review of emotion and emotional social phenomena will be implemented

**in the design and development of the** digital graphic **novel.** The **artefact** 67

will be developed in using the Unity game engine. Demonstration Focus groups will be held with young adults aged between 16- 25. The results of the demonstration will be evaluated and guidelines for the development of a digital graphic novel will be developed/adjusted at each iteration. Evaluation The process will then recommence from the design and development phase with the newly established guidelines being applied. This evaluation phase will be combined with the evaluation phase

**in the action research section of this** study. Communication **The** 17

guidelines developed as a result of the design science research

**process will be** specified **in the** Specifying Learning **section** of **the entire** 144

study. 2.5 Research plan for

**this study This study is structured** according **to the action research** processes proposed **by Checkland and Holwell (1998:** **86**

13) (Figure 2.1) and Baskerville (1999:14) as depicted in Figure 2.2. Figure 2.10 illustrates the manner in which the researcher integrates both proposed action research processes into the study. The Baskerville (1999:14) action research process will be adopted within the research process while the Checkland and Holwell (1998:13) action research process will be incorporated into the study as a whole. As illustrated in Figure 2.10, critical social theory research will form the framework of ideas that will guide the research methodologies applied

**in the** study. **Design science research and** **48**

action research will guide the actions that are

**applied to the area of research** **48**

– the use of digital graphic novels to portray emotional social phenomena. The research process will be conducted within the aforementioned area of research and will be comprised of the adapted (Figure 2.2) five phases of action research as given by Baskerville (1999:14). 2.6 Ethics adopted in this study Ethics in research can be defined as applying

**moral principles 'in planning, conducting, and reporting** the **results of** **120**

research studies. The fundamental moral standards involved focus on what is right and what is wrong' (McNabb, 2002:36) . In this study, ethical considerations were taken with regard to both the people directly involved and the researcher. The ethical considerations of those directly involved in the study were (Oates, 2006:55): ? The right not to participate – should an individual wish not to participate in the study, they will not be forced to. Their decision will be accepted and respected. ? The right to withdraw – if, at any time, an individual becomes uncomfortable, he or she will be allowed to decline to provide an answer or to discontinue his or her participation in the activity. ? The right to give informed consent – participants will only give their consent to participate once they have been made fully aware of both the nature of the research as well as what their involvement will be. ? The right to anonymity – individuals will be granted the right to have their identity and location protected due to the sensitive nature of the subject matter in the interviews and focus groups with ex-political prisoners. ? The right to confidentiality – the participants will be granted the right of having the information provided handled with the utmost of care and not made freely available to others not

**involved in the study. The** ethical considerations **of the researcher** **153**

in this study were (Oates, 2006:60): ? No unnecessary intrusion – the researcher will not intrude upon the activities of the participants or ask questions that may be seen as offensive. ? Integrity – the researcher will record the information accurately and fully. The information will be stored in a safe and secure location. The researcher will ensure that the information gathered will be used in a manner that will not cause harm. ? Plagiarism – the researcher will not pass off the work of another as her own. Full credit will be given the author within the references. 2.7 Conclusion Methodology enhancement will be used in this study. The overall paradigm and methodology of the study will be critical social research theory with techniques from different paradigms being incorporated within the various phases of the research study 75 | Chapter 2: Research Methodology structure (see Figure 2.2).

**A combination of the** action **research** cycle **and the** design science **research** **39**

process will be implemented. Within the phases of the action research cycle, methods from varying paradigms will be used: 1. Diagnosing – Critical social research using interpretive methods 2. Action Planning – Design science research methods 3. Action Taking – Design science research methods 4. Evaluation – Interpretive methods 5. Specifying Learning – Critical social research The research methodology has been covered first

**in order to** assist **the reader** in understanding **the structure of** **69**

the study. The following chapter will focus on the framework of ideas that will be embodied within the research methodology of the study. 3 Chapter Three: Critical Systems Heuristics 3

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| .1 Introduction The main goal of this study is to | 116 |

formulate a set of guidelines to aid in the development of digital graphic novels that will be used to portray emotional social phenomena. Critical social heuristics will be used in the formulation of these guidelines. Critical social research, more specifically critical social heuristics, is used in the diagnosing and specifying learning stages of this study. In order to discuss critical social heuristics, critical systems thinking needs to be discussed (Section 3.2). This chapter will start by defining the concept of systems in Section 3.2.1. Here we will discuss the definition of a system and its five components.

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| This is followed by Section 3.2.2 which presents a discourse of | 160 |

systems thinking. Within the discourse, we will cover the adaptive whole (Section 3.2.2.1), the five principles of systems thinking (Section 3.2.2.2), hard systems vs. soft systems (Section 3.2.2.3), and the performance of a system (Section 3.2.2.4). A brief history of the origin of critical theory is then presented by discussing the Frankfurt school in Section 3.2.3. Section 3.2.4 then covers critical social theory which is followed a comparison of rational vs. polemical reasoning in Section 3.2.5. Critical systems heuristics is discussed in Section 3.3 where the concept of boundary judgements is explored in detail. Section 3.4 depicts the researcher's initial

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| answers to the 12 boundary questions discussed in Section 3 .3. Finally, the | 156 |

discussion of

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| critical systems thinking ends with a summary of critical systems thinking in | 146 |

Section 3.5 and a conclusion

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| presented in Section 3. 6. Section 3.3 presents the concept of | 173 |

critical social heuristics and provides the 12 boundary questions as set forth by Ulrich (1987:279). The researcher provides initial answers to Ulrich's 12 boundary questions in Section 3.4. A summary of critical social heuristics is then provided in Section 3.5 with the conclusion of the chapter being presented in Section 3.6. 3.2 Critical Systems Thinking According to Ulrich (2002:72) critical systems thinking can be defined by three commitments – critique, emancipation, pluralism. 77 | Chapter 3: Critical Systems Heuristics Within the commitment of critique, critical systems thinking undertakes the continuous endeavour of attempting to uncover hidden assumptions nestled within the seemingly unbiased opinions of different schools of thought. It achieves this by "questioning the methods, practice, theory, normative content and rationality of all schools of thought" (Schecter, 1991:213). The commitment of critical systems thinking to emancipation is focused on the full development of a person as an individual. This is achieved through the equal and free participation of the individual with other individuals in a community (Schecter, 1991:213). The commitment to emancipation also assists in the identifying of unequal power relations and boundary judgements (see Section 3.3), which are in turn incorporated within the further understanding of the identified problem area as a system (Schecter, 1991:214). Finally, the commitment to pluralism maintains that not one single approach to systems thinking is the best, and that therefore, there is no single school of thought that is able to cater to the needs of the entire spectrum of problem situations (Schecter, 1991:214). In fact, the commitment to pluralism is in fact a commitment that seeks to integrate the different approaches to systems thinking in a broad framework of interaction (Schecter, 1991:214). 3.2.1 What is a system? In order to understand systems thinking,

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| it is important to understand what is meant by the | 112 |

word 'system'. Ackoff (1971:661)

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| defines a system as a set of interrelated elements. | 23 |

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| A system can also be defined as a set of components that are combined to | 97 |

create a complex whole (Checkland, 1997:667). Each individual component of a system works together in order to accomplish a common goal (Churchman, 1968:29). Systems may also be concrete (the human body) or abstract (the education system) (Ackoff, 1971:661). According to Von Bertalanffy (1950:23), a system may be either open or closed. A closed system does not allow any material to enter or leave it. A system can be defined

**as an open system** when it **interacts with its environment** **165**

by receiving an input and rendering an output – e.g. living organisms. Maturana and Varela (1980:76) challenged Von Bertalanffy's (1950:23) perspective of an open system by placing emphasis on the closed system of interactions that take place within living entities instead of its component parts. The interactions within the system are self-producing in nature and ensure the independence of the system. These systems are called autopoietic and respond to environmental pressures based Chapter 3: Critical Systems Heuristics | 78 on their organisational structure and with the goal of maintaining their core organisational identity (Jackson, 2007:7). These state-maintaining systems: ? React in only one way to a certain internal or external events. ? React in different ways to different internal or external events. ? Produce the same internal or external state. This type of system can also be categorised by the fact that is reacts only to change and that its reaction is governed by the event that brought about its change in state (Ackoff, 1971:665). Another term used to describe systems that use internal adjustments in order to retain their state is homeostatic (Ackoff, 1971:664). A homeostatic system is comprised of a static system that contains both a dynamic environment and dynamic elements (Ackoff, 1971:664). For the purposes of this study, we will be looking viewing a system in terms of Churchman's components of a system. Churchman (1968:29) identifies five features that need to be considered when defining a system, these are: ? Objectives ? Environment ? Resources ? Components ? Management Each of these features pays a key role in the defining of a system, and as such, will be discussed in further detail. 3.2.1.1 Objectives The objectives of a system serve as the measure of performance of a system in terms of efficacy (the systems does what it is supposed to do), efficiency (the use of resources is optimised), and effectiveness (achieves the higher goals) (Checkland & Scholes, 1999:39). In order to determine whether an objective is a real objective or a stated objective, the researcher must test whether the system will willingly forgo other goals in order to satisfy it (Churchman, 1968:31). Once the real objectives of a system are uncovered, the consequences of the system activities in relation to the objectives can be measured (Churchman, 1968:34). 3.2.1.2 Environment The environment of a system is what lies outside the scope of the system and consists of people and things that are a fixed or given constraints in terms of the system (Churchman, 1968:34) e.g. the weather and politics. The environment may play a part in determining the performance of a system by exerting external pressure on it (this is discussed further in Section 3.2.2.1). In order to determine whether an aspect is part of the system or the environment, two questions must be asked (Churchman, 1968:36): ? Is there anything that can be done to change it? ? Does it impact the objectives of the system? If an aspect has an impact on the objectives of a system and nothing can be done to change it, then it is part of the environment. 3.2.1.3 Resources Resources exist within a system and are used by the system in order to complete its activities (Churchman, 1968:37). Resources may be in the form of money, equipment, or time. Unlike the environment, resources are aspects that the system is able to alter for its own benefit. In general, the particular actions of a system are shaped by the amount of resources within the system (Churchman, 1968:39). 3.2.1.4 Components The particular actions of a system are taken by the components which make up the system (Churchman, 1968:39). Components are identified by deconstructing the tasks that a system needs to perform. Identification of components provides a means to tell whether a system is functioning properly at a specific point in time and what steps need to follow in order to maintain or increase performance (Churchman, 1968:42). The fundamental aim of component identification is to find components whose performances are directly related to the performance of the system as a whole – i.e. when the performance of a component increases, the performance of the system increases (Churchman, 1968:43). Chapter 3: Critical Systems Heuristics | 80 3.2.1.5 Management The management of a system pertains to the formation of strategies for the system (Churchman, 1968:44). These management strategies affect the aforementioned features of a system: ? The setting of overall objectives of the system. ? The determining of the environment. ? The allocation of resources. ? The identification and control of components. Management is not only responsible for defining the plans of a system but also for ensuring that those plans are carried out (Churchman, 1968:45). Evaluation of plans needs to be conducted in the system management with the appropriate changes being made if needed. In order to achieve this, the management aspect of a system needs to obtain information that informs it when there is an error within the system and what can be done to rectify it (Churchman, 1968:46). The system as a whole is viewed as possessing properties that make it greater than the sum of its parts; these are referred to as emergent properties (Checkland, 1997:667). Emergent properties have no significance in respect of the parts that form the system as a whole. To do systems thinking is to view a problem in terms of emerging properties and other systems properties such as objectives, environment, resources, components and management. 3.2.2 Systems Thinking Now that the definition and elements of a system has been discussed, we will now have a detailed look at the term 'systems thinking'. Checkland (1981:75) defines the term 'systems thinking' as using the concept of a system in order to think about the world outside ourselves. It is therefore the objective of the systems thinker to describe the world outside himself (external world) using systems thinking. This means that the systems thinker views reality and the processes contained within it in terms of whole entities (systems) which he identifies and circumscribes (Checkland, 1981:83). Checkland and Scholes (1999:25) further define systems thinking as setting "some constructed abstract wholes (often called 'systems models') against the perceived

real 81 | Chapter 3: Critical Systems Heuristics world in order to learn about it". Checkland (1981:83) states that the systems thinker may also form reality into certain systems according to his own needs. In this study, the researcher has identified and circumscribed reality into certain systems due to her own need to further learn about it. In this section, we will look at some fundamental concepts within systems thinking. 3.2.2.1 The adaptive whole Systems thinking is based upon the fundamental idea of the adaptive whole (Checkland, 1997:668). Checkland (1997:668) defines the idea of the adaptive whole as being the concept of a whole entity that exists within a specific environment that is subject to change and may subsequently cause trauma in the system – the adaptive whole adapts to the changes in the environment in order to ensure its survival. As mentioned in Section 3.2.1, a system which reacts to its environment in such a way that is self-producing and autonomous can be considered autopoietic. An autopoietic system only changes its structure with the goal of maintaining its core organisational identity (Jackson, 2007:7). The adaptive whole can therefore also be referred to as being autopoietic or homeostatic (see Section 3.2.1). Checkland (1997:668) states that four primary concepts need to be present before a system can be described as an adaptive whole: 1. Emergent properties – the system contains properties that exist only when all its components are joined together. 2. Layered structure – the system contains sub-systems which themselves function as whole systems. 3. Communication processes – processes that enable the system to perceive changes in the environment. 4. Control processes – processes that aid the system in responding through means of a control action. A fundamental aspect of systems thinking is the cognisant utilisation of systems concepts (such as the adaptive whole) in order to understand phenomena or to direct intervention that is aimed at bringing about improvement within an environment (Checkland, 1997:669). 3.2.2.2 Five principles of systems thinking Gharajedaghi (1999:29) states that there are five principles that need to be comprehended in order to truly grasp a systems thinking mind-set. These five principles are: ? Openness ? Purposefulness ? Multidimensionality ? Emergent properties ? Counterintuitiveness In the case of an open system, openness refers to the fact that a system can only be understood relative to its environment (Gharajedaghi, 1999:30). A system can be differentiated from its environment by observing the variables surrounding it. Variables that influence the system and can be controlled by it belong to the system. Variables that influence the system but cannot be controlled by it belong to the environment. A variable can be controlled by the system if the system can manipulate it for the benefit of the system. A variable is influenced if the system can only partially manipulate it – i.e. the system does not solely dictate the actions of the variable. 'Influenced' variables form part of what Gharajedaghi (1999:31) refers to as the 'transactional environment' Purposefulness seeks to answer the 'why' question in a system (Gharajedaghi, 1999:33). In order to fully understand a system, one has to ask why certain things operate the way they do. A purposeful system can yield the same results in different environments – e.g. human body temperature remains relatively constant at varying external temperatures. However, it is also capable of delivering varied results in the same or alternate environments – egg. a runner with an injured foot will not train. These qualities are due to the fact that purposeful systems contain both state- maintaining and goal-seeking properties (Gharajedaghi, 1999:37). Multidimensionality deals with the ability to observe complementary relationships between opposing properties of a system and to form viable whole system components from these impractical parts (Gharajedaghi, 1999:38). An example can be made of a runny nose. Although the properties of a runny nose are unpleasant, they are also intertwined with the body's attempt to rid itself of foreign substances. Thus, the 'opposite' properties of discomfort and health form a complementary relationship within this circumstance. Emergent properties, as previously mentioned, are the properties of the whole that cannot be inferred from the individual properties of the parts (Gharajedaghi, 1999:44). Checkland (1981:3) notes that the concept of a 'system' comprises a set of elements which are connected together in order to form a whole, and this whole possesses properties that are unique to itself and are not merely properties of its individual elements. Emergent properties of a system are therefore greater than the sum of the properties of the individual components (Checkland, 1997:667). In essence the focus on the 'whole-system' within systems thinking can be attributed to the concept of emergence. We can conclude this by considering a statement made by Ackoff (1971:661), the "systems approach to problems focuses on systems taken as a whole, not on their parts taken separately". Ackoff (1971:661) states that certain properties of systems can only be properly considered when observed from a holistic point of view. Counterintuitiveness refers to the outcomes of certain actions being opposite to their intended outcomes (Gharajedaghi, 1999:48). For example, dropping the required pass rate so that more students progress to the next level may aid in the short-term statistics of students who complete the curriculum, however, this inevitably leads to a significantly ignorant generation. Gharajedaghi (1999:49) states that the ramifications of the following statements need to be comprehended in order to understand counterintuitiveness: ? Time and space may separate cause and effect. An incident at a specific time and place may have a delayed effect that will take place in a different time and place. ? Circular relations may occur where cause and effect replace each other. ? Multiple effects may result from a single cause. As time passes, the order of importance may shift. ? Although certain variables originally yielded a specific effect, at a different time, different variables may be used to yield the same effect. This means that removing the original cause of the effect will not necessarily result in removing the odds of the effect taking place. Each of the preceding principles aid in developing the other. For example, once a systems thinker masters the principle of purposefulness, it is easier to look for multidimensional relationships between components that work together in order for the system to achieve its ultimate goal. The five principles of systems thinking are a great aid in order to get into a 'systems thinking' mind set (Gharajedaghi, 1999). 3.2.2.3 Hard vs soft systems Systems thinking can be categorised into two types – hard systems thinking and soft systems thinking. Hard systems thinking is applied to practical problems where an objective (or objectives) can be identified. A system is then constructed in order to achieve the pre-determined objective (Checkland, 1981:138). Hard systems thinkers believe that every practical problem can be represented by a current state and a desired state with multiple ways of progressing from the current state to

the desired state. The hard systems thinker needs to define both the current and desired states and then attempt to find the best alternative to get from the former to the latter (Checkland, 1981:138). Suffice to say, within hard systems thinking, it is believed that the world consists of systems that can be manipulated to work efficiently (Checkland, 1997:669). Engineers make use of hard systems thinking due to the fact that in their field, they are presented with a problem which they need to solve through the creation of a reliable, efficient system (Checkland, 1981:146). Hard systems thinking has a tendency of neglecting the human aspect of systems in that is considers people as components that can be engineered rather than actors whose support needs to be acquired in order to implement a solution and attain the final goal (Jackson, 2007:62). Unlike goal-driven hard systems thinking, soft systems thinking is a process of inquiry (Checkland, 1997:669). There are not pre-defined objectives or a structured problem statement. These unstructured problems are called soft problems (Checkland, 1981:146). Soft problems cannot be represented as an endeavour to achieve a pre- defined desired state in the most efficient way possible. In fact, the end states or purposes of the problem are problematic themselves (Checkland (1981:316). Given the fact that, in soft systems, it is not evident that a system needs to be engineered, the analysis of the system should entail defining a range of systems that could contribute towards the improvement of the problem situation (Jackson, 2007:183). Each proposed system should voice a unique worldview (Weltanschauung). This 85 | Chapter 3: Critical Systems Heuristics means, that in soft systems, a number of different models are constructed to compare to the real world as opposed to merely the single model used in hard systems (Jackson, 2007:183). The models used in soft systems represent 'human activity systems'. Jackson (2007:183) defines a human activity system as "a model of a notional system containing the activities people need to undertake in order to pursue a particular purpose". When selecting a name of a relevant system in soft systems, it is important to formulate an appropriate name. The chosen name of a system will serve as a 'root definition' as is represents the fundamental purpose of the modelled activity system (Checkland & Scholes, 1999:33). The fundamental purpose of a modelled activity system is always represented by a transformation process where a certain entity (input) is transformed into a new version of the same entity (output) (Checkland & Scholes, 1999:33). In order to formulate an appropriate root definition, the mnemonic CATWOE can be used (Checkland & Scholes, 1999:35): C – Customers: the victims or beneficiaries of the transformation process. A – Actors: those who would do the transformation process. T – Transformation process: the conversion of input to output. W – Weltanschauung: the worldview that makes the transformation process meaningful within context. O – Owners: those who could stop the transformation process. E – Environmental constraints: elements taken as given that exist outside the system. Within soft systems, the focus of the researcher is to construct the richest picture possible in terms of the problem situation rather than trying to mould it into various systems models (Jackson, 2007:183). Checkland and Scholes (1999:45) advocate literally drawing rich pictures, as they believe that human interactions are made up of rich relationships and connections that are better represented graphically rather than in written form. Figure 3.1 is an example of a rich picture. Figure 3.1: Example of a rich picture depicting the hypothesis testing research process of natural science (Checkland & Holwell, 1998:12)4. In summary, the fundamental difference between hard systems thinking and soft systems thinking lies in the fact that hard systems thinkers are of the opinion that they can understand the real world in terms of a system as a whole and can engineer that system in order to achieve their desired objectives. Soft systems thinkers, however, are of the opinion that they cannot understand the real world as a whole system, but can rather discover a method in which the limitations of their individual perspectives can be recognised and integrated within their decision making process (Checkland & Scholes, 1999:A10). To suffice, the hard systems thinker views the world as systemic, while the soft systems thinker views the process of inquiry as systemic (Checkland & Scholes, 1999:A11). Figure 3.2 is a graphical representation of the distinction between the two systems thinking stances. 4 Checkland intended for his 'rich pictures' to be displayed as is. Therefore, they have not been altered to fit into the format of the other images in this dissertation. Figure 3.2: Hard vs soft systems perspectives adapted from Checkland and Scholes (1999:A11). 3.2.2.4 Performance of a system Soft systems methodology provides criteria against which the transformation of input into output can be judged (Checkland & Scholes, 1999:288). The three E's (discussed in Section 3.2.1.1) can be expanded to include two more E's – namely ethicality and elegance (Checkland & Scholes, 1999:288). The 5 E's used to determine the performance of a system can then be defined as: ? Efficacy – Does the means of transformation of input to output work? In other words, is the input entity of the system successfully transformed into a new output entity? ? Efficiency – Is the minimal amount of resources necessary for the transformation used? ? Effectiveness – Does the transformation process aid in the acquisition of longer-term goals which are related to the owner's expectations? ? Ethicality – Is the transformation of the input entity into the output entity a moral process? ? Elegance – Is the transformation process aesthetically pleasing? By determining the answers to the aforementioned questions, the soft systems thinker is able to measure the performance of the identified system and make the necessary adjustments in order to achieve optimal performance of a system as whole. 3.2.3 Frankfurt school Before critical social theory is discussed, a brief history of critical theory will be covered. This brief history will cover the origins of critical theory and highlight a few key members of the field and their contributions towards the methodology. In the period between the two world wars, the founders of the Frankfurt School endeavoured to attain a unity of both theory and practice and theory and empirical research (Calhoun, 1995:13). It was the ambition of the founders of the Frankfurt School was to achieve both aforementioned unisons while maintaining a historically grounded awareness of the political, cultural, and social problems of the age (Horkheimer, 1972:230). The founders of the Frankfurt School included Theodor Adorno, Leo Lowenthal, Franz Neumann, Herbert Marcuse, Friedrich Pollock, Erich Fromm and the leader of the group, Mark Horkheimer (Calhoun, 1995:14). The members of the Frankfurt group aspired to differentiate critical theory from traditional theory. They noted that traditional theory failed to observe how categories in the consciousness of people were

moulded and how these categories affected their outlook and what they believed to be possible (Horkheimer, 1972:230). However, it was not one of the founding members of the Frankfurt School who made the biggest impact in the field of critical theory, but rather, a protégé of Theodor Adorno, Jürgen Habermas (Calhoun, 1995:29). Habermas developed a whole new approach to critical theory around the 1960s (Gutting, 2005:13). In his approach, Habermas agrees with the founders of the Frankfurt school. He maintains that modern deployments of reason inhibit human freedom and undermine values by limiting the scope of rationality to the means and ends of reasoning as found in empirical science, instead of including other forms of reason such as the understanding of hermeneutics (Gutting, 2005:13). According to Habermas, the ultimate purpose of philosophy is to provide a foundation for human values and restore freedom through an all- encompassing description of rationality (Gutting, 2005:14). Habermas (2005:310) states that “the only knowledge that can truly orient action is knowledge that frees itself from ideas”. Habermas’ approach is based on the assumption that – in principle – all differences can be resolved by means of rational discourse (Calhoun, 1995:33). Although they made a significant contribution to the field, one cannot limit the field of critical theory solely to the members of the Frankfurt school. There were many other theorists who had no ties with the Frankfurt school and yet managed to make significant contributions to the field of critical social theory Calhoun (1995:34). 3.2.4 Critical Social Theory Calhoun (1995:35) suggests that critical social theory should not be seen as merely a ‘school’, but rather a body of work which both produces and demands critique in four different areas: 1. A theorist engages critically with his environment with the understanding that the current state of affairs does not provide a representation of all possibilities and offers the positive implications of for social action. 2. The theorist’s own cognitive processes depend on the critical account of the cultural and historical conditions in both personal and social terms. 3. The theorist constantly conducts a critical re-examination of his understanding in terms of categories and conceptual frameworks, including how those frameworks were formed. 4. The theorist takes a critical look at other social explanations in order to identify their pros and cons, and establishes reasons for areas in which they fall short and misunderstandings they contain. Once done, the theorist reveals how their insights can be incorporated in a more solid foundation. Calhoun (1995:35) also notes that all the aforementioned areas of critique contain a need for historical analysis and understanding. In the first point, the world is ‘denaturalised’ by viewing the world as a result of some human actions among varying possibilities. In order for a theorist to engage critically with his environment, the environment needs to be explained in terms of its important features which will allow practical action to take place among other activities perceived as being normal within the environment (Calhoun, 1995:35). In the second point, the theorist is required to provide accomplishments, social formation and historical background that contributed toward his theoretical outlook (Calhoun, 1995:35). In the third point, the theorist is required to perform a historical analysis with which he views the manner in which certain notions tend to take on particular significance that is embedded within his view of the world in both experience and practice (Calhoun, 1995:36). Finally, in the fourth point, the theorist is required to critically examine past philosophies, not as references of insight, but rather as historical compositions that are different from his own (Calhoun, 1995:36). 3.2.5 Rational vs. polemical reasoning Werner Ulrich, the founder of critical heuristics, maintains that polemic reasoning, rather than rational reasoning, is needed in dealing with social situations which contain both involved and affected parties (Ulrich, 1987:277). Rational reasoning is based on deductive logic and the empirical verification or contradiction of facts by the involved party (Ulrich, 1987:277). Polemic reasoning seeks to understand the meaning behind the viewpoints of both the involved and affected parties in regard to what they believe to be ‘right’ in a given situation (Ulrich, 1987:277). Ulrich (1987:277) maintains that the problem with rational reasoning is that the founding philosophers, such as Habermas, developed ‘ideal’ models of rational discourse that are impractical. These ‘ideal’ models are based on the premise that all participants within a discourse are willing and able to make coherent arguments and then rely only on the force of the superior argument to decide the outcome (Ulrich, 1987:277). Finally, Ulrich (1987:277) states that his main concern with the ‘ideal’ models of rational reasoning is that they do not take account of justification break-offs. In other words, every argument that is formulated begins and ends with some form of judgements, and the justification of these judgements need to remain up for debate – this is not provided for in rational reasoning (Ulrich, 1991:104). 3.3 Critical Systems Heuristics Critical systems heuristics was conceived by Werner Ulrich (1987:277) in order to assist involved and affected parties in dealing with justification break-offs in terms of their a priori judgements. Ulrich (1987:277) calls these judgements ‘boundary judgements’ because they define the boundaries of the reference system against which a person validates his arguments (Ulrich, 2002:72). Boundary judgements determine the ‘facts’ and ‘values’ of a person and as such, have a vital role in determining the meaning behind and merits of an argument (Ulrich, 2005:2). Ulrich (2005:2) states that in order to achieve productive communication, it is vital to clarify, both with ourselves and other involved parties, which reference system is assumed in a particular discussion. Critical systems heuristics can be viewed as the first systematic attempt to provide a philosophical foundation and a practical framework for critical systems thinking (Ulrich, 2002:72). Ulrich (2002:73) defines critical systems heuristics as ‘a critical methodology for identifying and debating boundary judgements’. To achieve this end, critical systems heuristics requires 3 requisites to be essential (Ulrich, 1987:277): 4. To impart a clear understanding of the meaning, inevitability, and critical significance of justification break-offs. 5. To provide a conceptual framework that can be used by involved and affected parties in order to justify break-offs and boundary judgements. 6. To offer a tool for convincing argumentation to all parties. Critical systems heuristics supports boundary critique or the ‘systematic effort of handling boundary judgements critically’ (Ulrich, 2005:3). Boundary critique can either be applied in terms of dealing with one’s own boundary judgements (reflective practice) or with the boundary judgements of others who are not self-reflective (emancipatory practice) (Ulrich, 2005:3). The systematic process of boundary critique contains the following responsibilities (Ulrich, 2005:4): 1. The need to identify what determines the condition of a specific claim by distinguishing the

underlying boundary judgements. 2. The need to examine the underlying boundary judgements and their implications in terms of practical and ethical considerations. 3. The need to obtain alternatives for determining which reference system conditions a claim by providing alternative answers to boundary questions. 4. The need to acquire mutual understanding between all stakeholders in terms of the difference between each of their reference systems. 5. In the event that some stakeholders either take their boundary judgements for granted or attempt to force them upon others, the need to challenge their claims may arise. There is no technique that can provide a means of deciding exactly which boundary judgement is right or wrong; each answer will depend heavily upon the interests, views and value assumptions of an individual (Ulrich, 2002:72). As a result of this, it is vital to use a critical approach in order to reflect and debate the differing assumptions of individuals (Ulrich, 2002:72). As mentioned in the responsibilities of boundary critique, it is necessary to examine underlying boundary judgements and how they affect both the facts and values of an individual (Ulrich, 2005:6). Critical systems heuristics provides for this by making use of the 'eternal triangle' (Ulrich, 2000:6). When a problem definition or solution or any other claim with practical intent is raised, the relevance of selected facts are differentiated from others. The values and facts that are considered are directly related to the reference system used. When the facts, values or reference system changes, the remaining two are also changed. This makes up the 'eternal triangle'. In critical systems heuristics, the process of thinking about a situation through the 'eternal triangle' is called systemic triangulation. The eternal triangle is graphically represented in Figure 3.3. Figure 3.3: The 'eternal triangle' of boundary judgements, facts, and values (Ulrich, 2000:6). A boundary category is a form of boundary judgement that determines the normative and empirical selectivity of a claim (Ulrich, 2005:7). In order for a boundary category to prove useful, it is necessary to both empirical (facts) and normative (values) content (Ulrich, 2005:7). Normative selectivity statements suggest what facts should be considered as relevant and which facts should not, while empirical selectivity statements which facts are actually present in the selected system (Ulrich, 2005:7). Cross-tabulating the different forms of selectivity against the facts and values of a system provides four perspectives that are needed in examining selectivity (Ulrich, 2005:8). Table 3.1: Four perspectives for examining selectivity (Ulrich, 2005:8). Perspective Empirical selectivity ('is' mode) Normative selectivity ('ought' mode) 'Facts' Actual mapping: What 'facts' are considered relevant and which ones are left out? Ideal mapping: What facts 'ought' to be considered relevant and which ones should be left out? 'Values' Actual mapping: What 'values' are considered relevant and which ones are left out? Ideal mapping: What 'values' ought to be considered relevant and which ones should be left out? By looking at Table 3.1, it is evident that in order to account for empirical selectivity, the assumptions of the facts and values that are present need to be considered. Similarly, in accounting for normative selectivity, the assumptions of the facts and values that ought to be present is considered (Ulrich, 2005:8). Ulrich (2005:9) further defines four boundary issues that are vital to reflective practice in situations that involve intervention, problem solving or decision making. The boundary issues play a crucial role, because if they are not considered, the meaning and validity of a claim cannot be recognised (Ulrich, 2005:9). The four boundary issues are (Ulrich, 2005:9): ? Basis of motivation – Where does the sense of purposefulness and value come from? ? Basis of power – Who is in control of what is going on and what is needed for success? ? ? Basis of knowledge – What experience and expertise support the claim? Basis of legitimacy – Where does the legitimacy lie? Critical systems heuristics claim that the answers to the four boundary issues determine the 'anatomy of purposefulness' of a claim and are therefore necessary to determine in order to perform reflective practice in most situations (Ulrich, 2005:9). If the four boundary issues are not taken into consideration, the meaning of a claim can never be fully understood and its validity or basis for action cannot be determined (Ulrich, 2005:9). Ulrich (2005:9) further states that the meaning of a claim is linked to the manner in which it modifies our viewpoint on certain issues, on what we believe, and on the actions that we determine to be both ethical and rational. Ulrich (2005:9) assigns three categories to each of the basic boundary issues: ? Stakeholders – the people who are involved or affected in a particular situation. ? Concern – the concern of the stakeholder. ? Difficulty – the difficulties that arise with regard to the identified concerns of the stakeholder. Ulrich (2000:256) devised a table of boundary categories that links each of the boundary issues to each of the three categories of boundary issues. The table of boundary categories is shown in Figure 3.4. Figure 3.4: Table of boundary categories (Ulrich, 2000:256). Another way to represent and use the boundary categories is by transforming them into a checklist of 12 critical boundary questions. These critical boundary questions can be used in three ways (Ulrich, 2002:72): ? To systematically identify boundary judgements. ? To evaluate alternative reference systems that can be used to define a problem situation or to assess a potential solution proposal. ? To compellingly challenge any claims that depend on hidden boundary judgements or take them for granted. By providing a means of challenging claims based on hidden boundary judgements, critical systems heuristics offers an emancipatory application of systems thinking. This is due to the fact that both those affected and those involved in a certain situation are given a level of critical competence which enables them to take part in polemical reasoning regardless of their levels of expertise or knowledge (Ulrich, 2002:72). The 12 boundary questions are listed in table 3.2. Table 3.2: Checklist of 12 boundary questions (Ulrich, 1987:279). Boundary Questions Sources of Motivation Who ought to be the client (beneficiary) of the system S to be designed or improved? What ought to be the purpose of S, i.e., what goal states ought S be able to achieve to serve the client? What ought to be S's measure of success (or improvement)? Sources of Control Who ought to be the decision taker, that is, have the power to change S's measure of improvement? What components (resources and constraints) of S ought to be controlled by the decision taker? What resources and conditions ought to be part of S's environment, i.e., should not be controlled by S's decision taker? Sources of Expertise Who ought to be involved as designer of S? What kind of expertise ought to flow into the design of S, i.e., who ought to be considered an expert and what should be his role? Boundary Questions Who ought to be the guarantor of S, i.e., where ought the designer seek the guarantee that his design will be implemented and will prove

successful, judged by S's measure of success (or improvement)? Sources of Legitimation Who ought to belong to the witnesses representing the concerns of the citizens that will or might be affected by the design of S? That is to say, who among the affected ought to get involved? To what degree and in what way ought the affected be given the chance of emancipation from the premises and promises of the involved? Upon what world-views of either the involved or the affected ought S's design be based? The 12 boundary questions will be applied in throughout this study in order to determine the underlying boundary judgements of the both those involved and affected by the study. 3.4 Initial answers to the 12 boundary questions The initial answers to the 12 boundary questions represent the researcher's perspective of the study as a whole. By identifying the boundary judgements held by the researcher, the study can be conducted in a fair and unbiased manner. Table 3.3 displays the researcher's initial answers to the 12 boundary questions. Table 3.3: Initial answers to the checklist of 12 boundary questions as given by Ulrich (1987:279). Boundary question and answers Research Phase Sources of Motivation Who ought to be the client (beneficiary) of the system S to be designed or improved? Ex-political prisoners of Robben Island Prison. Diagnosis Action Planning Young adults between the ages of 16 – 25 years of age. Action planning Evaluation What ought to be the purpose of S, i.e., what goal states ought S be able to achieve so as to serve the client? The fair portrayal of the experiences of the ex-political-prisoners in Robben Island Prison. Diagnosis Action Planning Boundary question and answers Research Phase An exciting medium through which to learn about emotional social phenomena. Action Planning Action Taking The formulation of design guidelines for the development of digital graphic novels that portray emotional social phenomena. Specifying Learning What ought to be S's measure of success (or improvement)? The degree to which the portrayal of the experiences of the ex-political-prisoners are fairly related. Diagnosis The level of satisfaction of the readers. Evaluating The appropriate application of CSH and HCI principles in the development of a digital graphic novel so as to both correctly portray emotional social phenomena and to provide an engaging medium through which readers can learn about emotional social phenomena. Action Planning Action Taking Sources of Control Who ought to be the decision taker, that is, have the power to change S's measure of improvement? A representative of ex-political-prisoners. Diagnosis The representative of the Mandela27 project team. Evaluation The researcher. All Phases What components (resources and constraints) of S ought to be controlled by the decision taker? The recommendations for the content for the storyline of the digital graphic novel. Diagnosis The overall look-and-feel of the digital graphic novel and the content of the storyline. Implementation of the design. Evaluation The design of the digital graphic novel as a whole. This includes the co-ordination of the programming, artwork, sound recordings, project management and storyline. All Phases Boundary question and answers Research Phase What resources and conditions ought to be part of S's environment, i.e., should not be controlled by S's decision taker? The time period being addressed in the storyline. Diagnosis The accounts given by the ex-political- prisoners. Diagnosis The Mandela27 project deadlines. Action Planning Sources of Expertise Who ought to be involved as designer of S? The researcher will be involved by Action Planning incorporating the ideas of the clients. Action Taking Evaluation What kind of expertise ought to flow into the design of S, i.e., who ought to be considered an expert and what should be his role? Storyboarding – The researcher Diagnosis Programming – Programmer (SGI-SA5) Action Taking HCI principles – HCI Scholar and researcher Action Planning Artwork – Art student (VUT6) Action Taking Historical Consultant (RIM7) Diagnosis Project Co-ordination and Management – the researcher All Phases Who ought to be the guarantor of S, i.e., where ought the designer seek the guarantee that his design will be implemented and will prove successful, judged by S's measure of success (or improvement)? In terms of critical social heuristics, the means and not only the ends provide the guarantee for the inclusion of all affected parties. The guarantee that the design will be implemented and distributed will be offered by the Mandela27 project team. Action Taking On the correct use of CSH to accurately relay the experiences of the ex-political- prisoners. Diagnosis 5 SGI-SA – Serious Games Institute – South Africa 6 VUT – Vaal University of Technology 7 RIM – Robben Island Museum Boundary question and answers The appropriate application of HCI principles in order to provide an engaging medium through which users can learn about emotional social phenomena. Research Phase Action Planning Action Taking Evaluation The social relevance of the subject matter. Diagnosis The renewed popularity of comic books (medium). Action Planning Sources of Legitimation Who ought to belong to the witnesses representing the concerns of the citizens that will or might be affected by the design of S? That is to say, who among the affected ought to get involved? The historical consultant representing the ex -political prisoners who served time in Robben Island Prison during the specified time period. Diagnosis Representative of ex-political prisoners incarcerated in the general cells. Diagnosis Representative of ex-political prisoners incarcerated in the maximum security section. Diagnosis The readers at whom the digital graphic novel is aimed (individuals between the ages of 16 and 25). Evaluation To what degree and in what way ought the affected be given the chance of emancipation from the premises and promises of the involved? The ex-political-prisoners will have their stories accurately portrayed through the storyline of the digital graphic novel. Diagnosis Action Planning The users will receive an engaging medium that provides a larger enjoyment factor than the use of mere textbooks or the plain printed word. Action Planning Action Taking Evaluation Boundary question and answers Research Phase Upon what world-views of either the involved or the affected ought S's design be based? The Mandela27 project will tell ex-political- prisoners' stories to the world. Youth want to learn about historical events in an engaging way. Digital graphic novels may be used in the education of young people regarding emotional social phenomena. All phases 3.5 Reflection of Critical Systems Heuristics applied to this study The researcher chose to approach the selected problem area for this dissertation in terms of systems thinking. Upon further inspection, it becomes evident that the selected problem area cannot be observed as a definite system, but rather the process of inquiry into the selected problem area can be viewed as systemic. As a result, soft systems thinking will be applied to the study. By applying soft systems thinking, the researcher is able to view the problem area in terms of the limitations of the perspectives of all

individuals who are involved and affected within the scope of the study and subsequently incorporate their opinions into the decision making process. In order to achieve a fair representation of the opinions and concerns of both the involved and affected parties, critical systems heuristics will be applied in diagnosing phase of the study in order to determine the boundary judgements of the researcher before the study is conducted. The focus groups and interviews held with the ex- political prisoners of Robben Island Museum will then also be observed in terms of CSH so as to isolate core values that they deem necessary to be included within the proposed digital graphic novel. 3.6 Conclusion Systems thinking will be used to observe the selected problem area of this study. The soft systems approach, and more particularly, critical systems heuristics will serve as the framework of ideas that will be embodied within the research methodology of the study. Figure 3.5 is a graphical representation of the role of critical systems heuristics within this study. Critical systems heuristics will serve as the framework of ideas that will guide each phase of the action research cycle adopted in this study. Digital graphic novels will be discussed in the following chapter. Figure 3.5: Adaptation of elements relevant to any piece of research (Checkland & Holwell, 1998:13). 4 Chapter Four: Digital Graphic Novels 4.1 Introduction The researcher believes that it is important to be familiar with the features of a digital graphic novel in order to envision the interface of a digital graphic novel portraying an emotional social phenomenon. Once the features and interface of a digital graphic novel are understood, guidelines for the creation of a digital graphic novel portraying emotional social phenomena using critical social heuristics and human-computer interaction principles can be developed. This chapter will discuss the context of the digital graphic novel within the research structure of this study (Section 4.2) and will also provide an overview of digital graphic novels as a whole (Section 4.3). Design rules for digital graphic novels will then be investigated in Section 4.4. Section 4.5 will report on a few benefits of digital graphic novels and guidelines for creating digital graphic novels will be presented in Section 4.6. Section 4.7 will conclude by offering a summary of the chapter as well as an enriched section of the research structure of this study. 4.2 Context of digital graphic novels within the research structure of this study As shown in the research structure of this study (Figure 2.2), a literature review of digital graphic novels will take place in the action planning phase of the action research cycle. The action planning and action taking phases of this study will filter into the design science research process in order to create a digital graphic novel. The guidelines for creating digital graphic novels identified in this chapter will be used to inform the creation of the digital graphic novel during the design science research process of this study. 4.3 An overview of digital graphic novels At the time of writing, the researcher was not able to find a definition of the term digital graphic novel. Therefore, the term graphic novel will be defined in order to extrapolate a definition for the term digital graphic novel. Yang (2008:186) defines graphic novels as ‘thick comic books’. Carter (2007:49) further substantiates this by referring to graphic novels as the more refined, older sibling of comic books. Although graphic Chapter 4: Digital Graphic Novels | 104 novels and comic books are two separate entities, they tend to have a shared history. In fact, graphic novels grew out of the comic book movement of the 1960’s via writers who sought to make use of the comic book format to address topics of a more ‘adult’ nature (O'English et al., 2006:173). Callahan (2009:7) claims that the popularity of graphic novels increased after the publishing of Art Spiegelman’s Maus: A Survivor’s Tale (Spiegelman, 1986). Maus: A Survivor’s Tale was based on the afflictions and survival stories of Spiegelman’s father during the Holocaust. After winning a prestigious Pulitzer Prize in 1992, Maus: A Survivor’s Tale served as a pioneer for other graphic novels such as Ghost World (Clowes, 1997), Fun Home (Bechdel, 2006), and Watchmen (Moore & Gibbons, 1987) as graphic novels began to evolve into a genre entirely of their own. While some graphic novels carried on themes from their comic book predecessors such as superheroes and fantasy, others took it a step further by dealing with issues that include wars, civil rights, history, drugs, sexually transmitted diseases, dealing with disabilities and even family dynamics (Gorman, 2002:42). The researcher proposes that digital graphic novels can be defined as graphic novels that have been specifically designed for digital media. By bearing this definition in mind, it is easy to note the different requirements for digital graphic novels as opposed to graphic novels. For example, although a digital graphic novel may have the same layout as a graphic novel, the digital graphic novel will require a different colour palette (RGB)8 as opposed to printed graphic novels (CMYK)9 because digital graphic novels are read on a screen and not on printed paper (McGavin et al., 2005:761). Digital graphic novels will also be able to make use of features that graphic novels do not account for, such as sounds. Figure 4.1 provides an excerpt from a graphic novel while Figure 4.2 provides an example of a digital graphic novel. It is interesting to note how a digital graphic novel can draw the reader’s attention to certain aspects or frames by zooming in or changing the camera angle on a page as demonstrated in Figure 4.3. 8 RGB – colour is generated by varying the intensity of red, green and blue light on a screen. 9 CMYK – colour is generated by varying the amount and combination of ink on paper and is rendered using four colours of ink – cyan, magenta, yellow and black. 105 | Chapter 4: Digital Graphic Novels Figure 4.1: Page excerpt from the graphic novel Sandkings (Martin, 1986). Figure 4.2: Screenshot of a page layout in The Thrill Electric (www.thethrillelectric.com). Figure 4.3: Each frame of the digital graphic novel page is zoomed into on click (www.thethrillelectric.com). By inspecting Figures 4.1, 4.2 and 4.3, the similarities and differences of graphic novels and digital graphic novels become clearer. Therefore, the researcher proposes that although graphic novels and digital graphic novels may closely resemble each other, the design rules of digital graphic novels will differ from the design rules of graphic novels. 4.4 Design rules for digital graphic novels To date, the researcher is unable to find much literature with regard to design rules for digital graphic novels. Eisner (1990:159) briefly mentions that regardless of the medium in which sequential art is delivered, the fundamental requirements of the art form need to remain the same. The fundamental requirements for sequential art are that the narrative adheres to a general reading convention, the characters are skilfully created, the pages and panels are composed for narrative purposes, and finally, the rendering of the elements (Eisner, 1990:159). Due to the lack of design rules for creating digital graphic novels, design rules for creating a comic book will be listed and design rules for creating digital graphic

novels will be extrapolated from this data. McCloud (1994:170) offers six steps for developing a comic book and maintains that these steps can be applied to any form of art: 1. Idea/Purpose – What are the philosophies, emotions, and purposes of the work? In this step, the creator of the artwork must identify the work's content. 2. Form – What form will the art take? In this step, the creator of the artwork must distinguish how the work will be represented (e.g. digital graphic novel, statue). 3. Idiom – What 'school' will the art belong to? In this phase, the creator of the artwork must identify what genre the work will belong to. 4. Structure – How will everything fit together? In this phase, the creator of the artwork decides what should be included/excluded as well as how to arrange and compose the work. 5. Craft – How will the work be constructed? In this phase, problem-solving, practical knowledge invention, and the application of skills are involved in order to 'get the job done'. 6. Surface – This phase entails the production values and finishing. In this phase, the creator of the artwork adds the final superficial aspects to the artwork. McCloud (2011:10) also states that regardless of which working method is chosen for the creation of a comic book, there are series of decisions that need to be made. McCloud (2011:10) identifies five categories that can be used to inform and evaluate the each decision. These categories are the choices involved with movement, frame, image, word and flow. When the five categories of choices are successfully combined, the author will attain the clarity which enables the reader to comprehend the ultimate goal of the comic book (McCloud, 2011:37). Determining the answers to each of the choice categories does not need to take part in a specific order. Choice of movement refers to the selection process that a comic book author goes through in order to select which panels of a page to create. When making a choice of movement, comic book authors should enable the reader to 'read' the action clearly between frames (McCloud, 2011:12). In order to achieve clarity, it is important that each chosen moment should fit together like a 'connect-the-dots' puzzle and represent the correct timing of events (Eisner, 1990:25; McCloud, 2011:14). In other words, if one 'dot' (frame) is removed, then the story changes entirely. The choice of movement can be one of six different types (McCloud, 1994:70; McCloud, 2011:15): ? Moment-to-moment – series of moments portrays a single action. ? Action-to-action – series of actions of a single subject (person, object, etc.). ? Subject-to-subject – single scene with changing subjects. ? Scene-to-scene – moments that transition over significant distances of space or time. ? Aspect-to-aspect – moments transition from one aspect of a mood, place or idea to another. ? Non-sequitur – series of seemingly unrelated images and/or words. Figure 4.4 is a comic book excerpt that displays clarity through the use of a subject- to-subject movement. Figure 4.4: Page excerpt that illustrates a subject-to-subject movement (Johns & Frank, 2012:10). The choice of frame relates to the distance with which the author would like to frame an action as well as the level of detail that is needed (McCloud, 2011:19). The entire aim of comics is to relay stories and/or ideas to readers through the medium of pictures and words (Eisner, 1990:38). In order to achieve this goal, comic artists make use of frames to break up events into sequenced segments (Eisner, 1990:38). These frames serve as a reader's guide through time and space (McCloud, 1994:102).Through the use of frames, the reader should be encouraged to focus on important aspects of the story rather than being distracted by trivial views that are irrelevant to the story (McCloud, 2011:20). That being said, it is also not necessary to keep every view at eye level as this may bore the reader (McCloud, 2011:21). A variation of the position, shape and size of a frame can be used to entertain the reader as well as to guide them to the important object or idea (Eisner, 1990:88; McCloud, 2011:24) as demonstrated in Figure 4.5. By altering the shape or presence of a frame, the frame can also be seen as a part of the narrative itself (Eisner, 1990:46). The frame can be used to Chapter 4: Digital Graphic Novels | 110 contribute to the atmosphere of a page as a whole, convey a dimension of sound or even to provide a visual perspective of the emotional climate within which a certain action occurs (Eisner, 1990:46). The variation of shape or treatment of frames can also generate emotional involvement from the reader (Eisner, 1990:59). In summary, through the manipulation of the frame, the comic artist is granted the ability to guide the reader, clarify actions and stimulate desired emotions (Eisner, 1990:88; McCloud, 1994:99; McCloud, 2011:19). Figure 4.5: Page excerpt that demonstrates how frames guide the reader's view (Johns & Frank, 2012:13). The choice of image refers to the creation of pictures that are needed to fill the frames in order for the story to be visually brought to life (Eisner, 1990:89; McCloud, 2011:26). McCloud (2011:26) further states that regardless of the style of art chosen, the fundamental task of the chosen image is to clearly, compellingly and quickly communicate with the reader. McCloud (2011:118) believes that pictures can evoke an emotional or sensual response as depicted in Figure 4.6. According to Eisner (1990:13), the failure or success of communicating through pictures lies within the ease with which the reader to able to recognise both the meaning and emotional impact of the selected image. Figure 4.6: Possible use of images to represent or evoke emotion adapted from (McCloud, 2011:118). The goal of an writer's choice of words within a comic would be to unambiguously and persuasively communicate the sounds, ideas and voices in a seamless combination with the chosen images (McCloud, 2011:37). This is usually achieved through one of seven distinct categories of word-picture combinations (McCloud, 1994:153; McCloud, 2011:130): ? Word-specific – words describe everything that a reader needs to know while the pictures illustrate the scene described by the words. ? Picture-specific – opposite of word-specific; the pictures provide all the information that the reader needs while the words highlight certain aspects of the scene being shown. ? ? Duo-specific – the same message is portrayed by both words and pictures. Intersecting – both words and pictures make individual contributions to the scene while also working together in certain aspects to create the scene as a whole. ? Interdependent – neither the words nor the pictures would be able to convey the same message/idea on their own. ? ? Parallel – words and pictures do not seem to support each other or intersect. Montage – words and pictures are combined pictorially within a scene. ? The balance between words and images in great comics tends to be dynamic in nature with the images taking precedence in some instances and the words in others (McCloud, 1994:47; McCloud, 2011:128). The balance between words and images in great comics tends to be dynamic in nature with the images taking precedence in some instances and the words in others (McCloud, 1994:47; McCloud, 2011:128). The role of the writer is to limit

the writing of a comic book in such a way that the reader can still understand the story as a whole by only viewing a compressed version presented frame-by-frame (Eisner, 1990:122; McCloud, 2011:31). Finally, the choice of flow refers to how to guide a reader through the comic as a whole (McCloud, 2011:32). There is an unwritten agreement with the artist and the reader of a comic which affirms that readers will read frames of a comic from left-to- right first and then top-to-bottom (Eisner, 1990:41; McCloud, 2011:32). This also applies to word balloons and captions within a frame. An comic artist needs to bear this in mind when designing a page so as identify any aspects in the design that can help or hinder the agreed flow (McCloud, 2011:32). When writing a comic, it is important for the reader both care about and understand the story being told (McCloud, 2011:53). In order for a reader to understand the story being told, the comic needs to have clarity which is a result of the correct choices of moment, frame, image, word and flow (McCloud, 2011:53). Getting reader to care about the story can be achieved in two ways – the content of the story itself or the intensity of the presentation (McCloud, 2011:53). Finding a good balance between both clarity and intensity has reaffirmed philosophical divides within the comic culture with one school of thought being that good stories should be told with much intensity, flair, and ingenious art techniques, while the other believes that the appropriate clarity, events and characters will be effective and encourage a reader to continue reading (McCloud, 2011:52). McCloud (2011:150) suggests that there are a few goals that an author hoping to write a good story should achieve, these are: ? Stories should be rooted in an author's own experience while also speaking to the experiences of readers. 113 | Chapter 4: Digital Graphic Novels ? There should be novel and attention-grabbing conflicts between characters in the story as well as between individuals and the world around them. ? ? Readers should be surprised. Provoke emotions such as sadness, suspense and joy by exploiting common experiences or heritage. ? Make readers care enough about the story and characters to want to find out more. A comic author and artist can make the reader care about the characters in the story by designing characters as both believable and vivid human beings (McCloud, 2011:62) Good characters can be measured according to their design, facial expressions and body language. Character design refers to the ability to create a character which is unique and has a distinct personality (McCloud, 2011:62) McCloud (2011:63) states that there are three qualities that a good character should have, namely – an inner life, visual distinction and expressive traits. The inner life of a character contains a character's life history which should help the reader emotionally connect with the character while also providing a platform from which differences in life experiences of the character and other characters can elicit stories worth being told (McCloud, 2011:65). An example of this would be designing a character that grew up in a poor household and has to feed his family by winning a certain boxing match against a very rich competitor who has the best of everything. Visual distinction refers to the character's individual outward design and is important in helping the reader distinguish one character from another (McCloud, 2011:70). In addition, the visual traits of characters will aid in visually reminding readers about their different personalities (McCloud, 2011:71). Expressive traits of a character are essentially the emotional territory of a character and incorporate a character's body language, speech patterns, facial expressions, key expressions, poses and personal quirks (McCloud, 2011:76). Facial expressions in comics are very important in order for the comic artist to portray the emotions of the characters to the readers as well as to provoke emotions in the readers themselves (McCloud, 2011:81). Eisner (1990:111) states that the face's role in communication is to register emotions and that the face acts as 'an adverb to the gesture or posture of the body'. As Eisner (1990:111) sees it, the face is the surface upon which the reader expects to reveal an emotion through the variation its moveable elements. The manner in which readers perceive the context of a facial expression depends on the words with which it is paired. This concept is illustrated in Figure 4.7. As previously discussed, the choice of moment is also vital in determining which facial expression to portray in order to elicit the desired emotions from the reader. Some emotions, such as surprise, may be expressed in a series of images. For emotions such as this, the comic artist can either represent all the emotions in one pane by drawing a face that represents the 'emotional average' of the scene or draw attention to the emotional changes by devoting a series of panels to each change of emotion (McCloud, 2011:99). Figure 4.7: Example of how words dictate a reader's interpretation of a character's expression adapted from McCloud (2011:94). McCloud (2011:82) states that there are six basic emotions that every human being exhibits. These emotions are not affected by age, language or culture and the expressions of these can be considered as 'pure' expressions from which a multitude of others are derived (McCloud, 2011:82). The six basic emotional expressions that McCloud (2011:83) mentions are anger, surprise, fear, joy, sadness and disgust. According to McCloud (2011:84), the variation in intensity of each of the six basic emotional expressions as well as their combination leads to the emergence of other emotional expressions all together. For example, if the intensity of the emotional expression for sadness is increased to its maximum, the expression shifts from one of sadness to grief. Body language and facial expressions work together to represent a certain emotion (Eisner, 1990:111; McCloud, 2011:103). The body language of a character is also a powerful tool for communicating the emotions of a character (Eisner, 1990:113; McCloud, 2011:103). Readers can tell who a character is or what he is feeling before 115 | Chapter 4: Digital Graphic Novels he speaks just by observing his body language (Eisner, 1990:102; McCloud, 2011:102). For example, an easily frightened character can appear hunched with arms held close to the body while a confident character can be portrayed with chest forward, chin up and hands on hips. This concludes the discussion of design rules for comic books that may be applied to the design of digital graphic novels. The next section of this chapter will discuss the benefits of graphic novels. 4.5 Benefits of digital graphic novels The researcher believes that the benefits of graphic novels can be applied to digital graphic novels if one bears the previously discussed definition of digital graphic novels in mind. As a result, we will discuss the benefits of graphic novels as found in the literature and extrapolate them to include digital graphic novels. Graphic novels can serve as an exciting medium that meets the high need of stimulation that is preferred by generations that grew up surrounded by television and the Internet (Short & Reeves, 2009:417). These individuals are now accustomed to receiving a great deal of both visual

and verbal stimulation (Wolf, 1996:124). According to Tabachnick (2007:28), the graphic novel is also well suited to the contemporary age due to its unique and comforting combination of the qualities of both book and screen. Another benefit of graphic novels lies in the multimedia principle which states that people learn more from words and pictures that are combined rather than from words alone (Mayer, 2008:766), as well as the spatial continuity principle which states that people learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen (Mayer, 2008:764). Finally, the researcher believes that the use of graphic novels aids in bridging both racial and cultural divides by offering a 'neutral' canvas upon which historical facts can be portrayed. In a democracy as young as South Africa's, the importance of this concept cannot be stressed enough. An example of a graphic novel that deals with a topic of a sensitive social nature is that of Maus: A Survivor's Tale (Spiegelman, 1986). In this graphic novel, Art Spiegelman represents different nationalities and races as different types of animals - for example, Jews are mice, Germans are cats, Poles are pigs, Americans are dogs, etc. By making use of animals instead of social stereotypes, Spiegelman achieves two things. Firstly, he shows the irrationality of classifying human beings based on their ethnicity. Secondly, when reading the graphic novel the reader becomes rather detached from real life. The researcher feels that this may be an important feature when trying to relate a historical event to a younger audience without tainting their perspective of the involved parties. It is important for human-computer interface designers to understand the technology on which the interface will run, because the technology will both drive and empower the human-computer interface (Dix et al., 2004:61). The designer also needs to ensure that the interface will be compatible with the computational power and storage capacity of the technology that will host it (Dix et al., 2004:61) in order to ensure optimal performance. Furthermore, because the role of the computer within the field of human- computer interaction is to both receive information from the user and provide information to the user, it is important to provide a user-friendly medium through which this information transfer can take place (Dix et al., 2004:60). The researcher believes that the chosen interface of a digital graphic novel for the Mandela27 project will address the aforementioned issues and cater to the needs of the target group of individuals between the ages of 16 and 25 years of age, even though they will interact with the system on a range of different devices. This concludes the discussion of the benefits of digital graphic novels. Guidelines for creating digital graphic novels will be presented in the section that follows. 4.6 Guidelines for creating digital graphic novels The researcher has extrapolated proposed guidelines for digital graphic novels that are derived from the literature reviewed in the previous sections and chapters. The guidelines have been categorised according to the fundamental requirements for sequential art as given by Eisner (1990:159). Proposed guidelines for creating digital graphic novels are given in Table 4.1 117 | Chapter 4: Digital Graphic Novels Table 4.1: Proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical systems heuristics and HCI principles. Narrative N1 The author should determine the emotions, worldviews and the purpose for developing the narrative (McCloud, 1994:170). N2 The author should make readers care about the narrative either by the content itself or through the intensity of its presentation (McCloud, 2011:53). N3 The author should exploit the common experiences or heritage of the target group of the digital graphic novel to provoke emotions such as suspense, sadness and joy (McCloud, 2011:150). Character C1 Characters should engage in novel and attention-grabbing conflicts with themselves, other characters and the world around them McCloud (2011:150). C2 Characters should be designed as believable and vivid human beings beings (McCloud, 2011:62). C3 Facial expressions of a character should be used to portray a character's emotions to the reader as well as to elicit emotions from the reader (Eisner, 1990:111; McCloud, 2011:81). C4 A combination of and variation in the six basic emotional expressions should be used to represent more complex or intense emotions (McCloud, 2011:84). C5 The body language of the character should be used to communicate the emotions of a character (Eisner, 1990:113; McCloud, 2011:103). Pages and panels P1 Panels that enable the reader to easily follow the narrative should be used (McCloud, 2011:12). P2 Each panel should lead to and support the next (Eisner, 1990:25; McCloud, 2011:14). P3 The specific moment that is represented within a panel should serve to elicit emotions from readers or to portray emotion to readers (Eisner, 1990:46). P4 Movement represented in panels should be one of six different types as given in literature (McCloud, 1994:70; McCloud, 2011:15). Moment-to-moment – series of moments portrays a single action. Action-to-action – series of actions of a single subject (person, object, etc.). Subject-to-subject – single scene with changing subjects. Scene-to-scene – moments that transition over significant distances of space or time. Aspect-to-aspect – moments transition from one aspect of a mood, place or idea to another. Non-sequitur – series of seemingly unrelated images and/or words. P5 Frames should guide the reader's focus to aspects that are important to the narrative (McCloud, 2011:20). P6 The variation of the look-and-feel of panels should be manipulated in order to elicit specific emotions from readers (Eisner, 1990:46) P7 The flow of the digital graphic novel should adhere to the standard that readers will read frames from left-to-right and then top-to-bottom (Eisner, 1990:41; McCloud, 2011:32). Artwork A1 The artist should decide on images that brings the narrative to life for the reader (Eisner, 1990:89; McCloud, 2011:26). A2 Images should communicate the narrative clearly and compellingly (McCloud, 2011:26). A3 Pictures should be used to evoke specific emotions or sensual responses from readers in order to increase immersion within the narrative (McCloud, 2011:118). A4 Images should be combined with narrative text in seven distinct categories as given in McCloud (1994:153) and McCloud (2011:130). Word-specific – words describe everything that a reader needs to know while the pictures illustrate the scene described by the words. Picture-specific – opposite of word-specific; the pictures provide all the information that the reader needs while the words highlight certain aspects of the scene being shown. Duo-specific – the same message is portrayed by both words and pictures. Intersecting – both words and pictures make individual contributions to the scene while also working together in certain aspects to create the scene as a whole. Interdependent – neither the words nor the pictures would be able to convey the same message/idea on their own. Parallel – words and pictures do not seem to support each other or intersect. Montage – words

and pictures are combined pictorially within a scene. This concludes the discussion of digital graphic novels. In the next chapter, we will take a closer look at human computer interaction in order to further enrich the guidelines for creating a digital graphic novel that portrays emotional social phenomena using critical social heuristics and HCI principles. 4.7 Conclusion The researcher will apply the aforementioned rules in the development process of the artwork for the digital graphic novel. It is still necessary to refine guidelines for displaying the artwork of a digital graphic novel as it needs to conform to rules of digital media and not to that of paper-based sources. In order to achieve this, an in-depth look at the human will be taken in the following chapter in order to identify the key factors that need to be considered when creating the design elements of a graphic novel for digital media. Once the study is complete, the researcher will attempt to contribute towards the literature by proposing a set of guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics and human-computer interaction principles. 119 | Chapter 4: Digital Graphic Novels 5 Chapter Five: Human-Computer Interaction 5.1 Introduction The goal of this study is to develop guidelines for designing digital graphic novels portraying emotional social phenomena using critical social heuristics and human- computer interaction principles. It is important to conduct a review of HCI principles and digital graphic novels in order to become familiar with the current literature and offer a valid contribution to the field. Human-computer interaction (HCI) can be defined as 'a set of processes, dialogues, and actions through which a human user employs and interacts with a computer' (Baecker & Buxton, 1987:40). In other words, human-computer interaction focuses on the interaction between human and computers by focusing on the theoretical, psychological and physical aspects of the aforementioned process (Dix, Finlay, Abowd & Beale, 2004:3). When referring to human-computer interaction, we do not merely refer to a simple desktop computer with a single user. Instead, we consider each of the terms in the following manner (Dix et al., 2004:4): ? Human – any user who is completing a task by means of technology. A human could be either a single user, a group of users who are working together, or users who are required to complete a task in sequence within an organisation. ? Computer – any form of technology ranging from a typical desktop computer to a process system, a large network of computers, or a system that is embedded within other devices (e.g. mobile phones). ? Interaction – any method of communication that occurs between the computer and the user. The interaction may be either direct or indirect. Interaction is considered direct when it involves a dialog between the human and the computer with feedback and control throughout the entire process. Indirect interaction, on the other hand, may involve different methods, such as intelligent sensors that serve to control the environment. Chapter 5: Human-Computer Interaction | 120 Even though we define each of the terms individually, the most important aspect in terms of human-computer interaction is that the human is interacting with the computer in order to complete a specific task (Dix et al., 2004:4). This chapter will be divided according to each of the individual terms of human- computer interaction – human, computer and interaction. Section 5.2 will cover HCI in general. Applicable characteristics of humans will be discussed in Section 5.3 which will cover characteristics of humans (Section 5.3.1), the role of the human in HCI (Section 5.3.2), the importance of designing for humans (Section 5.3.3), as well as the process of designing for humans (Section 5.3.4). Applicable characteristics of computers will then be discussed in Section 5.4. Interaction will be covered in Section 5.5 which will include discussions on the interaction framework (Section 5.5.1), interaction styles (Section 5.5.2), why are HCI principles important (Section 5.5.3), what are the HCI principles (Section 5.5.4), and which HCI principles were chosen for this study (Section 5.5.5). Section 5.6 will present a set of guidelines for the design on digital graphic novels portraying emotional social phenomena that has been enriched with the chosen HCI principles for this study and Section 5.7 will conclude by refining the guidelines for creating digital graphic novels portraying emotional social phenomena given in the previous chapter. 5.2 An overview of Human-Computer Interaction Before exploring each of the individual terms of human-computer interaction (HCI), we need to understand HCI as a whole. The following aspects are important in the field of HCI (Smith-Atakan, 2006:184): ? It provides an overview of an interactive system from the user's perspective. ? It aids in the systematic analysis of the accessibility and usability of existing interactive systems. ? It promotes the design and construction of systems that are useful, usable and accessible. ? It aids in the evaluation of different design options. ? It substantiates the feasibility of creating interactive systems that are easier to use. 121 | Chapter 5: Human-Computer Interaction Most interactive systems have been developed by software engineers or computer programmers who are familiar with computer systems. This familiarity grants the developers (computer programmers and software engineers) a degree of confidence in using interactive systems that may not be possessed by the public. As a result, the developers of interactive systems often make the mistake of designing an interactive system based on the incorrect assumption that the general public possesses the same level of understanding of computer systems as they do (Smith-Atakan, 2006:7). This yields an inefficient design. In order for a computer to be used effectively and accepted by its intended users, it needs to be well designed (Preece et al., 1994:5). The term 'well-designed' does not imply that a computer needs to be designed in such a way as to accommodate every prospective user, but rather to be designed to cater for the capabilities and needs of the users for which it was intended (Preece et al., 1994:5). Human-computer interaction serves to unite both theory and practice as it aims to better understand both the designs that users need and the design processes involved in their creation (Smith-Atakan, 2006:2). There are two major challenges that HCI designers are faced with (Preece et al., 1994:8): ? How to keep up with the rapid changes that occur within the field of technology. ? How to ensure that their designs exhibit good HCI while utilising the functionality of the new technology to its full potential. There are four main concerns in HCI: the humans, the computers, the tasks that are performed and the support a computer provides a user in achieving a task (usability) (Dix et al., 2004:5). In order for a computer to allow a human to successfully accomplish a task, it needs to satisfy three 'use' words (Dix et al., 2004:5): ? Useful – the user needs to be able to accomplish what is required through the use of the computer (e.g. sending an email). ? Usable – the user needs to accomplish the task easily and in a natural

manner (e.g. pressing a 'k' key should produce the letter 'k' and not 'z'). ? Used – the computer should be attractive, fun, engaging, etc., and as a result make individuals want to use it. In order to design a successful computer, designers need to be mindful of the capabilities and limitations of humans and account for these in the design of a human- computer interface. It is also important to bear in mind that designers themselves are not 'typical users' (Norman, 2002:155). There is a clear distinction between the forms of expertise needed to be a designer and those of being a user. The core difference between designer and user lies within the fact that while designers often tend to become experts with regard to the device they are designing, users are often experts on/in the specific task that they are trying to accomplish using the device (Norman, 2002:156). While designing the device, designers become so familiar with it that they tend to no longer be able to identify or understand certain features of the device that may lead to difficulty for the users (Norman, 2002:156). Therefore, in order to successfully produce a device that is useful, usable, and used it is important to design for the intended human user. The literature review of HCI will begin with an examination of the first word of the term human-computer interaction – the human. 5.3 The human in HCI The role of the human within the human-computer interaction process is to accomplish a specific task through the use of technology (Dix et al., 2004:4). The human can be defined as the individual (user) whom an interactive computer system was designed to assist (Dix et al., 2004:12). As a result of this, the requirements of a user should be considered of highest priority in the construction of a computer system. In order to successfully design a computer system that suits the needs of the intended user, we need to understand their limitations and capabilities (Dix et al., 2004:12). By determining these, we will be able to isolate features that the user may find difficult or impossible to complete (Dix et al., 2004:12). 5.3.1 Characteristics of humans The capabilities and limitations of the human can be determined by observing the unique features that humans possess. Some of the distinguishing factors that make up humans are (Dix et al., 2004:13): ? Input channels – sight, touch, hearing, smell, taste ? Output channels – eyes, fingers, limbs, vocal system, head, body movement ? Memory – sensory memory, short-term memory, long-term memory ? Problem solving and reasoning ? Emotion ? Differences among individuals Only sight, hearing, and touch play a big role as input channels of the human-computer interaction process (Dix et al., 2004:14). For example, when attempting to save a file with the same name as an existing file, a user hears a 'ping' alert, sees the error dialog box and has to touch the mouse in order to click on the necessary button to continue (see Figure 5.1). Figure 5.1: Example of error message that incorporates hearing, sight and touch. For the purpose of this study, we will focus our attention on input channels, memory, emotion (Chapter 6) and differences among individuals as distinguishing factors of humans. 5.3.1.1 Sight as an input channel There are numerous theories which claim to explain the manner in which visual perception occurs, however they can be roughly classified into two distinct classes – constructivist or ecological approaches (Preece et al., 1994:76). Within the constructivist approach, it is believed that our view of the world around us stems from both the information that is contained within our environment and the knowledge that has been previously stored in our memory (Preece et al., 1994:76). On the other hand, the ecological approach claims that perception is merely 'picking up' information in our environment and as a result, does not require any process of construction (Preece et al., 1994:76). For the purpose of this study, we shall adopt the constructivist approach to perception. Visual perception (sight) is comprised of both the receiving of information through the medium of the eye as well as the processing of the information in order to derive meaning from it (Dix et al., 2004:15). Processing the image received by the eye involves (Dix et al., 2004:16) perceiving size and depth, brightness and colour. In order to perceive size and depth, the retina of the eye determines the visual angle of an object (Dix et al., 2004:17). Both the size of the object and its distance from the eye affect the visual angle. For example, if two objects of different sizes are at the same distance, then the larger object will have a larger visual angle. This results in the human perceiving the one object as being bigger than the other (See Figure 5.2). Figure 5.2: Adaptation of graphical representation of the visual angle of two objects of different sizes (Dix et al., 2004:17). Although an object's visual angle decreases as it moves further away from the eye, the size of the object is perceived as constant (referred to as the law of constancy (Dix et al., 2004:17)). However, if the visual angle of an object is too small, then the human will not be able to detect it (Dix et al., 2004:17). The term used for the ability of a human to perceive fine detail is called visual acuity (Dix et al., 2004:17). The first limitation of the human discussed in this study is the limits of visual acuity. One of the factors that aid perception of size is perception of depth (Dix et al., 2004:17). The human perceives an object to be smaller because it is farther away, not because it shrunk in size. Familiarity with the object's size enables the human to judge the distance of an object (Dix et al., 2004:18). The perception of brightness in humans is a subjective response to the level of light in their environment (Dix et al., 2004:18). For example, a smartphone screen that is legible in the shade may not be legible in direct sunlight. The brightness of the screen Chapter 5: Human-Computer Interaction | 126 appears dimmed, but the visual system merely compensated for the extra light. The level of brightness that is perceived is affected by the luminance of an object. The luminance of an object can be defined as the amount of light an object emits subject to the amount of light falling on the surface of the object as well as the reflective properties of the object (Dix et al., 2004:18). Dix et al. (2004:18) further states that the visual acuity of the human is increased with luminance. In addition to enhancing the visual acuity of the human, the brightness, size, and depth of an object on a computer screen are some of the factors that aid in the human capability of perceiving a 2- dimensional object as a 3-dimensional object (Preece et al., 1994:83). Colour is comprised of three components (Dix et al., 2004:18) hue (the spectral wavelength of light), intensity (brightness) and saturation (amount of whiteness). Although the perception of colour, brightness, sight and depth play an important part in the discussion of sight, the perception and processing of text is of particular importance to interface design due to the fact that a form of textual display is often required (Dix et al., 2004:22). The reading process consists of several stages namely (Dix et al., 2004:22): 1. Perception of the pattern of the word on the page. 2. An internal representation of language is used as a reference to decode the perceived

word. 3. Language processes including syntactic and semantic analysis are conducted on sentences or phrases. During the reading process, the human eye makes jerky movements called saccades (Dix et al., 2004:22). These saccades are followed by fixations. Fixation accounts for about 98% of the time spent reading and is the period in which perception occurs (Dix et al., 2004:22). There are also stages in which the eye moves backwards and forwards over the text during the reading process. These are called regressions and tend to occur more as the complexity of the text increases (Dix et al., 2004:22). Research has shown that humans recognise familiar words by the shape of the word (Dix et al., 2004:22). Therefore, if the shapes of words are removed (such as in the capitalisation of text), the speed and accuracy of reading is diminished (Dix et al., 2004:22). Legibility is defined as the speed at which text can be read (Dix et al., 2004:22). Research done by Muter et al. (1982:507) is of particular importance to this study as it shows that reading from digital media was slower than reading from a book. The reason for this decrease in legibility could be as a result of having fewer words to a digital page, the longer line length of a digital page, the orientation of the digital page, as well as the familiarity that the human has with the digital medium (Dix et al., 2004:23). Negative contrast (dark characters of text on a light background) can be used to increase the legibility of text (Dix et al., 2004:23). This is due to the fact that negative contrast provides higher luminance, and as a result, more acuity than a positive contrast (light characters of text on a dark background). Research originally conducted by Bauer and Cavonius (1980:137) as early as the 1980s suggests that, in practice, humans prefer negative contrast displays and that the use of these result in more accurate performance. The researcher believes that in order to enhance user experience, it is important to understand the dynamics of reading on a digital medium and the basics of human sight when designing a digital graphic novel. The aforementioned topics are summarised in Table 5.1 in Section 5.3.1.6 and will be incorporated within the guidelines for creating digital graphic novels portraying emotional social phenomena as presented in Section 5.6. 5.3.1.2 Hearing as in input channel Like sight, hearing is important to human performance (Te'eni et al., 2007:75). The human auditory system conveys a large amount of information about an environment (Dix et al., 2004:23). Sound contains a number of characteristics which include frequency and intensity (Te'eni et al., 2007:75). Frequency can be defined as the number of cycles (sound waves) per unit of time while intensity can be defined as the amount of pressure with which a vibration strikes the eardrum. (Te'eni et al., 2007:75). Pitch refers to the frequency of a sound – a high frequency has a high pitch and a low frequency has a low pitch (Dix et al., 2004:24). The intensity of a sound is measured in decibels (Db). The range for normal hearing ranges from 20 Db (whisper) to 120 Db (thunder) (Te'eni et al., 2007:75). Dix et al. (2004:24) refers to another characteristic of sound called timbre. Timbre relates to the sound type (Dix et al., 2004:24). For example, a violin and flute may play at the same pitch and intensity, but vary in timbre because they are different instruments. The human auditory system filters the perceived sounds which enables the human to eliminate any background noise and focus on information that the human deems to be important (Dix et al., 2004:24). This ability it diminished if the frequencies of sounds are too similar or if sounds are too loud (Dix et al., 2004:24). That concludes the brief discussion of hearing. The researcher believes that incorporating sound into a digital graphic novel will enhance user experience and immersion. As a result, the researcher believes that a basic understanding of human hearing as an input channel is necessary for the design of a digital graphic novel. The aforementioned topics are summarised in Table 5.1 in Section 5.3.1.6 and will be incorporated within the guidelines for creating digital graphic novels portraying emotional social phenomena as presented in Section 5.6. 5.3.1.3 Touch as an input channel Touch is often viewed as being less important than sight and hearing, but it is vital for providing important information from the environment (Dix et al., 2004:25). For example, if humans could not detect heat, cold and pain via touch they would be subject to grave harm as they would not be able to sense when a part of their body was being hurt. Similarly, if touch did provide feedback when attempting to lift an object, humans would not know how much force to exert to accomplish the task. Thus, the absence or reduction of the sense of touch results in a reduction of the speed and accuracy on an action (Dix et al., 2004:25). As a result, touch serves as an important means of feedback, and this is also true within the context of human-computer interaction (Dix et al., 2004:25). For example, an important part of pressing a mouse button is being able to feel the button depress. Unlike vision and hearing, the touch receptors are not localised in the human body (Dix et al., 2004:25). Humans receive touch stimuli through three types of sensory receptors found in the skin (Dix et al., 2004:25) namely – thermoreceptors (respond to heat and cold, nociceptors (respond to intense pressure, heat and pain) and mechanoreceptors (respond to pressure). 129 | Chapter 5: Human-Computer Interaction An aspect that falls within the perception of touch is kinesthesis. Kinesthesis refers to the brain's awareness of the limbs and body (Dix et al., 2004:26). Three types of receptors in the joints are responsible for kinesthesis (Dix et al., 2004:26) namely – rapidly adapting receptors (movement of a limb in a particular direction), slowly adapting receptors (movement and static position) and positional receptors (only when a limb is in a static position). It is important to understand that kinesthesis affects both the performance and comfort of a human (Dix et al., 2004:26). For example, for an individual who is a touch typist, both the feedback from the keyboard and the awareness of the fingers in relation to the keys is of utmost importance. The researcher believes that it is important to consider the sense of touch in the design of a digital graphic novel. While the digital graphic novel is not a hardware component, and may be played on a variety of devices, adding features such as button highlights when the user touches a button may help users to consolidate kinesthesis without any physical feedback. This concludes our discussion on input channels. The researcher believes that it is important to consider the sense of touch in the design of a digital graphic novel. While the digital graphic novel is not a hardware component, and may be played on a variety of devices, adding features such as button highlights when the user touches a button may help users to consolidate kinesthesis without any physical feedback. The aforementioned topics are summarised in Table 5.1 in Section 5.3.1.6 and will be incorporated within the guidelines for creating digital graphic novels portraying emotional social phenomena as presented in Section 5.6. We will now discuss the remaining characteristics of humans identified in

Section 5.3.1. 5.3.1.4 Memory as a human characteristic There are three different types of memory, namely – sensory, short-term and long- term (Lutz & Huitt, 2003:1; Dix et al., 2004:28). Sensory memories are memories that are associated with the senses (Lutz & Huitt, 2003:3). There is a type of sensory memory for each sensory stimuli – haptic memory (touch), iconic memory (visual) and echoic memory (aural) (Dix et al., 2004:28). If sensory memory is not transferred to a more permanent memory store, it will rapidly decay and be overwritten. Sensory memories are continually overwritten by new information that is received through the aforementioned senses (Dix et al., 2004:28). This process occurs within three seconds for aural stimuli and half a second for visual stimuli (Lutz & Huitt, 2003:3). Attention is used to pass information from sensory memory to short-term memory (Dix et al., 2004:29). Attention can be defined as the focusing on a specific stimulus while making a conscious effort to ignore others that are not of interest at that specific moment (Lutz & Huitt, 2003:3; Dix et al., 2004:29). Attention can be influenced by the complexity of new information, the similarity between the competing stimuli or ideas, the meaningfulness that the learner associates with the new stimulus, and finally the physical ability that the individual has to attend (Lutz & Huitt, 2003:3). Short-term memory is used to store transient information (Dix et al., 2004:29). As a result, it has a very limited capacity and information will be lost if no action is taken on it within 15-30 seconds (Lutz & Huitt, 2003:4). One method for measuring capacity allows individuals to recall items in any order. The second method for measuring capacity is the determination of the length of a sequence that can be recalled in the correct order (Dix et al., 2004:29). According to research conducted by Miller (1994:343), the average individual can recall 7 ± 2 digits. A generalisation of this principle is that individuals can store 7 ± 2 chunks of information in short-term memory. As a result, chunking information may increase short-term memory (Dix et al., 2004:30). Long-term memory serves as the storage area of all knowledge, perceptions, and information learned by an individual (Lutz & Huitt, 2003:5). Long-term memory differs from the aforementioned memory types in various ways. Unlike sensory and short- term memory, long-term memory tends to have a vast, if not unlimited, capacity. The access time for long-term memory is also longer than sensory and short-term memory at approximately a tenth of a second. And finally, it takes longer for an individual to forget something that is stored in long-term memory, if even at all (Dix et al., 2004:32). Long-term memory can be categorised into two types, namely – semantic memory and episodic memory (Tulving, 1972:384; Dix et al., 2004:32). Semantic memory serves as a structured record of concepts, facts and skills that an individual as acquired while episodic memory stores information about events that took place in an individual's life (Tulving, 1972:386; Dix et al., 2004:32). Information contained in semantic memory is derived from episodic memory in order for an individual to acquire new concepts or facts from events and experiences (Dix et al., 2004:32). According to Lutz and Huitt (2003:6), in order to facilitate learning, information must be presented in a manner that lends itself to being incorporated into the memory structure of an individual. Sprenger (1999:75) states that emotions can activate many storage areas and that emotional memory strategies are the most powerful LeDoux (1996:287) further stated that the brain releases specific neurotransmitters that aid in memory retention when it experiences both negative and positive emotions and that strong feelings about content can enhance emotional memory (Sprenger, 1999:76). Sound, role-playing and the plot or conflict of a story can be used to elicit strong feelings from the target audience (Sprenger, 1999:76). Memory can also be obtained by the way in which semantic information is presented; storytelling is an exciting way for accessing multiple memory lanes in an individual (Sprenger, 1999:76). The researcher believes that an understanding of human memory is essential for the design of a digital graphic novel portraying emotional social phenomena. This is due to the fact that digital graphic novels of this nature will often aim to teach their target audience about an emotional social phenomenon and a basic understanding of human memory will aid in achieving this. The aforementioned topics are summarised in Table 5.1 in Section 5.3.1.6 and will be incorporated within the guidelines for creating digital graphic novels portraying emotional social phenomena as presented in Section 5.6. 5.3.1.5 Differences among individuals Although humans share many capabilities and limitations, not all humans are the same (Dix et al., 2004:52). Some individuals may prefer a slightly 'busy' page, while others may prefer a 'clean' looking page. Some individuals may be indifferent to a certain aspect of an interface under certain circumstances, and may be frustrated by it in other circumstances. For example, a certain user is usually indifferent to the fact that closing an internet browser closes all the tabs within the browser. However, if the same individual spent a considerable amount of time finding specific web pages and closed the internet browser by mistake, the user may feel frustrated at the fact that closing the browser closes all the tabs within the browser. It is important to be aware of the differences of individuals in order to be able to account for them within the design of a human-computer interface (Dix et al., 2004:52). It is also important to distinguish between long-term differences (e.g. culture, gender, intellect, physical abilities) and short-term differences (e.g. fatigue, stress). Both types of differences should be considered when designing a human-computer interface. That concludes the brief discussion of the differences among individuals and the discussion of characteristics of humans. The researcher believes that it is important to understand and cater for differences among individuals in order to create a digital graphic novel that successfully caters to its target audience. The aforementioned topics are summarised in the next section. 5.3.1.6 Influence of human characteristics on the design of a digital graphic novel Table 5.1 summarises the characteristics of humans discussed this chapter and their influence on the design of a digital graphic novel. These concepts will be incorporated within the guidelines for creating digital graphic novels portraying emotional social phenomena as presented in Section 5.6. Table 5.1: Important concepts of the human and their impact on the design of a digital graphic novel. Concept Application to this study Sight Familiarity – the distance of an object can be judged if the human expects the object to be of a particular size (Dix et al., 2004:18). By making use of the familiarity principle, the researcher will be able to simulate depth of field within the digital graphic novel. Visual acuity – the ability of a human to perceive fine detail (Dix et al., 2004:17). The thickness of lines and spaces between lines in the digital graphic novel should not fall outside an individual's ability to perceive it. Luminance increases an individual's visual acuity. Brightness,

size and depth of an object on a computer screen aid in an individual's ability to perceive a 2-dimensional object as a 3- dimensional object. (Preece et al., 1994:83). By varying the brightness, size and depth of images within the digital graphic novel, the researcher will be able to project a 2- dimensional image as a 3-dimensional image within the digital graphic novel. If the shapes of words are removed (such as in the capitalisation of text), the speed and accuracy of reading is diminished (Dix et al., 2004:22) The text in the digital graphic novel should not be written in capital letters in order to promote legibility and accuracy in reading. Negative contrast (dark characters of text on a light background) can be used to increase the legibility of text (Dix et al., 2004:23). The text of the digital graphic novel should be black on a white background in order to promote legibility. Hearing The range for normal hearing ranges from 20 Db (whisper) to 120 Db (thunder) (Te'eni et al., 2007:75). The human ear is capable of hearing sounds with frequencies between 20 and 20 000 hertz (Hz) (Te'eni et al., 2007:75). Humans tend to respond to frequencies between 1000 and 10 000 Hz (Te'eni et al., 2007:75). This ability of a human to focus on important information is diminished if the frequencies of sounds are too similar or if sounds are too loud (Dix et al., 2004:24) The designer of a digital graphic novel should ensure that the sounds used within the novel fall between the appropriate intensity and frequencies while not being too similar or too loud. Touch It is important to understand that kinesthesis affects both the performance and comfort of a human (Dix et al., 2004:26). Features such as button highlights and page turning animations may help users to consolidate kinesthesis without any physical feedback that may affect the performance and comfort of a user. Memory Attention can be influenced by the complexity of new information, the similarity between the competing stimuli or ideas, the meaningfulness that the learner associates with the new stimulus, and finally the physical ability that the individual has to attend (Lutz & Huitt, 2003:3). Content presented in the digital graphic novel should not be complex. The content of the digital graphic novel should elicit a sense of meaningfulness from the reader. Chunking information may increase short- term memory (Dix et al., 2004:30). The narrative text should be presented as concise sentences and not paragraphs. According to Lutz and Huitt (2003:6), in order to facilitate learning, information must be presented in a manner that lends itself to being incorporated into the memory structure of an individual. Sprenger (1999:75) states that emotions can activate many storage areas and that emotional memory strategies are the most powerful. Sound, role-playing and the plot or conflict of a story can be used to elicit strong feelings from the target audience (Sprenger, 1999:76). Memory can also be obtained by the way in which semantic information is presented; storytelling is an exciting way for accessing multiple memory lanes in an individual (Sprenger, 1999:76). The digital graphic novel should make use of sound and a well-written narrative in order to elicit emotions and activate emotional memory in readers. Differences among individuals Although humans share many capabilities and limitations, not all humans are the same (Dix et al., 2004:52). It is important to be aware of the differences of individuals in order to be able to account for them within the design of a human- computer interface (Dix et al., 2004:52). It is also important to distinguish between long-term differences (e.g. culture, gender, intellect, physical abilities) and short-term differences (e.g. fatigue, stress). Research of the target audience of the digital graphic novel needs to be conducted in order for it to cater to their specific requirements, preferences, etc. This concludes the discussion of the characteristics of humans in human-computer interaction. Design principles for humans within the human-computer interaction process will be discussed in the following section. 5.3.2 Design principles for humans According to Norman (2002:188), in order to design according to the needs and interests of human users, a designer should: ? Bear human constraints in mind in order to make it easy for the user to determine what actions are possible at any point. ? Make items visible, such as alternative actions and the results of actions taken. ? Enable the user to determine the current state of the system. 135 | Chapter 5: Human-Computer Interaction ? Ensure that the mapping between a user's intentions, actions and the resulting effects occurs in a natural manner. A natural mapping should also exist between information that is shown and the current state of the system. The aforementioned can be simplified into two main concepts (Norman, 2002:188): ? The user needs to be able to determine what to do. ? The user needs to be able to tell what is going on. Norman (2002:188) states that in order to design for humans, designers are required to: ? Make use of knowledge present within the user's world, and determine the knowledge the user possesses. ? Ensure that the structures of tasks are simplified. ? Ensure that items are visible to the user. ? Ensure that all mappings between the user and the device are correct. ? Exploit the power of natural and artificial constraints by incorporating them into the design. ? Design with the anticipation of error. ? Standardise in order to increase a user's familiarity with a device. A human-computer interface designer can apply the aforementioned by familiarising himself with the types of constraints that can be applied to a human-computer interface with regard to human users. 5.3.2.1 Summary of constraints From our previous discussions of important factors of humans, we can derive four main groups of constraints that should be incorporated in the design of the human- computer interface (Norman, 2002:84). These four groups of constraints are: ? Physical constraints ? Semantic constraints ? Cultural constraints ? Logical constraints Physical constraints can be used to limit the possible operations of a user (Norman, 2002:84). An example of a physical constraint is the fingerprint scanner present in Chapter 5: Human-Computer Interaction | 136 some laptops. The size of the fingerprint scanner indicates that only one finger can be scanned at a time. As demonstrated in this case, the efficiency and usefulness of a physical constraint is increased by its ability to be seen and interpreted, because the set of possible actions has been restricted before any wrong action can be attempted (Norman, 2002:84). In other cases, a physical constraint can prevent an incorrect action once the action has been attempted – for example, trying to play a DVD in a CD drive. Semantic constraints are dependent on a human's perceived meaning of a situation in order to control the set of possible actions (Norman, 2002:85). Semantic constraints also rely upon a human's knowledge of a situation and the world (Norman, 2002:85). For example, when a computer seems to be 'frozen' the correct interpretation of the situation by the user will determine the actions that can be taken. If a user thinks that there is nothing wrong with the computer, or that it is just taking a little longer to open a new window than usual, the user might wait

and see when the computer reacts. On the other hand, if the user perceives the time taken to open a new window to be too long, the user might try to move the mouse to determine if the computer is 'frozen' or not. If the pointer on the screen does not react to the movement of the mouse, the user may try to reboot the computer. Cultural constraints rely on culturally accepted conventions (Norman, 2002:85). For example, some women within the religion of Islam choose to cover their faces in public. This constraint does not allow them to make use of facial recognition software in public places and therefore the designers of a login system that uses facial recognition should also incorporate a 'backup password' in order to accommodate these constraints. Natural mappings are made possible due to logical constraints (Norman, 2002:86). Logical constraints are reflected by the relationships between the functional and spatial layout of components and that which they affect or are affected by (Norman, 2002:86). For example, pressing the 'a' key on the keyboard of a computer yields the letter 'a'. A human-computer interface designer can bear the aforementioned constraints in mind and provide affordances to help the user interpret what to do. 5.3.2.2 Affordances Affordances can be defined as both the perceived and actual properties that an item possesses, and more specifically, the properties of an item that determines its use (Norman, 2002:9). Affordances provide convincing clues regarding the use of an object (Norman, 2002:9). For example, when a user receives a dialog box with an 'Ok' button at the end, the user is aware that the button should be pressed once the content has been read and understood. This affordance can be improved by disabling all the background windows and highlighting the dialog box or 'Ok' button whenever the user tries to click elsewhere. Within the scope of a digital graphic novel, the page can zoom back out to full size once all the frames on the page have been read. This indicates that the page is complete and that the user can move onto the next page. The researcher believes that a successful digital graphic novel can be created by understanding the nature of a human, the human's role within the human-computer interaction process and how to design with the human in mind. This concludes the discussion of the human within the human-computer interaction process. We will now discuss the second word of the term human-computer interaction – computer. 5.4 Computer in HCI In order to fully understand the human-computer interaction process, it is important to understand both of the parties that are involved within the interaction process – the human and the computer (Dix et al., 2004:60). Having discussed the human in the previous section, we will now direct our attention to the computer. In this section, we will cover the various input-output devices and discuss the manner in which technology influences the interaction and subsequently, the styles of human-computer interfaces. We will begin this section by defining a computer. A traditional computer is a machine that is composed of input devices, output devices, memory, processors and communication channels (Dix et al., 2004:61). Examples of the five different types of hardware that make up a traditional computer are (Dix et al., 2004:61): ? Input devices – Keyboard, mouse, touchscreen, touchpad, motion tracker ? Output devices – Screen, speaker, printer ? Memory – Random-Access Memory (RAM), short-term memory, hard disk ? Processors – Central processing unit (CPU), graphics processing unit (GPU) ? Communication channels – Internal communication (facilitated by the motherboard), external communication channels (e.g. Local-Area Network (LAN), Wide-Area Network (WAN)) The term 'computer' can also refer to any kind of technology ranging from the traditional personal computer to an extensive computer system and can even be extended to include an embedded system or process control system (Dix et al., 2004:4). Although digital graphic novels are read, they also serve as an interface as the human interacts with the computer through the interface of the digital graphic novel. For example, in order to turn a page in the digital graphic novel, the human must click on certain areas of the digital graphic novel itself. Therefore, for this study, the researcher has extended the aforementioned definition to include digital graphic novels as the computer component. 5.5 Interaction in HCI We can define interaction as the communication that occurs between the human and the computer. Interaction can also be viewed as the process of information transfer between the human and the user and vice versa (Dix et al., 2004:60). In general, the purpose of an interactive system is to aid a user in his intention to accomplish a specific goal within a certain domain (Dix et al., 2004:125). This definition can be better understood by defining the key terms from which it is comprised (Dix et al., 2004:125): ? Intention – A particular action that is essential in achieving a goal. ? Goal – The desired output as a result of performing a task. ? Task – Operations that can be conducted in order to influence the concepts within a domain. ? Domain – A specific area of expertise and the knowledge contained within a certain real-world activity. Norman (2002:48) developed a model of interaction between the human user and the computer where the user devises an action plan that is executed at the computer's interface. Once the plan or a section of the plan has been executed, the user evaluates the outcome of the executed action plan and determines further steps to be taken by 139 | Chapter 5: Human-Computer Interaction observing the computer interface (Dix et al., 2004:125). Norman (2002:49) identifies two major phases into which the aforementioned process can be divided – the execution phase and the evaluation phase. There are various states within human- computer interaction that result in the separation of mental states and physical actions – some of these occur within the execution and evaluation phases and are referred to as the Gulf of Execution and the Gulf of Evaluation respectively (Norman, 2002:50). The Gulf of Execution can be identified as the difference between the intentions of the user and the actions that are allowable within the computer system (Norman, 2002:51). Norman (2002:51) suggests that one measure of the Gulf of Execution is the degree to which a computer system allows a user to directly perform the intended actions, without extra effort. Therefore, a good question to ask when evaluating the Gulf of Execution would be (Norman, 2002:51): Does the system provide actions that are equivalent to those that the user wishes to perform? The Gulf of Evaluation can be identified as a reflection of the amount of effort exerted by a user in order to interpret the physical state that the system is in, as well as to determine the degree to which the expectations and intentions of the user has been met (Norman, 2002:51). The Gulf of Evaluation is deemed to be small when the computer system provides the user with information about its state in a manner that is easy to acquire and interpret and also correlates with the manner in which the user views the system

(Norman, 2002:51). There are three core actions that serve to bridge the gap between what a user would like to do and all the possible physical actions available on the computer system and consequently bridge the Gulf of Execution. Once a goal is established, a user can form an intention to attain the goal, identify what actions need to be taken and then perform them – this is the stage of execution (Norman, 2002:48). Three core actions aid in bridging the Gulf of Evaluation. The user perceives what happens in the world, interprets the event, and compares it to his original intentions (Norman, 2002:48). The aforementioned actions can be summarised into seven stages of action (Norman, 2002:48): 1. A goal must be formed. 2. An intention must be formed to achieve the goal. 3. An action to achieve the goal must be specified. 4. The specified action must be executed. 5. The current state of the world must be perceived. 6. The perceived state of the world must be interpreted. 7. The outcome must be evaluated to see whether it compares to the user's original intentions. Although Norman's model allows more complex work to be placed within the bounds of a common framework, it concentrates only on the interaction from the user's point of view. It does not discuss the communication that a system conducts through the interface (Dix et al., 2004:127). Abowd and Beale (1991:73) adapted Norman's model in order to develop the interaction framework, which serves to offer a more realistic description of what happens during the interaction between the human and the computer. 5.5.1 Interaction framework Abowd and Beale (1991:73) offer a more realistic description of the interaction process by breaking it down into four components, namely – system, user, input and output. According to Abowd and Beale (1991:74), the system and the user each have their own language in which they express their concepts and operations. The system's language is referred to as the core language, while the user's language is referred to as the task language (Abowd & Beale, 1991:74). In addition to these languages, the input and the output components possess languages of their own that represent the separate components although they may overlap (Abowd & Beale, 1991:75). The combination of the input and output form the system interface (Abowd & Beale, 1991:75). Abowd and Beale (1991:75) distinguish between two types of interfaces: ? System interface – composed of the input and output components. ? Physical interface – part of the interface that is in direct contact with the human user. Each type of interface forms a subset of the interface used within Abowd and Beale's (1991:75) framework shown in Figure 5.3. Figure 5.3: Translations between components (Abowd & Beale, 1991:76). Abowd and Beale's (1991:76) framework closely resembles that of Norman (2002:48) in that the interactive cycle begins with the user formulating a goal and the action required to achieve that goal. Due to the fact that the user is only able to manipulate the computer through the input, the task must be articulated from task language into input language. The input language is further converted into core language, as the input needs to communicate with the system. Once the system transforms itself as required by the user, the execution phase is complete. The evaluation phase begins with the system's new state being transformed from core language into output language. The user is then able to view the output and compare the new system state to the original goal. Once this is done, the evaluation phase is completed – along with the interactive cycle (Abowd & Beale, 1991:76). This concludes the discussion of the interaction framework. Methods of interaction will be discussed in the following section. 5.5.2 Interaction styles As previously defined, interaction is the communication between the user and the computer. There is a wide range of interface styles that can be applied to this dialog (Dix et al., 2004:136). Each style possesses its own effect on the interaction process. Table 5.2 lists the common interface styles and their key attributes (Dix et al., 2004:136): Table 5.2: Common interface styles and their key attributes.(Dix et al., 2004:136). Interface Type Attributes Command line interface Powerful. Flexible. Allows users direct access to system functionality. Difficult to use and learn. Menus Options are visible. Options are meaningfully and logically arranged in groups. Natural language Users need not remember a command or get lost in menus. Ambiguity of language results in difficulty in comprehension for the computer. Question/answer Simple mechanism to obtain user input. Limited in functionality and power. Query dialog Uses natural-language-style phrases. Requires a specific syntax. Requires knowledge of a database structure. May become complex when more than one attribute is queried. Form-fills Useful for data entry/retrieval. Easy to learn and use. Spreadsheets Values can be freely manipulated. Blurred distinction between input and output. Flexible. Natural. WIMP (Windows Icons, Menus, Pointers) Familiar. The WIMP interface can be deemed familiar due to the fact that users of desktop computers, laptops, tablets and even smartphones use operating systems that incorporate the WIMP interface style of windows, icons, menus and pointers. Point and click Virtually all actions can be performed by a single click of a mouse button. Not limited to mouse-based interfaces (e.g. touchscreens). Three-dimensional interfaces Allows users to actively participate in a virtual world rather than being a spectator. Sculptural effects may not be properly applied, which results in a loss of differentiation. Due to the fact that point and click interface systems are employed in most web pages (Dix et al., 2004:142), the point and click interface style will be applied to this study as the digital graphic novel will be hosted on a web page. The point and click interface style will enable the digital graphic novel to be played on devices that do not contain keyboards and mice. The digital graphic novel will be used within a WIMP interface and will therefore have to comply with the WIMP interface style. Finally, because the digital graphic novel will be made available to a wide audience, the researcher feels that the interface style used should be familiar and not be hard to learn or use. Certain principles should be used in order to create an interface that is useful, usable, and used. Several sets of human-computer interaction principles will be discussed in the following section. 5.5.3 The use of HCI principles in interaction As designers, we understand that beautiful or innovative human-computer interfaces are proficient in completing the required task while being artistically pleasing (Dix et al., 2004:6). In order to replicate a good interface, we would like to reuse lessons from the past (Dix et al., 2004:6). It is true that innovative ideas tend to lend themselves towards the creation of more usable systems, but in order to fully benefit from innovative ideas, we need to not only understand the fact that they work, but also how they work and why they work (Dix et al., 2004:6). Just as a civil engineer is able to construct a bridge and be sure that it will stand, this aforementioned form of rationalisation will allow designers to reuse related concepts within similar

situations as it is based upon a set of principles that have been both tried and tested (Dix et al., 2004:6). As mentioned in this chapter, individuals differ. It is therefore unrealistic to expect a designer to rely merely on artistic skill and a perfect sense of insight to create systems that are deemed usable by the user (Dix et al., 2004:6). Through the use of human- computer interaction principles, designers are provided with an understanding of the different types of concepts involved and a scientific perspective which reflects why certain features are successful and others are not (Dix et al., 2004:6). Designers can then use these scientific human-computer interaction principles as a springboard for their creative flow which is supported by science and fast-tracked by artistic insight (Dix et al., 2004:6). 5.5.4 What are the HCI principles? As the field of computers grew, so did the amount of researchers who specialised in the field of interaction between humans and computers. These researchers observed the theoretical, psychological, and physical aspects of the interaction process (Dix et al., 2004:3). As a result of this, there are a number of proposed human-computer interaction principles. An overview of several HCI principles given in literature is given in Table 5.3. Table 5.3: Summary of several HCI principles given in literature. Author Principles Human-computer interaction principles as given by Norman (1983:257). 1. Feedback – The user should be able to clearly see the state of the system in a form that is straightforward and clearly defines the options that are available in order to prevent mode errors. 2. Similarity of response sequences – Different categories of actions should have different command sequences in order to prevent capture and description errors. 3. Actions should be reversible – in order to prevent unintentional performance, actions should be reversible and hard to do in instances where actions should be irreversible and are of quite a high consequence. 4. Consistency – The structure and design of a system should be consistent in order to minimise the occurrence of memory problems in retrieving the required operations. Human-computer interaction principles as given by Shneiderman and Plaisant (2005:74). 1. Strive for consistency. 2. Cater to universal usability. 3. Offer informative feedback. 4. Design task flows to yield closure. 5. Prevent errors. 6. Permit easy reversal of actions. 7. Make users feel they are in control. 8. Minimise short-term memory load. Human-computer interaction principles as given by Nielsen and Molich (1990:249). 1. Consistency and standards. 2. Visibility of system status. 3. Match between system and real world. 4. User control and freedom. 5. Error prevention. 6. Recognition rather than recall. 7. Flexibility and efficiency of use. 8. Aesthetic and minimalist design. 9. Help users recognise, diagnose and recover from errors. 10. Provide online documentation and help. Human-computer interaction principles as given by Stone et al. (2005:97). 1. Visibility – The first step in order to achieve the goal should be clear. 2. Affordance – The control should suggest how the user should use it. 3. Feedback – What happened or is happening should be clear. 4. Simplicity – As simple as possible and task-focused. 5. Structure – Sensible organisation of content. 6. Consistency – Similarity for predictability. 7. Tolerance – Prevent errors and aid in recovery. 8. Accessibility – Usable by all intended users in spite of handicap, or environmental conditions. Human-computer interaction principles as given by Johnson (2007:8). 1. Focus on the users and their tasks, not on the technology. 2. Consider function first, presentation later. 3. Conform to the users' view of the task. 4. Design for the common case. 5. Do not complicate the user's task. 6. Facilitate learning 7. Deliver information, not just data. 8. Design for responsiveness. 9. Try it out on users; then fix it. Principles for learnability – how easily new users can effectively interact and achieve maximum performance. 1. Predictability – enable the user to determine effects of future action based on interaction history. 2. Synthesisability – enable the user to judge the effect that past operations had on the current system state. 3. Familiarity – how much of a user's computer-based or real-world experience and knowledge can be applied to the interaction with the new system. 4. Generalisability – the ability of a user to apply the same knowledge in different applications or situations. Principles to support usability as given by Dix et al. (2004:261). 5. Consistency Principles for flexibility – the array of information exchange between user and system. 1. Dialog initiative – Do not restrict the user by allowing the system to impose constraints on the input dialog. 2. Multi-threading – a system's ability to sustain user interaction with more than one task at the same time. 3. Task migratability – the ability to pass the control of the execution of a task between the user and the system. 4. Substitutivity – the allowing of equal input and output values to be substituted with each other. 5. Customisability – the ability of a user to modify the user interface. Principles for robustness – the amount of support a user has in determining the achievement and assessment of goals. 1. Observability – the capacity a user has to assess the internal state of a system through its representation. 2. Recoverability – the ability of a user to correct actions that have yielded errors. 3. Responsiveness – the user's perception of the rate of communication with the system. 4. Task conformance – the extent of support that system services provide a user who wishes to perform certain in a specific way. As seen in Table 5.3, many of the popular HCI authors share common HCI principles. Rogers et al. (2011:25), more popular names within the field of HCI, discusses popular design principles instead of proposing a new list. The list of popular design principles 147 | Chapter 5: Human-Computer Interaction as given by Rogers et al. (2011:25) are: visibility, feedback, constraints, consistency and affordance. Dix et al. (2004:261) proposed a new structure for the presentation of design principles by categorising their usability principles in order to extend the list as knowledge in the field increases. Hinze-Hoare (2007:1) conducted an in-depth review and analysis of human-computer interaction principles that include those mentioned in Table 5.3 and others such as Maxwell (2001:191) and Myers (1998:44). In doing so, Hinze-Hoare (2007:7) attempts to normalise a range of proposed principles and to determine the principles that form the most significant set. The normalisation process began by conducting a survey that was based on the citation frequency of authors of HCI principles. Hinze-Hoare (2007:7) believed that authors who were most frequently cited would offer the most respected and therefore important HCI principles. Hinze- Hoare also used the citation frequency of authors as a means of weighting the authority of HCI principles. The authors were weighted as a percentage of all the citations listed in the ranking. The HCI principles of each author were then placed within a matrix and subsequently factored into HCI categories. As a result of doing so, an entire set of HCI principles was drawn from the principles given by each significant

author (Hinze-Hoare, 2007:8). Principles that were the most popular in terms of the literature were taken from many different authors. Principles that were the least popular were obtained from only one or two of the authors. At the end of the exercise, each HCI principle obtained had at least one author proposing it. Finally, Hinze-Hoare (2007:8) multiplied the weighting factor obtained from the citation frequency of a significant author by the number of times a certain HCI principle was proposed by the author in order to derive a ranking of HCI principles that needed to be established. Once the fundamental principles of every significant author were examined, categorised and weighted, the top eight HCI rules were found to be those given in Table 5.4. Table 5.4: Weighted HCI rules according to their frequency of use. 1 Recoverability 96 2 Familiarity 57 3 Consistency 57 4 Substitutivity 54 5 Task Migratability 40 6 Synthesisability 34 7 Predictability 32 8 Perceptual Ergonomics 31 Recoverability refers to the ability that users have to recover from any errors they may have made. Recoverability can occur both forward (Norman, 1983:257; Shneiderman & Plaisant, 2005:74) and backward (Nielsen & Molich, 1990:249; Shneiderman & Plaisant, 2005:74). In forward recoverability, errors are prevented. This is usually engineered into and initiated by the system. In backward recoverability, the easy reversal of errors is facilitated. This usually concerns the user's actions and is initiated as a result of them. Familiarity concerns the degree to which the real world experience and knowledge of a user can be drawn upon in order to understand how a new system works (Nielsen & Molich, 1990:249; Hinze-Hoare, 2007:10). Familiarity can drastically reduce the amount of time and knowledge that is needed in order to work a new system. Consistency can be defined as a similar behaviour that arises from similar task objectives or situations. Many authors consider consistency to be a vital principle of human-computer interaction. This is reflected in the fact that consistency is the most quoted principle amongst all HCI authors (Norman, 1983:257; Nielsen & Molich, 1990:249; Shneiderman & Plaisant, 2005:74; Stone et al., 2005:95; Johnson, 2007:8). Substitutivity relates to the ability that a user has to perform the same action or enter the same value in various ways according to the user's individual experience (Hinze- Hoare, 2007:11). An example of this would be the ability to copy and paste using either the mouse or keyboard shortcuts. Task migratability refers to the transferring of control between the user and the computer. An example of task migratability is requesting the computer to perform a spell check on a document. Maxwell (2001:191) states that he considers task migratability as a high level of interaction. Synthesisability refers to the ability of the user to predict what actions can be performed next based on his use of the system (Hinze-Hoare, 2007:11), which in turn helps the user to construct a framework of all the possible actions that he can perform. Synthesisability is closely linked with predictability which supports the user in determining the kind of effect of future actions based on the past knowledge the user has of operating the system (Hinze-Hoare, 2007:11). Finally, perceptual ergonomics involves the tracking of the manner in which humans perceive events in order to make an interface that is efficient for humans to use (Hinze- Hoare, 2007:11). This concludes the overview of the most common human-computer interaction principles. Based on the above review of human-computer interaction principles, the researcher will be able to determine the principles that will be applicable for this study. 5.5.5 Chosen HCI principles for this study Although all human-computer interaction principles are important, not all of them will be applicable to a digital graphic novel. As a result of this, the researcher has identified a set of human-computer interaction principles that will be applied within the context of this study. The selected human-computer interaction principles that will be used within this study are: Consistency (Norman, 1983:257) – The structure and design of a system should be consistent in order to minimise the occurrence of memory problems in retrieving the required operations. The design should exhibit similarity for predictability (Stone et al., 2005:170). This principle is applied within the digital graphic novel, The Thrill Electric (Moore & Reppion, 2015) as indicated in Figures 5.4 and 5.5. Although the frames of the digital graphic novel change, the overall look-and-feel of the web page that contains it remains the same. Figure 5.4: The consistency principle incorporated in the structure of The Thrill Electric (Moore & Reppion, 2015). Figure 5.5: The consistency principle incorporated in the structure of The Thrill Electric (Moore & Reppion, 2015). Cater to universal usability (Shneiderman & Plaisant, 2005:74) – The Thrill Electric (Moore & Reppion, 2015) demonstrates this in its navigation bar (Figure 5.6) by making use of directional arrows and buttons which have icons that make their function clear to the user without the need for text. Figure 5.6: The navigation bar from The Thrill Electric (Moore & Reppion, 2015). Prevent errors (Shneiderman & Plaisant, 2005:74) – An example of this principle can be found when a user tries to use a backslash "\" in the name of a file (Figure 5.7). A computer interprets a backslash as a new directory. Therefore, if a file is saved with the name this\text.doc the computer will interpret 'this' as a directory and text.doc as the file within the non-existent directory (Figure 5.8). To prevent errors of this nature, the operating system does not allow the backslash to be entered in file names. Figure 5.7: An error prevention method used by the Windows operating system when a user tries to enter a backslash in a file name. Figure 5.8: An error prevention method used by the Windows operating system when a user tries to enter a backslash in a file name. Permit easy reversal of actions (Shneiderman & Plaisant, 2005:74) – The 'back' button in an internet browser facilitates this by allowing the user to revert back to the previous webpage without having to type in the URL again (Figure 5.9). Figure 5.9: The 'back' button in a web browser (www.google.com). Make users feel they are in control (Shneiderman & Plaisant, 2005:75). Within The Thrill Electric (Moore & Reppion, 2015) the navigation bar only appears if the user moves the cursor to the bottom of the screen. Users are also given the option to read all the instructions or skip through them (Figure 5.10). Figure 5.10: Instruction screen in The Thrill Electric (Moore & Reppion, 2015). Aesthetic and minimalist design (Nielsen & Molich, 1990:249) – This goes hand-in- hand with the simplicity principle which states that the designer should keep the interface as simple as possible and task-focused (Stone et al., 2005:170). The Google landing page encompasses these principles by displaying only important links and showing only the Google search bar in the middle of the webpage (Figure 5.11). Figure 5.11: Google landing page (www.google.com). Provide documentation and help (Nielsen & Molich, 1990:249) – The Thrill Electric (Moore & Reppion, 2015) provides a help menu to

assist the reader in understanding the functions of each navigation button (Figure 5.12). Figure 5.12: The help menu from The Thrill Electric (Moore & Reppion, 2015). Structure (Stone et al., 2005:97) – Sensible organisation of content. The Thrill Electric (Moore & Reppion, 2015) exhibits this principle by clearly indicating the current page in the middle of the screen and the other volumes of the graphic novel at the bottom of the screen (Figure 5.13). Figure 5.13: The organisation of content within The Thrill Electric (Moore & Reppion, 2015). Accessibility (Stone et al., 2005:177) – Usable by all intended users in spite of handicap, or environmental conditions. The Google landing page is once again a good example. In this case, a user can search the web not only by typing, but also by saying 'Ok, Google' and articulating what they would like to search. Figure 5.14: Google's voice recognition search function (www.google.com). Try it out on users; then fix it (Johnson, 2007:48) – Google has created a 'Google Usability' page where users can provide product feedback directly to Google (Figure 5.15). Figure 5.15: Google's usability feedback page (http://www.google.com/usability/). The researcher believes that the aforementioned principles can be applied to digital graphic novels that portray emotional social phenomena as they have been applied in environments that mimic the intended environment of the digital graphic novel to be created. By combining principles applied in an online digital graphic novel and interfaces that are familiar to users, the researcher aims to create an environment within the proposed digital graphic novel that is conducive to a positive user experience. 5.6 HCI enriched guidelines for creating digital graphic novels The chosen HCI principles mentioned in the previous section have been used to enrich the original proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics discussed in Chapter 3. Table 5.5 provides proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics and HCI principles. Table 5.5: Proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics and HCI principles. Narrative N1 The author should determine the emotions, worldviews and the purpose for developing the narrative (McCloud, 1994:170). N2 The author should make readers care about the narrative either by the content itself or through the intensity of its presentation (McCloud, 2011:53). N3 The author should exploit the common experiences or heritage of the target group of the digital graphic novel to provoke emotions such as suspense, sadness and joy (McCloud, 2011:150). N4 Complex information should not be presented in the narrative (Lutz & Huitt, 2003:3). N5 A goal of the narrative should be to elicit a sense of meaningfulness from the reader (Lutz & Huitt, 2003:3). N6 The narrative text should be presented as concise sentences and not paragraphs (Dix et al., 2004:30). N7 The narrative should be well-written in order to elicit emotions and activate emotional memory in readers (Sprenger, 1999:76; Lutz & Huitt, 2003:6). Character C1 Characters should engage in novel and attention-grabbing conflicts with themselves, other characters and the world around them McCloud (2011:150). C2 Characters should be designed as believable and vivid human beings beings (McCloud, 2011:62). C3 Facial expressions of a character should be used to portray a character's emotions to the reader and to elicit emotions from the reader (Eisner, 1990:111; McCloud, 2011:81). C4 A combination of and variation in the six basic emotional expressions should be used to represent more complex or intense emotions (McCloud, 2011:84). C5 The body language of the character should be used to communicate the emotions of a character (Eisner, 1990:113; McCloud, 2011:103). Pages and panels P1 Panels that enable the reader to easily follow the narrative should be used (McCloud, 2011:12). P2 Each panel should lead to and support the next (Eisner, 1990:25; McCloud, 2011:14). P3 The specific moment that is represented within a panel should serve to elicit emotions from readers or to portray emotion to readers (Eisner, 1990:46). P4 Movement represented in panels should be one of six different types as given in literature (McCloud, 1994:70; McCloud, 2011:15). Moment-to-moment – series of moments portrays a single action. Action-to-action – series of actions of a single subject (person, object, etc.). Subject-to-subject – single scene with changing subjects. Scene-to-scene – moments that transition over significant distances of space or time. Aspect-to-aspect – moments transition from one aspect of a mood, place or idea to another. Non-sequitur – series of seemingly unrelated images and/or words. P5 Frames should guide the reader's focus to aspects that are important to the narrative (McCloud, 2011:20). P6 The variation of the look-and-feel of panels should be manipulated in order to elicit specific emotions from readers (Eisner, 1990:46) P7 The flow of the digital graphic novel should adhere to the standard that readers will read frames from left-to-right and then top-to-bottom (Eisner, 1990:41; McCloud, 2011:32). P8 By making use of the familiarity principle depth of field can be simulated within the digital graphic novel (Dix et al., 2004:18). P9 The thickness of lines and spaces between lines in the digital graphic novel should not fall outside an individual's ability to perceive it (Dix et al., 2004:17). P10 Luminance increases an individual's visual acuity (Dix et al., 2004:17). P11 By varying the brightness, size and depth of images within the digital graphic novel, a 2- dimensional image can be projected as a 3-dimensional image within the digital graphic novel (Preece et al., 1994:83). P12 The text in the digital graphic novel should not be written in capital letters in order to promote legibility and accuracy in reading (Dix et al., 2004:22). P13 Negative contrast (e.g. black text on a white background) should be used to increase the legibility of the text in a digital graphic novel (Dix et al., 2004:23). Artwork A1 The artist should decide on images that brings the narrative to life for the reader (Eisner, 1990:89; McCloud, 2011:26). A2 Images should communicate the narrative clearly and compellingly (McCloud, 2011:26). A3 Pictures should be used to evoke specific emotions or sensual responses from readers in order to increase immersion within the narrative (McCloud, 2011:118). A4 Images should be combined with narrative text in seven distinct categories as given in McCloud (1994:153) and McCloud (2011:130). Word-specific – words describe everything that a reader needs to know while the pictures illustrate the scene described by the words. Picture-specific – opposite of word-specific; the pictures provide all the information that the reader needs while the words highlight certain aspects of the scene being shown. Duo-specific – the same message is portrayed by both words and pictures. Intersecting – both words and pictures make individual contributions to the scene while also working together in certain aspects to create the scene as a whole. Interdependent – neither the words nor the pictures would be able to convey the

same message/idea on their own. Parallel – words and pictures do not seem to support each other or intersect. Montage – words and pictures are combined pictorially within a scene. Interface I1 Features such as button highlights and page turning animations should help users to consolidate kinesthesis without any physical feedback which may affect the performance and comfort of a user (Dix et al., 2004:26). I2 Research of the target audience of the digital graphic novel should be conducted in order for it to cater to their specific requirements, preferences and abilities (Dix et al., 2004:52). I3 The user should be able to determine what is going on and what to do next (Norman, 2002:188). I4 Affordances should made to account for a reader's physical, semantic, cultural and logical constraints (Norman, 2002:84). I5 The structure and design of the interface of a digital graphic novel should be consistent in order to resolve memory problems and promote predictability (Norman, 1983:257; Nielsen & Molich, 1990:249; Shneiderman & Plaisant, 2005:74; Stone et al., 2005:95; Johnson, 2007:8). I6 The interface of a digital graphic novel should cater to universal usability (Shneiderman & Plaisant, 2005:74). I7 The interface of a digital graphic novel should be designed so as so reduce errors (Norman, 1983:257; Shneiderman & Plaisant, 2005:74). I8 The interface of a digital graphic novel should allow for easy reversal of actions (Nielsen & Molich, 1990:249; Shneiderman & Plaisant, 2005:74). I9 The interface of a digital graphic novel should allow users to feel as though they are in control (Shneiderman & Plaisant, 2005:75). I10 The interface of a digital graphic novel should be task-focused and as simple as possible (Nielsen & Molich, 1990:249; Stone et al., 2005:170). I11 There should be a help menu to assist readers in understanding the functions of each interface element (Nielsen & Molich, 1990:249). I12 The content of the interface of a digital novel should be sensibly organised (Stone et al., 2005:170). I13 The interface of a digital graphic novel should enable all intended readers to read it regardless of environmental conditions or handicaps (Stone et al., 2005:177). I14 The interface of a digital graphic novel should be tested on member of the target audience and then altered to accommodate their preferences (Johnson, 2007:48). Sound S1 Sounds used within the novel should fall between the appropriate intensity and frequencies of human hearing while not being too similar or too loud (Dix et al., 2004:24; Te'eni et al., 2007:75). S2 A digital graphic novel should make use of sounds in order to elicit emotions and activate emotional memory in readers (Sprenger, 1999:76; Lutz & Huitt, 2003:6). The categories of 'interface' and 'sound' have been added to the enriched proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics and human-computer interaction principles (Table 5.5). Although these categories are not part of the fundamental requirements of sequential art as given by Eisner (1990:159), they play an important role within the human- computer interaction process and therefore needed to be represented in the enriched proposed guidelines presented in this chapter. 5.7 Conclusion In this chapter, the researcher identified 10 HCI principles that can be applied in the development of a digital graphic novel portraying emotional social phenomena. These principles have been used to enrich the proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics and human-computer interaction principles. The next chapter will focus on emotion – one of the distinguishing factors of humans – and emotional social phenomena. The guidelines given in the previous section will then be further enriched in order to develop a set of guidelines for designing digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles. These enriched guidelines will then be incorporated within the design of the digital graphic novel that takes place within the action planning and action taking phases of this study. This is represented in Figure 5.16. Figure 5.16: Adaptation of the research structure that reflects the role of HCI principles in this study 6 Chapter Six: Emotion 6.1 Introduction The aim of this study is to formulate a set of guidelines to aid in the development of digital graphic novels that will be used to portray emotional social phenomena using critical systems heuristics and HCI principles. In this chapter, the proposed guidelines identified in Chapter 4 and Chapter 5 will be enriched by a literature review of emotion. Although not a human sense like those mentioned in Chapter 5, emotion plays a critical part in the performance of an individual (Preece et al., 1994:150; Dix et al., 2004:51). The researcher believes that in order to develop guidelines for designing digital graphic novels portraying emotional social phenomena, one must understand the terms emotion and emotional social phenomena. Due to the lack of literature surrounding the term emotional social phenomena, emotions and a proposed definition of the term emotional social phenomena will be discussed in Section 6.2. The links between emotion and sight and emotion and sound will be discussed in Section 6.3 and Section 6.4 respectively. Emotions and HCI will be discussed in Section 6.5 and emotions in digital graphic novels will be briefly recapped in Section 6.6. Emotion-enriched guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics and HCI principles will be presented in Section 6.7. The chapter will conclude with a summary and reflection of the chapter (Section 6.8). 6.2 Overview of emotions and emotional social phenomena There are two main approaches that are used to structure emotion – the discrete approach and the dimensional approach. The discrete approach asserts the existence of 'universal emotions' (Plutchik & Kellerman, 1980:3; Ekman, 1992b:169; Izard, 1992:561). According to the literature, these 'universal emotions' are historically evolved basic emotions and, as a result, can be found in all cultures (Ekman, 1992a:550). Although there are several psychologists who have suggested various different basic emotions, there is significant agreement on six basic emotions, namely – sadness, happiness, fear, disgust, anger and surprise (Ekman, 1992b:170; Peter & Herbon, 2006:142). While no distinct patterns for the six basic emotions could be 163 | Chapter 6: Emotion agreed upon, there are several arguments in support of their existence such as their presence in other primates and distinctive facial expressions (Ekman, 1992b:170). In his research, Ekman (1992b:178) found that the facial expressions associated with different emotions were recognised by individuals from varying cultures which enabled him to justify his assertion of 'universal emotions'. The dimensional approach presupposes the existence of two or more major dimensions which have the ability to both describe the various emotions and distinguish between them (Russell, 1980:1161). Theories relating to the dimensional approach to emotion describe emotions by making use of dimensions

instead of distinct categories (Peter & Herbon, 2006:143). The dimensional view of emotions assumes that all emotions are characterised by the dimensions of arousal and valence (Russell, 1983:1286; Peter & Herbon, 2006:143). Although it is understood that arousal and valence are not claimed to be the only two dimensions or deemed able to sufficiently and equally differentiate between the various emotions, they have proven to be the two main dimensions (Russell, 1983:1286). As a result, valence and arousal are referred to in the explanation of the dimensional approach in this study. Russell and Feldman Barrett (1999:805) offer a review of alternative dimensional theories that may also be used. Peter and Herbon (2006:143) agree that there has been a considerable amount of controversy associated with the naming of the two dimensions of the dimensional approach. This is further discussed by Feldman Barrett and Russell (1998:967), but is beyond the scope of this study. Although there have been attempts to merge both the discrete and dimensional approaches by Russell and Feldman Barrett (1999:805), there are still disputes as to which approach best represents the structure of emotion. With this incongruence in the definition of the structure of emotion, it is easy to see why there are various definitions for emotion within the literature (Cabanac, 2002:69). For the purposes of this study, the researcher will categorise emotions as either being positive (e.g. happiness) or negative (e.g. sadness) as proposed by Cacioppo and Gardner (1999:203). In addition, for the purposes of this study, the researcher will make use of the definition supplied by Te'eni et al. (2007:112) which defines emotion as “a core affect that is intentional and directed towards a certain object”. To elaborate on this Chapter 6: Emotion | 164 definition, the word affect can be defined as a set of psychological states and processes which include emotions, moods and attitudes (Te'eni et al., 2007:111). As mentioned earlier, humans have a set of core affects that include feeling sad, satisfied, delighted, etc., which they direct towards other objects – usually other humans, events, conditions or things. For the purpose of this study, we will assume that the object that a human directs his core affect towards is a computer. The concern over how a user feels and reacts when interacting with a particular technological product can be defined as emotional interaction (Rogers et al., 2011:128). Affective quality can be defined as the ability an object possesses in terms of altering the user’s core affect (Te'eni et al., 2007:113). For example, some individuals might find that the rhythm of certain types of music calms them. The affective quality of music in such cases can therefore be defined as its rhythm because a change in the rhythm will result in a change in the individuals core affect. Similarly, the human-computer interface serves as the affective quality of a computer system (Te'eni et al., 2007:113). Research conducted by (Zhang & Li, 2005:107) found affective qualities to be present in both websites and screens, namely – beauty, overview, title, shape, structure, texture, menu, main images and colour. Moon and Kim (2003) further identified two affective qualities of online content – interactivity and vividness. Interactivity can be defined as the extent to which a human can communicate and interact with a computer in real time (Te'eni et al., 2007:114). The factors that influence interactivity are (Te'eni et al., 2007:114): ? The speed of a user’s actions and effects. ? The range of a user’s actions. ? The mapping of a user’s actions to effects. Vividness relates to the richness of the content that is represented within a human- computer interface (Te'eni et al., 2007:114). The influencing factors of vividness are sensory breadth (e.g. auditory and visual aspects) and sensory depth (e.g. the resolution of the screen) (Te'eni et al., 2007:114). Emotion (affect) and cognition interact with and influence each other (Te'eni et al., 2007:119). Humans who are subjected to positive emotions are able to solve complex 165 | Chapter 6: Emotion problems and are more prone to creative thinking, while humans who are subjected to negative emotions tend to engage in more narrow and focused thinking patterns (Preece et al., 1994:150; Dix et al., 2004:51). An example of this would be to imagine writing a test without any time limit and no marking system versus writing a final matric exam. In order to ensure the positive performance of a human user and to adequately adjust the human-computer interface, it is important to understand the effect that emotion has on cognition (Te'eni et al., 2007:119). When a user experiences a sense of anxiety, the attention level of the human drops as it is divided between cognition and the predisposition of attention towards the identified sources of danger (Te'eni et al., 2007:119). Te'eni et al. (2007:119) also state that while positive affects10 of humans positively influence their self-control and ability to recall positive information, negative affects tend to negatively influence the self-control of a human as he interprets ambiguous stimuli as being threatening. The final link between affect and cognition that will be discussed is that of the link between the obsessiveness of a human and the performance of a human. If a human possesses an affect of obsessive behaviour, he may take longer to make decisions and have a degree of insecurity due to his inability to recollect recent events or to distinguish between events that were real or imagined (Te'eni et al., 2007:119). A number of theories regarding emotional design have been developed within the field on interaction design or even introduced from other fields. The goal of these theories is to aid designers in understanding the way in which users may respond or react within different contexts. Understanding this will enable designers to know how to design in order to reduce or increase certain emotions (Rogers et al., 2011:149). A few popular theories regarding emotional design include research by Norman (2005:21), Ortony, Norman and Ravelle (2005:173), Jordan (2000) and McCarthy and Wright (2007). Table 6.1 offers a summary of these popular emotional design theories. Norman (2005:21) states that a user’s emotional attachment and involvement with a product is of equal importance to a product’s ease of use. Furthermore, users are more likely to have a positive experience if they find the look and feel of a product pleasing (Jordan, 2000:13; Norman, 2005:2; Ortony et al., 2005:173). A number of techniques can be used in order to enable a product to feel, sound and look good. These 10 The word ‘affect’ can be defined as a set of psychological states and processes which include emotions, moods and attitudes (Te'eni et al., 2007:111). techniques include clean lines, balance, colour, shape and texture (Rogers et al., 2011:150). Table 6.1: Summary of popular emotional design theories. Author Emotional design theory Emotional design model ? The affective state11 of an individual, whether positive or negative, affects the way the individual thinks. Norman (2005) Ortony et al. (2005) ? Three different levels of the brain interact with and affect each other. o Visceral level – lowest level that responds to events occurring in the physical

world. o Behavioural level – middle level that controls an individual's everyday behaviour. o Reflective level – highest level of the brain where an individual contemplates. ? Designers must incorporate all levels in their design. o Visceral design ensures that the product looks, feels, and sounds good. o Behavioural design ensures that a product is usable. o Reflective design incorporates personal value and meaning that a certain product has in a specific culture. Jordan (2000) Pleasure Model The pleasure model aids designers to be mindful of the different types of pleasure that users experience and to incorporate these into the design of a product. The different types of pleasure are: ? Socio-pleasure – the joy of being in the company of others. ? Physio-pleasure – pleasures linked to sensory events such as sight, touch, smell, sound and taste. ? Psycho-pleasure – the cognitive and emotional reactions of users toward a product. ? Ideo-pleasure – the values of an individual. Similar to reflective design in the emotional design model. 11 Affective state: Refers to emotions, moods and attitudes (Te'eni et al., 2007:111). 167 | Chapter 6: Emotion McCarthy and Wright (2007) Technology as Experience Framework Although experience cannot be defined, it can be broken down into four interrelated threads. The aim of the framework is to aid designers in considering the entire experience of a product rather than a single aspect such as marketability or usability. The four interrelated threads that comprise experience are: ? ? ? Compositional thread – the manner in which an individual makes sense of an experience; the narrative part of an experience. Spatio-temporal thread – the time and space in which experiences take place and the effect of time and space on an experience. Sensual thread – focuses on a user's sensory engagement in a situation. This is similar to the visceral level in the emotional design model. The researcher believes that it is important to keep these techniques in consideration when designing a digital graphic novel portraying emotional social phenomena in order to ensure that the intended user finds it pleasing to work with. This belief is substantiated by a claim made by Picard and Daily (2005:2120) which states that the efficiency of a human-computer interaction (HCI) depends greatly upon the ability of the computer-based application to interpret the affective states of users, to express emotions and to understand the role that the internal and external influences play on effective responses. A key question when considering qualities and experiences with regard to human-computer interaction is whether a user's emotions are legitimate factors in the user's interaction with the technology and, if so, which emotions are of key significance (Schrammel et al., 2006). The researcher believes that in designing digital graphic novels portraying emotional social phenomena, a user's emotions are legitimate factors in the user's interaction with the technology and it is important for the designer to understand the emotions that are of key significance to the emotional social phenomena being covered. As mentioned in the previous section, because of the content that will be represented within the digital graphic novel, it is also important to understand the emotions involved within the emotional social phenomenon in order to correctly portray them to others. The term emotional social phenomenon does not exist in any literature to date, and as a result, the researcher aims to define it by its individual terms: ? Emotional – readily or excessively affected by emotion (Collins English dictionary: complete and unabridged, 2003:537). ? Social – of, relating to, or characteristic of the experience, behaviour and interaction of persons forming a group (Collins English dictionary: complete and unabridged, 2003:1531). ? Phenomenon – any remarkable occurrence or person (Collins English dictionary: complete and unabridged, 2003:1221). Therefore, the researcher proposes that the definition of an emotional social phenomenon should be as follows: the experience, behaviour and interaction of a group of individuals surrounding a remarkable occurrence that is excessively affected by emotion. By the aforementioned definition, emotional social phenomena include racism, sexism, war, the effects of AIDS, etc. The researcher believes that familiarity with the term emotional social phenomenon is vital to the investigation of the emotions surrounding the phenomenon and as a result, to the design of digital graphic novels portraying emotional social phenomena. The following sections will explore the correlation between various factors and emotion. 6.3 Emotion and sight The researcher believes that due to the graphic nature of the digital graphic novel, it is important to understand the emotions associated with an individual's perceptions of colour. Studies conducted by Guilford and Smith (1959:490) investigated colour preferences in individuals with regard to hue, saturation, and brightness. These studies produced the following ranking of hues ranging from least preferred to most preferred: yellow, orange, red, violet, purple, green and blue. Guilford and Smith (1959:502) further found that more saturated and brighter colours tend to elicit greater pleasure from individuals. The relationship between brightness, saturation and pleasure was found to be of a curvilinear nature. Terwogt and Hoeksma (1995:7) maintained that the link between colours and emotions could be rationalised through the basis of colour preferences and emotion preferences. Terwogt and Hoeksma (1995:11) proposed that colours that are highly 169 | Chapter 6: Emotion preferred should be linked to emotions that are highly preferred. On the other hand, colours that are non-preferred should be linked to a non-preferred emotion. Terwogt and Hoeksma (1995:11) state that it is unlikely for a preferred colour to be linked to a non-preferred emotion and vice versa. The results of their research found that in groups of 7- and 11-year-old children colours and emotions that were further apart in terms of preferences (such as the colour black which was least preferred and the emotion happy that was most preferred) were less likely to be combined. However, the research of Terwogt and Hoeksma (1995:12) also revealed that the effect of preference in regard to colours and emotions decreased with age. For example, the most preferred emotion, happiness, was not associated with the most preferred colour, blue, but rather with the colour yellow. Wexner (1954:433) conducted a study that covered the associations adults have between colour samples and words that describe certain types of feelings. In his findings, Wexner (1954:433) reports that the colour red was associated with the words 'exciting' and 'stimulating'. The colour blue was associated with 'secure/comfortable' and 'tender/soothing', while orange was associated with 'disturbing/distressed /upset' and black was associated with 'powerful/strong/masterful'. Weller and Livingston (1988:438) explored the effects of the colour of paper on which text was printed and presented to participants. The text on the paper contained information about murder and rape incidents. The participants were asked to read the text and then describe their emotional reactions to the incidents contained within the text. Weller and Livingston

(1988:438) found that the exact same incidents were deemed less upsetting when described on pink paper as opposed to white or blue paper. Adams and Osgood (1973:135) performed a study that was unlike any that preceded them by investigating the emotional reactions of individuals to colour concepts instead of the emotional and behavioural reactions of individuals to particular colour stimuli. In their cross-cultural study, Adams and Osgood (1973:135) required participants to rate colour concepts such as the words 'green' and 'blue'. The results of the study found that the colour red was strong and active; black was bad, inactive and strong; green and blue were good; yellow was bad and weak; grey was weak, bad and inactive; and white was good and weak (Adams & Osgood, 1973:145). Overall, the study also found that colour itself was deemed both good and active. Research conducted by Valdez and Mehrabian (1994:398) found that individuals experienced colours with greater brightness and saturation to be more pleasant than others. Valdez and Mehrabian (1994:398) also found that individuals experienced colours that were less bright and more saturated to be more emotionally arousing than others were. The study further reported that both men and women responded with exceptionally similar emotional reactions to variations in the brightness and saturation of colours (Valdez & Mehrabian, 1994:407). The research revealed that brighter colours such as whites, light greys or colours that are lighter tend to be experienced as more pleasant, less dominance-inducing and less emotionally arousing than darker colours such as blacks or dark greys (Valdez & Mehrabian, 1994:407). The research conducted by Detenber and Reeves (1996:76) is important for this study, since they found that individuals rate large, still versions of images as more emotionally arousing than small, still versions, small, motion versions and even large, motion versions of an image. The results of the experiment also showed that pictures seen as large images elicited stronger feelings of emotional arousal within individuals than when the same picture was seen as a small image (Detenber & Reeves, 1996:77). As a result of this research, the researcher believes that the correct use of image sizes will have a considerable effect on the impact of the digital graphic novel and should be carefully considered when planning the layout. The researcher believes that the correlation between sight and emotion can play a vital role in the design of a digital graphic novel portraying emotional social phenomena and should therefore be properly understood and incorporated in the design process. 6.4 Emotions and sound Sound can convey a large amount of information to an individual, however, it is rarely used to its full potential within the design of an interface (Dix et al., 2004:23). Dix et al. (2004:24) suggest that sound could be more extensively used in interface design without confining it to warning sounds and notifications. Tajadura-Jiménez and Västfjäll (2008:63) agree with the statement made by Dix et al. (2004:24) and conducted research which showed the potential that sound has in inducing desired emotional states. Juslin and Västfjäll (2008:560) further substantiate these claims by establishing that sounds evoke emotions and can therefore supply affective 171 | Chapter 6: Emotion information with possibly even more effectiveness than various other forms of information channels available to HCI designers and researchers. In their book 'How people treat computers, television, and new media like real people and places', Reeves and Nass (1996) discuss the fact that individuals were found to be considerably more sensitive to audio fidelity than to visual fidelity. This translates into the statement that visual imperfections may be compensated for through the use of sound (Tajadura-Jiménez & Västfjäll, 2008:69). Tajadura-Jiménez and Västfjäll (2008:69) also stated that sound should be considered when planning the design of affective human-computer interfaces. This is because sound has the ability to elicit a full range of emotions in individuals. This claim is substantiated by research conducted by Vastfjall et al. (2012:5) which further showed that intense or arousing emotional experiences complement a user's engagement in media applications. The researcher believes that a proficient understanding of the affective qualities of sound will enable the designer of a digital graphic novel that portrays emotional social phenomena to elicit the intended emotions from the user within each frame and page. This will result in greater user engagement and an improved user experience. 6.5 Emotions and HCI Within almost the last three decades there has been a large movement towards a social and interactional approach to understanding cognition within human-computer interaction (Boehner et al., 2007:276; Fuchs & Obrist, 2010:639; Choi et al., 2015:41). Bearing in mind the prevalence of computers technology in our current everyday lives and the subsequent impact that it has on society, it is important to surpass natural- scientific conceptions of emotions and pay attention to users' actual emotional experiences surrounding technology (Boehner et al., 2007:289). Studies conducted by Choi et al. (2015:49) found that emotional content in computers successfully influence the decision making of individuals by means of two processes – inferential and affective. In the inferential process, the expressions of emotion serve to provide information about the mental states of others. In the affective process, expressions of emotion on a computer serve to elicit emotion in the user. These emotions then impact the decisions made by the user (Choi et al., 2015:49). Finally, research conducted by Rimé et al. (1998:148) found that if an individual experiences a certain emotion that is salient enough for the individual to recall after a few hours, then, almost always, the individual confided or will confide the emotional experience to one or more other individuals. The researcher believes that properly designing a digital graphic novel portraying emotional social phenomena will enhance its ability to influence the decision making of the intended audience. In addition, if the emotional experience elicited from the user through the digital graphic novel is salient enough, the user will most likely tell others about the digital graphic novel, which will serve to increase awareness of the emotional social phenomenon that it addresses. 6.6 Emotions in digital graphic novels As discussed in Chapter 4, emotions can be graphically represented within the design of a digital graphic novel. The correlations between the design of a digital graphic novel and its role on emotion discussed in this study can be briefly summarised in the following statements: ? Frames can be used to portray a visual perspective of the emotional climate within which a certain action occurs (Eisner, 1990:46). The variation of shape or treatment of frames can also generate emotional involvement from the reader (Eisner, 1990:59). ? According to McCloud (2011:118), pictures can also evoke an emotional response as depicted in Figure 4.6 (Chapter 4). In fact, according to Eisner (1990:13), the failure or success of communicating through pictures lies within the ease with which

the reader is able to recognise both the meaning and emotional impact of the selected image. ? The inner life of a character contains a character's life history which should help the reader emotionally connect with the character while also providing a platform from which differences in life experiences of the character and other characters can elicit stories worth being told (McCloud, 2011:65). ? Facial expressions in comics are important in order for the comic artist to portray the emotions of the characters to the readers as well as to provoke emotions in the readers themselves (McCloud, 2011:81). The researcher believes that it is important to understand the correlation between the design of a digital graphic novel and its role on emotion due to the content that will be contained within a digital graphic novel portraying emotional social phenomena. In the following section, the aforementioned correlations between emotion and sight, sound, HCI and digital graphic novels will be used to enrich the guidelines for creating digital graphic novels portraying emotional social phenomena given in Chapter 5. 6.7 Emotion-enriched principles for creating digital graphic novels portraying emotional social phenomena The investigation of emotion and emotional social phenomena presented in this chapter yielded many new factors that should be considered when creating a digital graphic novel portraying emotional social phenomena. To incorporate this new information, Table 6.2 presents an emotion-enriched set of guidelines for creating digital graphic novels portraying emotional social phenomena using HCI principles. Table 6.2: Proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical systems heuristics and HCI principles. Narrative N1 The author should determine the emotions, worldviews and the purpose for developing the narrative (McCloud, 1994:170). N2 The author should make readers care about the narrative either by the content itself or through the intensity of its presentation (McCloud, 2011:53). N3 The author should exploit the common experiences or heritage of the target group of the digital graphic novel to provoke emotions such as suspense, sadness and joy (McCloud, 2011:150). N4 Complex information should not be presented in the narrative (Lutz & Huitt, 2003:3). N5 A goal of the narrative should be to elicit a sense of meaningfulness from the reader (Lutz & Huitt, 2003:3). N6 The narrative text should be presented as concise sentences and not paragraphs (Dix et al., 2004:30). N7 The narrative should be well-written in order to elicit emotions and activate emotional memory in readers (Sprenger, 1999:76; Lutz & Huitt, 2003:6). Character C1 Characters should engage in novel and attention-grabbing conflicts with themselves, other characters and the world around them McCloud (2011:150). C2 Characters should be designed as believable and vivid human beings beings (McCloud, 2011:62). C3 Facial expressions of a character should be used to portray a character's emotions to the reader as well as to elicit emotions from the reader (Eisner, 1990:111; McCloud, 2011:81). C4 A combination of and variation in the six basic emotional expressions should be used to represent more complex or intense emotions (McCloud, 2011:84). C5 The body language of the character should be used to communicate the emotions of a character (Eisner, 1990:113; McCloud, 2011:103). Pages and panels P1 Panels that enable the reader to easily follow the narrative should be used (McCloud, 2011:12). P2 Each panel should lead to and support the next (Eisner, 1990:25; McCloud, 2011:14). P3 The specific moment that is represented within a panel should serve to elicit emotions from readers or to portray emotion to readers (Eisner, 1990:46). P4 Movement represented in panels should be one of six different types as given in literature (McCloud, 1994:70; McCloud, 2011:15). Moment-to-moment – series of moments portrays a single action. Action-to-action – series of actions of a single subject (person, object, etc.). Subject-to-subject – single scene with changing subjects. Scene-to-scene – moments that transition over significant distances of space or time. Aspect-to-aspect – moments transition from one aspect of a mood, place or idea to another. Non-sequitur – series of seemingly unrelated images and/or words. P5 Frames should guide the reader's focus to aspects that are important to the narrative (McCloud, 2011:20). P6 The variation of the look-and-feel of panels should be manipulated in order to elicit specific emotions from readers (Eisner, 1990:46). P7 The flow of the digital graphic novel should adhere to the standard that readers will read frames from left-to-right and then top-to-bottom (Eisner, 1990:41; McCloud, 2011:32). P8 By making use of the familiarity principle depth of field can be simulated within the digital graphic novel (Dix et al., 2004:18). P9 The thickness of lines and spaces between lines in the digital graphic novel should not fall outside an individual's ability to perceive it (Dix et al., 2004:17). P10 Luminance increases an individual's visual acuity (Dix et al., 2004:17). P11 By varying the brightness, size and depth of images within the digital graphic novel, a 2- dimensional image can be projected as a 3-dimensional image within the digital graphic novel (Preece et al., 1994:83). P12 The text in the digital graphic novel should not be written in capital letters in order to promote legibility and accuracy in reading (Dix et al., 2004:22). P13 Negative contrast (e.g. black text on a white background) should be used to increase the legibility of the text in a digital graphic novel (Dix et al., 2004:23). Artwork A1 The artist should decide on images that brings the narrative to life for the reader (Eisner, 1990:89; McCloud, 2011:26). A2 Images should communicate the narrative clearly and compellingly (McCloud, 2011:26). A3 Pictures should be used to evoke specific emotions or sensual responses from readers in order to increase immersion within the narrative (McCloud, 2011:118). A4 Images should be combined with narrative text in seven distinct categories as given in McCloud (1994:153) and McCloud (2011:130). Word-specific – words describe everything that a reader needs to know while the pictures illustrate the scene described by the words. Picture-specific – opposite of word-specific; the pictures provide all the information that the reader needs while the words highlight certain aspects of the scene being shown. Duo-specific – the same message is portrayed by both words and pictures. Intersecting – both words and pictures make individual contributions to the scene while also working together in certain aspects to create the scene as a whole. Interdependent – neither the words nor the pictures would be able to convey the same message/idea on their own. Parallel – words and pictures do not seem to support each other or intersect. Montage – words and pictures are combined pictorially within a scene. Interface I1 Features such as button highlights and page turning animations should help users to consolidate kinesthesis without any physical feedback which may affect the performance and comfort of a user (Dix et al., 2004:26). I2 Research of the target audience of the digital graphic novel should be conducted in order for it to cater to their specific

requirements, preferences and abilities (Dix et al., 2004:52). I3 The user should be able to determine what is going on and what to do next (Norman, 2002:188). I4 Affordances should made to account for a reader's physical, semantic, cultural and logical constraints (Norman, 2002:84). I5 The structure and design of the interface of a digital graphic novel should be consistent in order to resolve memory problems and promote predictability (Norman, 1983:257; Nielsen & Molich, 1990:249; Shneiderman & Plaisant, 2005:74; Stone et al., 2005:95; Johnson, 2007:8). I6 The interface of a digital graphic novel should cater to universal usability (Shneiderman & Plaisant, 2005:74). I7 The interface of a digital graphic novel should be designed so as so reduce errors (Norman, 1983:257; Shneiderman & Plaisant, 2005:74). I8 The interface of a digital graphic novel should allow for easy reversal of actions (Nielsen & Molich, 1990:249; Shneiderman & Plaisant, 2005:74). I9 The interface of a digital graphic novel should allow users to feel as though they are in control (Shneiderman & Plaisant, 2005:75). I10 The interface of a digital graphic novel should be task-focused and as simple as possible (Nielsen & Molich, 1990:249; Stone et al., 2005:170). I11 There should be a help menu to assist readers in understanding the functions of each interface element (Nielsen & Molich, 1990:249). I12 The content of the interface of a digital novel should be sensibly organised (Stone et al., 2005:170). I13 The interface of a digital graphic novel should enable all intended readers to read it regardless of environmental conditions or handicaps (Stone et al., 2005:177). I14 The interface of a digital graphic novel should be tested on member of the target audience and then altered to accommodate their preferences (Johnson, 2007:48). Sound S1 Sounds used within the novel should fall between the appropriate intensity and frequencies of human hearing while not being too similar or too loud (Dix et al., 2004:24; Te'eni et al., 2007:75). S2 A digital graphic novel should make use of sounds in order to elicit emotions and activate emotional memory in readers (Sprenger, 1999:76; Lutz & Huitt, 2003:6). Emotion E1 The six basic emotions sadness, happiness, fear, disgust, anger and surprise are universal, can be found in all cultures (Ekman, 1992b:170; Ekman, 1992a:550; Peter & Herbon, 2006:142) and should be incorporated into the characters of a digital graphic novel. E2 The designer should pay attention to the affective qualities of the beauty, overview, title, shape, structure, texture, menu, main images and colour of websites and screens (Zhang & Li, 2005:107). E3 The look and feel of the digital graphic novel should be pleasing to the reader in order to attain a positive user experience. (Jordan, 2000:13; Norman, 2005:2; Ortony et al., 2005:173). E4 The designer should make use of clean lines, balance, colour, shape and texture to enhance the look and feel of the digital graphic novel (Rogers et al., 2011:150). E5 More saturated and brighter colours should be used to elicit greater pleasure from readers (Guilford & Smith, 1959:502). E6 Colours which are highly preferred should be linked to emotions which are highly preferred and vice versa (Terwogt & Hoeksma, 1995:11). Hues ranging from least preferred to most preferred are yellow, orange, red, violet, purple, green and blue (Guilford & Smith, 1959:490). E7 Colours should be associated with concepts such as (Wexner, 1954:433; Adams & Osgood, 1973:145): 1. Red = exciting, stimulating, strong, active 2. Blue = secure, comfortable, tender, soothing 3. Orange = disturbing, distressed, upset 4. Black = powerful, strong, masterful, bad E8 Colours that are less bright and more saturated should be incorporated as they are more emotionally arousing than others (Valdez & Mehrabian, 1994:398). E9 Large, still versions of images should be used as they are more emotionally arousing than small, still versions, small, motion versions and even large, motion versions of an image (Detenber & Reeves, 1996:77). E10 Sounds should be used to supply further affective information to and elicit emotions from readers (Juslin & Västfjäll, 2008:560). E11 Visual imperfections should be compensated for through the use of sound (Reeves & Nass, 1996; Tajadura-Jiménez & Västfjäll, 2008:69). E12 The designer, artist and author of a digital graphic novel portraying emotional social phenomena should strive to make a reader experience emotion salient enough for the reader to confide the emotional experience to others (Rimé et al., 1998:148). E13 Frames should be used to generate emotional involvement from the reader and portray a visual perspective of the emotional climate within which a certain action occurs through the variation of shape or treatment of frames (Eisner, 1990:46). E14 Pictures used within a digital graphic novel portraying emotional social phenomena should evoke an emotional response (McCloud, 2011:118). E15 The reader should be able to recognise both the meaning and emotional impact of the selected image used within a digital graphic novel portraying emotional social phenomena Eisner (1990:13). E16 The inner life of a character contains a character's life history which should help the reader emotionally connect with the character while also providing a platform from which differences in life experiences of the character and other characters can elicit stories worth being told (McCloud, 2011:65). E17 Facial expressions in comics are important in order for the comic artist to portray the emotions of the characters to the readers as well as to provoke emotions in the readers themselves (McCloud, 2011:81). 6.8 Summary The all-encompassing goal of human-computer interaction can be defined as the development of products that elicit positive emotional responses from their users (Rogers et al., 2011:127). These responses include a feeling of comfort and pleasure from using the product. Human-computer interaction designers concern themselves with a product's ability to elicit the intended emotional responses from the user, such as the motivation of users to be creative or social (Rogers et al., 2011:127). Emotions and emotional social phenomena have been discussed in Section 6.2 of this study. The correlation between emotions and other subjects such as sight, sound, HCI and digital graphic novels were explored in Section 6.3, 6.4, 6.5 and 6.6 respectively. The relationships discovered in the aforementioned sections were used to enrich guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics and HCI principles, which are presented in Section 6.7. Within this study, the researcher will attempt to use the aforementioned guidelines in order to elicit emotions from the user that correlate with the content discussed within a digital graphic novel portraying an emotional social phenomenon. The next chapter will report on the Diagnosis phase of the study. As seen in Figure 6.1, this phase is the first phase of the action research cycle and will assist the researcher in identifying which stories told by the ex-political prisoners should be included in the digital graphic novel. Figure 6.1: An adaptation of the action research cycle (Baskerville, 1999:14) and the design science research process (Peffers et al.,

2006:93) to represent the research structure of this study. 7 Chapter Seven: Diagnosis 7.1 Introduction The objective of the research conducted in this study is to develop guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics and human-computer interaction principles. This chapter reports on the diagnosis phase of the action research cycle adopted in this study. The purpose of this chapter is to explore the various stories and experiences of Robben Island Prison that ex-political prisoners believe should be included in the digital graphic novel. Section 7.2 presents an initial reflection on the 12 boundary questions developed by Ulrich (1987:279). As a result of the boundary reflection and to involve the identified affected parties in the digital graphic novel, the ex-political prisoners were invited to participate in the process. Data was collected through focus groups and an interview held with ex- political prisoners of Robben Island Prison. The data collection process will then be reported in Section 7.3.1. Data analysis will be discussed in Section 7.3.2 according to the various phases of the content analysis process. The conclusions that are gained from the coded data will be presented in Section 7.4. This chapter will conclude with a summary that is presented in Section 7.5. 7.2 Initial answers to boundary questions In Chapter 3, the researcher answered Ulrich's 12 boundary questions that served to represent the researcher's perspective of the study as a whole. The researcher felt that by identifying the boundary judgements held by the researcher, the study could be conducted in both a fair and unbiased manner. Table 3.3 contains the researcher's answers to the 12 boundary questions as given by Ulrich. These answers are mapped to the phases in the research cycle. We will discuss each answer to the boundary questions in Table 3.3 in the following sections. 7.2.1 Sources of motivation As discussed in Chapter 3, the first three questions as given by Ulrich deal with the sources of motivation – the question of where the sense of purposefulness and value Chapter 7: Diagnosis | 180 of a system comes from. The first question in Table 3 addresses who ought to be the clients (or beneficiaries) of the system. The researcher believes that there are two beneficiaries of the digital graphic novel being developed in this study. Firstly, the ex- political prisoners are also beneficiaries of the digital graphic novel as they are granted a medium through which they can make their stories heard. Secondly, the young adults are beneficiaries as they will be able to learn about an important part of South Africa's history through a medium that they find interesting. The second question relating to the source of motivation addresses what the purpose of the system ought to be. In other words, what should the system achieve in order to serve the beneficiaries? In order to benefit the ex-political prisoners, the digital graphic novel should serve as a fair representation of their experiences in Robben Island Prison. The researcher believes that the two aforementioned goals can be achieved through the formulation of design guidelines for the development of digital graphic novels that portray emotional social phenomena. The final question pertaining to sources of motivation addresses what measure of success ought to be used on the system. Due to the fact that one of the purposes of digital graphic novels is to be a fair representation of the experiences of ex-political in Robben Island Prison, another measure of success should be the degree to which the experiences of the ex-political prisoners are fairly related. Similarly, because the digital graphic novel should be an exciting medium for young adults, the researcher believes that one measure of success should be the level of satisfaction of the readers of the target audience. Finally, because of the purpose of the formulation of design guidelines for the development of digital graphic novels that portray emotional social phenomena, the researcher believes that the final measure of success should be the appropriate application of CSH and HCI principles in the development of a digital graphic novel. This will correctly portray emotional social phenomena while providing an engaging medium through which readers can learn about emotional social phenomena. 7.2.2 Sources of control The next set of questions presented by Ulrich deals with the sources of power or control. These questions are aimed at identifying who is in control of what is going on 181 | Chapter 7: Diagnosis and what is needed for a system's success. The first question in this set discusses who ought to be the decision taker and therefore have the power to change the measure of improvement of a system. The researcher believes that there are multiple owners of the digital graphic novel that is constructed in this study. Firstly, a representative of the Mandela27 project team will be considered as an owner, as the digital graphic novel being developed will have to correlate with the aims and objectives of the project as a whole. Secondly, the ex-political prisoners will be considered owners because they will contribute to the content of the digital graphic novel. A representative of ex-political prisoners of the general cells will be selected as an owner, as well as a representative of ex-political prisoners of maximum-security cells. This is due to the fact that the experiences of ex-political prisoners in general cells may differ from the experiences of those in maximum-security cells. The researcher believes that in order for a fair portrayal of the experiences in Robben Island Prison to be related, it is important to consider both types of ex-political prisoners of Robben Island Prison. Finally, the researcher believes that she will be an owner of the digital graphic novel, as she will be responsible for the appropriate application of CSH and HCI principles in the development of a digital graphic novel to correctly portray emotional social phenomena and to provide an engaging medium through which readers can learn about emotional social phenomena. The second question in the 'sources of control set' discusses what components of the system should be controlled by the decision taker. The representatives of the ex- political prisoners will be responsible for making recommendation for the content of the storyline of the digital graphic novel. The representative of the Mandela27 team will ensure that the look-and-feel of the digital graphic novel ties in with the Mandela27 project as a whole while also providing additional content for the digital graphic novel. Once the digital graphic novel is completed, the Mandela27 representative will be responsible for the implementation of the digital graphic novel as per the Mandela27 project plans. Lastly, the researcher will be responsible for the design of the digital graphic novel as a whole, which will include the co-ordination of the programming, artwork, sound recordings, project management and storyline. The final question regarding the sources of control addresses what resources and conditions should be part of the system's environment and subsequently not controlled Chapter 7: Diagnosis | 182 by the decision taker. The timeline being addressed in the Mandela27 project as a whole is beyond the control of any of the aforementioned

decision takers and is therefore considered part of the environment. Furthermore, the accounts given by the ex-political prisoners cannot be controlled by the Mandela27 representative, the researcher and her supervisors, and to a certain degree, the ex-political prisoners themselves. Therefore, the account of the ex-political prisoners is also considered as part of the environment. Finally, the project deadlines of the Mandela27 project will also be considered as part of the environment as they are beyond the control of all of the decision takers. 7.2.3 Sources of expertise The third set of questions proposed by Ulrich deals with what experiences and expertise support the claims made in the system. The first question posed in this set addresses who should be involved as the designer of the system. The researcher believes that she will be the designer of the system as it will be her responsibility to incorporate all the ideas of the clients into the digital graphic novel. The second question deals with the kind of expertise that should flow into the design of the system. This addresses who should be considered as an expert and what the role of the expert should be. The researcher believes that she should be considered as an expert because of the current research study and the resulting formulation of design guidelines for the development of digital graphic novels that portray emotional social phenomena. The roles of the researcher will then be to develop a storyboard for the digital graphic novel, as well as co-ordinate and manage the development of the digital graphic novel. Programming is also necessary in the development of a digital graphic novel as it is not a collection of static pages, but rather a compilation of various coding techniques. Therefore, the programmer of the digital graphic novel should also be considered as an expert as he is responsible for ensuring that the coding structure of the digital graphic novel delivers a fully-working and stable product. Due to its digital nature, it is important for the digital graphic novel to abide by HCI principles. As a result, an HCI scholar should be included in the design of the digital graphic novel in order to ensure that the final product does not violate any HCI principles and is a usable product. Due to the graphic nature of a digital graphic novel, it is important to bear the artwork in mind during the design of a digital graphic novel. 183 | Chapter 7: Diagnosis Therefore, an artist should be considered as an expert whose role is to provide the artwork that adequately represents the content of the storyboard of the digital graphic novel. When dealing with emotional social phenomena that occurred during an important part of a country's history, it is very important to ensure that all the facts and statements incorporated into the storyline are accurate and a true representation of actual events. For this reason, the researcher believes that a historical consultant should be considered an expert and should be incorporated in the design of the digital graphic novel. The responsibility of the historical consultant will be to validate the events and experiences incorporated into the storyline. The final question relating to the sources of expertise in a system addresses where the designer of the system will seek the guarantee that the system will be implemented and prove successful according to the previously defined measures of success. The researcher believes that the guarantee that the digital graphic novel will be implemented and distributed will be offered by the Mandela27 project team. This is due to the fact that the digital graphic novel forms part of the Mandela27 project as a whole which, once completed, will be hosted online and displayed at various museums and libraries around the world. The correct use of CSH will also guarantee that the experiences of the ex-political prisoners will be accurately portrayed in the storyline of the digital graphic novel and should therefore be considered a guarantor. Similarly, the appropriate application of HCI principles should also be considered as a guarantor of the success of the digital graphic novel. Another factor that will serve a guarantor of the digital graphic novel is the social relevance of the subject matter. In the instance of the Mandela27 digital graphic novel, the history of South Africa coupled with the struggles experienced by others in a similar position as Nelson Mandela during the identified period will serve as a guarantor of the success of the digital graphic novel. Finally, the researcher believes that another guarantor of the digital graphic novel will be the renewed popularity of the comic book medium amongst the young adults of today. 7.2.4 Sources of legitimation The final set of questions given by Ulrich deal with where the legitimacy of the system lies. The first question in this set addresses who among those affected should be involved in the development of the system. The researcher believes that the historical Chapter 7: Diagnosis | 184 consultant should also be involved as an additional source of legitimation to the stories related by the ex-political prisoners. In addition to this, researcher believes that the ex- political prisoners representing both those who were in imprisoned in the general cells and those who were in the maximum security cells should be involved in the development of the digital graphic novel. This is to ensure that the experiences common to all ex-political prisoners of Robben Island prison are accurately portrayed in the digital graphic novel. The researcher believes that members of the target audience of the digital graphic novel should be included in the development of the digital graphic novel. Members of the target audience should be involved in order to offer recommendations for the design of the digital graphic novel. These recommendations can be incorporated into the final design in order to ensure that the completed digital graphic novel is appealing to its target audience. The second question relating to legitimation addresses the degree and manner in which the affected will be given a chance of emancipation from those who are involved. Through the involvement of the historical consultant and representatives of the ex- political prisoners, the ex-political prisoners will have their stories accurately portrayed through the storyline of the digital graphic novel. Through the involvement of members of the target audience, the users will receive an engaging medium that provides a larger enjoyment factor than the use of mere textbooks or the plain printed word. The final question relating to the sources of legitimation addresses the world-views upon which the design of a system is based. There are four world-views incorporated in to the design of the Mandela27 digital graphic novel one guiding world-view that directs the design as a whole. The first world-view is that that the Mandela27 digital graphic novel will relate the stories of the ex-political prisoners to the rest of the world. This is as a result of the digital graphic novel being placed online and being made available all over the world. The second world-view is that young adults want to learn about historical events in an engaging way. This world-view stems from a review of literature conducted in Chapter 4 as well as observation of current trends amongst the youth. The third world-view is that digital graphic novels may be used in the education of young people

regarding emotional social phenomena. A review of the literature conducted in Chapter 4 found that graphic novels are an effective medium for relating more 'adult' topics in a manner in which young adults will be able to relate to – for example, Maus (Spiegelman, 1986) which deals with the plight of those who lived through the Holocaust. 7.3 Research design – Diagnosing phase The diagnosis phase is the first phase of the action research cycle. In this phase, the researcher hopes to determine the core elements that the ex-political prisoners found important to relay in their stories about the emotional social phenomenon they experienced. This phase implements the first principle of the design of a narrative of a digital graphic novel (N1 in Table 6.1), which states that the author should determine the emotions, worldviews and the purpose for developing the narrative (McCloud, 1994:170). The researcher will attempt to achieve this by conducting focus groups and an interview with ex-political prisoners from both the general and maximum-security sections of Robben Island Prison. The literature review conducted in Chapter 2 guided the researcher in further understanding the data that is collected through the interpretive methods. At the end of this phase, the researcher will identify themes in the data that should be included in the design of a digital graphic novel portraying emotional social phenomena. 7.3.1 Data collection Prior to the commencement of this research study, the Mandela27 project team held discussions with ex-political prisoners of Robben Island Prison to ascertain key factors of prison life during incarceration on Robben Island. These discussions were organised by the Robben Island Museum, a collaborative partner in the Mandela27 project. The discussions were held by the lead partner of the Mandela27 project, Coventry University. A delegation from Coventry University met with the ex-political prisoners to discuss their world-views of life in Robben Island Prison in order to develop a scope for the project. At the end of these discussions, the Mandela27 project team were able to isolate the five key factors listed in Table 7.1. Table 7.1: Key factors of prison life during incarceration in Robben Island Prison. Code Key factor F1 Prisoners were not allowed to see children under the age of 16, as they were not allowed on the island. F2 The importance that prisoners attached to physical activity in order to keep their bodies healthy. F3 The extent in which communication to their loved ones was censored and how this drove the prisoners to smuggle documents and other notes to the outside world. F4 The fact that they made use of hunger strikes to rally for better prison conditions and basic human rights in the island prison. F5 The struggle for obtaining the right to education and how the older prisoners made use of their sessions of hard labour at the quarries to educate (even teaching them to read and write) the younger ones. The researcher formulated questions for the focus groups and interview based on the aforementioned key factors. The questions were designed to help the researcher gain a better understanding of the events and experiences that resulted in the above- mentioned factors. In addition to the key factors, the researcher also structured the questions around principles regarding the narrative and characters in digital graphic novels identified in Chapter 4. The principles incorporated in the structuring of the questions are given in Table 7.2. Table 7.2: Principles for the design of the narrative and characters in a digital graphic novel. Narrative N1 The author should determine the emotions, worldviews and the purpose for developing the narrative (McCloud, 1994:170). N2 Make readers care about the narrative either by the content itself or through the intensity of its presentation (McCloud, 2011:53). N3 Exploit the common experiences or heritage of the target group of the digital graphic novel to provoke emotions such as suspense, sadness and joy McCloud (2011:150). Character C1 Characters should engage in novel and attention-grabbing conflicts with themselves, other characters and the world around them McCloud (2011:150) C2 Characters should be designed as believable and vivid human beings (McCloud, 2011:62). By applying the aforementioned principles to the identified key factors, the researcher was able to structure questions that not only addressed the key factors, but also defined elements that would be crucial to the narrative and character development in the digital graphic novel. All questions posed to the participants are given in Table 7.3 alongside which key factor and/or principles they are derived from. Table 7.3: Questions posed to the participants of the focus groups and interviews. Question posed to participants Factor Principle 1 What was the process leading to your imprisonment? N1, N2, N3, C1, C2 2 What was the sequence of events from arriving at the harbour to being assigned a cell? N2, C1, C2 3 Were you allowed to see your children while you were in Robben Island Prison? F1 N1, N2, N3, C1, C2 4 What types of punishments were there in Robben Island Prison? N1, N2, N3, C1 5 Were there any punishments relating to meals? F4 N2 6 Where would you eat your meals? N2, C2 7 Did you ever take part in any hunger strikes? F4 N2, C1 8 Was it common to have hunger strikes in Robben Island Prison? F4 N2, C1 9 Did you have to wake up at a specific time? N2, C2 10 Were you discriminated against with regard to the meal card? F4 N1, N2, N3 11 How was information passed around the prison? N1, N2, C1 12 When were lawyers allowed to visit you in prison? F3 N2, C1 13 Besides individual exercise, were there any team sports played in the prison? F2 N2,C2 14 Was there education in Robben Island Prison? F5 N1, N2, C2 15 What was the motivation for educating fellow inmates? F5 N2, C1, C2 16 Did you experience censorship of letters? F3 N2, N3 C1, C2 As presented in Table 7.3, some questions were not directly related to the identified key factors discussed earlier. These questions were required to assist the researcher in composing a narrative that was both interesting to the reader and historically accurate. The development of believable and relatable characters also influenced the researcher's decision not base questions solely on the identified key factors. Due to the limited availability of the participants, subsets of the questions given in Table 7.3 were posed in the focus groups and interviews. 7.3.1.1 Process and participants Once the researcher had structured and finalised the questions, interviews with the ex-political prisoners were held at the Robben Island Museum in order to provide the ex-political prisoners with an opportunity to tell their stories about their experiences around the period of their incarceration in Robben Island Prison. The process followed for the focus groups and interview is given in Section 7.3.1.2 and the details of the participants are given in Section 7.3.1.3. 7.3.1.2 Focus groups and interview process The focus groups and interview were held in a venue at the Robben Island Museum in the Victoria and Alfred Waterfront development in Cape Town as this was the most central location for all participants. These meetings were held in the initial stages of the Mandela 27 project and were not

facilitated by the researcher but a representative of the Mandela27 project using the guidelines and questions formulated by the researcher. Most of the participants worked at the museum and agreed to take part in the focus groups or interview while they were on lunch or whenever they had an opening in their schedule. The focus groups and interview were open-ended and semi-structured, which allowed the participants to discuss and digress from the posed questions. This resulted in the facilitator not having sufficient time to ask all the questions listed in Table 7.3 in each focus group and interview. To compensate for this, the facilitator asked a subset of the listed questions at each focus group or interview. For example, if the participants of the first focus group answered Question 1, 2, 3 and 4, the facilitator omitted these in the subsequent focus group and interview. Although this method may be unconventional, the researcher believes that it was important to allow the participants to speak freely about all ideas and experiences pertaining to the question. By doing so, the researcher is able to achieve a richness in the data rather than a rushed answer by each participant. If the facilitator felt that a certain topic was not sufficiently discussed, the same question would be posed to another group or individual to further enrich the data. The researcher found that in the focus groups additional questions were asked amongst the participants. The facilitator allowed the participants to discuss these questions and their answers amongst themselves. The researcher believes that this greatly contributed towards the richness of the data. These questions and their answers proved extremely helpful in the developing of the storyline. 7.3.1.3 Participant detail The participants involved in this study preferred to remain anonymous, as they believe that openly speaking about such a sensitive topic may result in animosity amongst their peers. For the purposes of this study, five ex-political prisoners referred to as P1 –P5 were involved in the data collection. Most of the ex-political prisoners were hesitant to talk about their experiences, which resulted in the small number of participants. To further substantiate the stories of the ex-political prisoners, a senior employee of the Robben Island Museum in the role of a historical consultant was also included in the focus groups referred to as P6. The details of the participants of the focus groups and interviews are given in Table 7.4. The age and year imprisoned of each participant is given in the form of ranges in order to preserve anonymity. The details of the participants may assist in clarifying an individual's answers as not all of the participants were imprisoned during the same period. It is also important to note that one of the participants (P1) was incarcerated in the maximum-security prison. This participant offered valued insight into some concepts that the other participants did not address and vice versa. Although there was only one representative of the ex-political prisoners of Robben Island Prison, the researcher believes that it is important to elevate his story to hold the same importance as those who served their time in the general cells. From a critical systems heuristics approach, this is an example of involving a person from a specific group of affected people. Unfortunately, P1 was not available during the times of the focus groups and therefore an individual interview was conducted with P1. The interview with P1 was conducted prior to the focus groups. There were two focus groups. The first focus groups contained three prisoners (P2 – P4) and the historical consultant (P6). The second focus group consisted of one ex-political prisoner (P5) and the historical consultant (P6). It was decided to view this meeting as a focus group since the consultant gave rich information in the discussion of the questions. Table 7.4: Details of participants of focus groups and interview. Atlas.ti Doc Reference Document Name Age Year Imprisoned P1 Interview 55-60 1975-1980 P2 Focus Group 1 55-60 1985-1990 P3 Focus Group 1 45-50 1985-1990 P4 Focus Group 1 50-55 1980-1985 P5 Focus Group 2 55-60 1975-1980 P6 Focus Group 1 Focus Group 2 50-55 Not applicable 7.3.2 Data analysis The content analysis of the data collected in the focus groups and interview will be analysed in a directed manner. The number of theories on a phenomenon may be limited and may increase upon further study. Directed content analysis focuses on the description and validation of theories on a phenomenon (Hsieh & Shannon, 2005:1279). The textual analysis of the data in this study will by cyclic in nature. In this study, the whole body of text that will be analysed will be the focus groups and interview. The parts of this whole will be the questions, separate focus group or a participant's response. By understanding each of these individual parts, the researcher will be able to gain a better understanding of the text as a whole. Therefore, the mode of textual analysis that will be used in this study is hermeneutics. The data analysis in this study took place according to the eight step process of performing content analysis as proposed by Zhang and Wildemuth (2009:3). Table 7.5 provides an overview of the eight steps proposed by Zhang and Wildemuth (2009:3) as well as how each step has been applied in this research. Table 7.5: Adapted summary of the content analysis process as summarised from Zhang and Wildemuth (2009:3). 1. Prepare the Data This step was completed by transcribing the focus groups and interview and removing any identifying data as discussed in Section 7.3.2.1. 2. Define the unit of analysis The chosen unit of analysis for this research is response per participant per question as discussed in Section 7.3.2.2. 3. Develop categories and a coding scheme Key factors isolated by the Mandela27 project team (Table 7.2) were combined with principles for the design of the narrative and characters in a digital graphic novel (Table 7.3) in order to develop the questions asked in the focus groups and interview. The bulk of the categorisation of the data takes place during the coding phase discussed in Section 7.3.2.5. 4. Test your coding on a sample of text One focus group was coded as an initial sample. An excerpt of this sample is presented in Section 7.3.2.4. 5. Code all the text The other focus group and interview were then coded. A summary of all codes is given in Section 7.3.2.5. 6. Assess your coding consistency The coding consistency was assessed by applying newer codes to the entire body of text. The researcher also merged codes that had very similar meanings. In a further attempt to prevent inconsistency, the researcher grouped the codes into code families according to the topics to which they were related. 7. Draw conclusions Once the codes were grouped into code families, the researcher from the coded data isolated themes, which are further discussed in Section 7.4. 8. Report your method and findings Chapters 2, 7 and 8 serve as the report of the methods and findings. This section covering data analysis will discuss steps 1 through 6 of Table 7.5. Step 7 will be discussed in Section 7.4 titled "Conclusions from the data" and step 8 will be discussed in Chapter 10. 7.3.2.1 Prepare the data The first of the eight steps proposed by Zhang and Wildemuth (2009:3) was completed as described in Table 7.5

and discussed in Section 7.3.1. The focus groups and interview were transcribed and edited in order to ensure that no identifiable data was present in any of the responses. The transcriptions of the focus groups and interview do not contain any changes in terms of grammar or colloquialisms in an attempt to make the environment of the focus groups and interview transparent to the reader. Chapter 7: Diagnosis | 192 7.3.2.2 Define the unit of analysis The next step in the data analysis process was to define a unit of analysis. This step corresponds to Step 2 in Table 7.5. Due to the fact that not all questions were asked to all participants as well as the fact that not all participants were imprisoned in the same section, the researcher will analyse each answer with respect to the other answers given by the participants and the general discussion in the focus group. This process is supportive of the interaction ideas of hermeneutics. 7.3.2.3 Develop categories and a coding scheme As discussed in Section 7.3.1, the Mandela27 project team held discussions with ex-political prisoners of Robben Island Prison. As a result of these discussions, the Mandela27 project team isolated five key factors present in the world-views of the ex- political prisoners regarding incarceration in Robben Island Prison. Principles regarding the narrative and characters in digital graphic novels identified in Chapter 4 and discussed in 7.3.1 were applied alongside the key factors to develop questions for the focus groups and interviews. Although the key factors and principles regarding the narrative and characters in digital graphic novels served as categorisation of the questions, final categories can only be developed once the content analysis was completed. 7.3.2.4 Test your coding scheme on a sample of text As directed content analysis in being used, the text is coded in a directed approach according to the selected unit of analysis. The chosen unit of analysis is response per participant per question. In order to test the directed coding method, the one focus group was coded. Due to the fact that not all participants answered the same questions, the researcher tested the coding scheme on the responses of a participant to a particular question. Code Excerpt 1 demonstrates the coding of P3's response to P6's question of P3's experience of Jetty One. Code Excerpt 7.1: Codes for P2's response to P6's question of P2's experience of Jetty One. Codes: [Daily Life - While awaiting trial, individuals were tortured and interrogated. - Family: Daily Life in Apartheid] [Life in Robben Island Prison - Prisoners waited on Jetty One to be loaded onto the boat and taken to Robben Island Prison. - Family: Life in Robben Island Prison] P6: Okay, tell us about Waterfront. Jetty one? P3: That would be jetty one, ya, where, uhm, we didn't even uhm, stay at the jetty one for long, I think it was about 30 minutes, then, with them taken from those holding cells into the boat to the Island. So that's why I'm saying, generally it will be something like that, ya, where it's police station for interrogation, torture and everything but immediately when they charge you then they transfer you, as an awaiting trial prisoner, now, to uhm, a particular prison. The researcher was able to categorise two codes from P3's response that offered insight into the first experiences of a convicted political prisoner awaiting incarceration in Robben Island prison. This example demonstrates the richness of data achieved by allowing participants to interact amongst themselves and granting them sufficient time to relate their stories. By analysing the responses of each participant and then applying the analysis to the interpretation of the entire collection of data, the researcher was able to achieve a holistic understanding. 7.3.2.5 Code all the text In the fifth phase of content analysis, codes were created in a directed manner as they were discovered within the text. The researcher used Atlas.ti to code the focus groups and interview. Once all the text was coded, codes discovered at the end of the analysis were reused on the text analysed at the beginning of the analysis in order to ensure consistency. Table 7.6 shows the code counts of the most frequent codes discovered in the focus groups and interview. All the codes of the focus groups and interviews are included in the Data CD. Answers or portions of answers that related to a specific concept were categorised into codes. All of the codes will be given and grouped in themes in the discussion of the findings in Section 7.4. Table 7.6: Summary of most frequent codes discovered in focus groups and interview. Interview FG 1 FG 2 TOTALS: Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. 10 0 0 1 0 Life in Robben Island Prison - The ballie12 that Mandela used was not the same as the others. 0 4 5 9 Youth - Beginning of the youth uprisings. 8 0 0 8 Youth - The younger generation of the Apartheid era would take part in the riots. 7 0 0 7 Meals - The inmates shared their food with each other even though each race group was assigned their own menu. 2 2 2 6 Daily Life - The living conditions are compared to that of a war zone. 5 0 0 5 Daily Life - The passes were a big source of resentment within the black community. 5 0 0 5 Daily Life - A sense of fear gripped those who were living in the Apartheid era. 4 0 0 4 Life in Robben Island Prison - Even though there were attempts to create separation between the race groups in Robben Island, the inmates did not dwell on it and always stood together. 3 0 1 4 Meals - Were eaten in the passage at first and then were allowed in cells in later years. 0 0 4 4 Due to the unstructured nature of the focus groups and interview, the participants were free to address multiple topics per response. An example of this is demonstrated in Code Excerpt 2 where the P4 addressed the topics punishment, lawyers and cases in one response. Code Excerpt 7.2: Example of response that addresses multiple topics. P 6: Focus Group 2 - 6:110 [P4: Then they will put a repor..] (58:58) (Super) No codes No memos P4: Then they will put a report in, you will also send your report uhm, in your report you will call your lawyers to come and represent you. So you would tell them what you, what you, about your story. So the lawyers were allowed to come in and then you present your story uhm, to the lawyers. And this question of, of three meals uhm, spare diet, comes in when you are sentenced now uhm, with the representative of you, if they found you guilty. On most cases, there are cases they found you guilty in their cases. The lawyers was not, so powerful, uhm, in, in, in actually winning the cases in most cases. Most cases are won by, by warders. 12 A ballie is a small metal bucket with a lid that prisoners used as a toilet in Robben Island Prison. 195 | Chapter 7: Diagnosis 7.3.2.6 Assess the coding consistency In this step, the entire body of text was re-evaluated by coding the previous focus groups and interview based on the new codes. Codes were also re-evaluated for consistency. New codes created in each document are given in the Data CD. Many new codes were introduced in each focus group and interview. This is due to the fact that not all participants in the focus groups and interview answered or addressed the same question in their discussions. It is also interesting to note the richness of

the data achieved by allowing the participants freedom to express their thoughts and digress from the topic if needed. This richness is evident in the code categories obtained during the analysis. Some codes were not initially considered by the researcher, but form a crucial role in the true portrayal of experiences of ex-political prisoners of Robben Island Prison. Once the entire body of text had been coded, the researcher reviewed all codes in order to ensure that no codes represented the same concept. In this revision, the researcher isolated two codes that could be merged into one. These codes are given in Table 7.7. The merged codes retained the code name of the code with the most instances. Table 7.7: Codes merged due to high degree of similarity. Interview FG 1 FG 2 TOTALS: Punishment - prisoners were not given food and placed in isolation for an entire day as punishment (only water was provided) 0 3 0 3 Punishment - prisoners were placed in isolation cells for the whole day without food. 0 1 0 1 In the coding process, many codes related to similar topics. In order to prevent these from becoming inconsistencies, codes were grouped together into families. Families are codes that are grouped according to their similar topics. Code Excerpt 3 is an example of a code family. The Data CD contains the entire code family list. These families form the themes in the data analysis. Each theme is discussed in the following section. Code Excerpt 7.3: Example of code families Code Family: Censorship Created: 2015-09-27 21:41:16 (Super) Codes (3): [Censorship - letters found with forbidden content were destroyed] [Censorship - letters were censored if prisoners asked questions about anyone else besides the person they were writing to] [Censorship - Prisoners were not allowed to discuss other people with their visitor during their visiting session.] Quotation(s): 3 _____ Code Family: Meals in Robben Island Prison Created: 2015-09-27 21:44:19 (Super) Codes (5): [Meals - Prisoners did not receive real coffee.] [Meals - Prisoners prepared and served the meals.] [Meals - The inmates shared their food with each other even though each race group was assigned their own menu.] [Meals - Were eaten in the courtyard.] [Meals - Were eaten in the passage at first and then were allowed in cells in later years.] Quotation(s): 15 _____ From Code Excerpt 3, one can see all the codes within both the Censorship and Daily Life in Apartheid code families. There are three codes in the code family Censorship and fifteen codes in the code family Meals in Robben Island Prison. The quotations listed at the bottom of each code family indicate how many quotes from the entire body of text fall under the specific family. The code groups are useful when analysing data with the view of developing themes. 7.4 Conclusions from the data Step 7 of the content analysis process according to Zhang and Wildemuth (2009:3) is to draw conclusions from the coded data. By making use of code families as discussed in the previous section, the researcher was able to distinguish twelve themes that were present in the data. These themes are discussed in the sub-sections of this section. The discussion of each theme will begin with a short summary of the theme. The codes that support this theme and form part of its code family are then presented in table format along with the number of their occurrences in each primary document. One of the most frequently occurring codes is discussed and finally, conclusions are drawn from the analysis of the data. 7.4.1 Theme 1: Daily life in Apartheid Although the discussions held in the Diagnosing phase were meant to centre on life inside Robben Island Prison, the researcher believes that she needs to understand the context of the participant in order to write a narrative that exploits the common experiences or heritage of the target group of the digital graphic novel to provoke emotions such as suspense, sadness and joy (N3). The participants lived in the Apartheid era and were removed from their daily lives in apartheid. The researcher believes that it is important to represent their lives before incarceration. It was clear from the data that the participants were motivated to talk about their daily lives during Apartheid. The interview with P5 was conducted first. From this interview, it became clear that if not managed, participants would primarily speak about life in Apartheid before their incarceration. As a result of this, the facilitator guided the focus groups away from this topic. During the analysis of the data, the researcher found a large number of codes relating to daily life during the Apartheid era. This theme was represented mainly in the interview with a total of 53 code occurrences. Each code addressing daily life during the Apartheid era was grouped into the code family Daily life in Apartheid. The code occurrence frequencies of each code in the Daily life in Apartheid code family are given in Table 7.8. Table 7.8: Code occurrence frequencies for codes in the Daily life in Apartheid code family. Interview FG 1 FG 2 TOTALS: Daily Life - A sense of fear gripped those who were living in the Apartheid era. 4 0 0 4 Daily Life - activists were not afraid to die for their cause. 3 0 0 3 Daily Life - Anyone in possession of banned material was deemed dangerous. 1 0 0 1 Daily Life - Despite the dismal circumstances, there was a hope for a better future. 2 0 0 2 Daily Life - Discrimination was pre-programmed into individuals to such an extent that it was not considered wrong. 1 0 0 1 Daily Life - Entire families were intimidated if one family member is deemed dangerous. 2 0 0 2 Daily Life - Marches in solidarity with other freedom fighters were held. 2 0 0 2 Daily Life - Men would hide in their houses after hearing of a shooting or violent incident to avoid the risk of being imprisoned. 2 0 0 2 Interview FG 1 FG 2 TOTALS: Daily Life - Music was a source of motivation for the activists. 2 0 0 2 Daily Life - Participation in riots resulted in long-term sentences. 1 0 0 1 Daily Life - Politicians were deemed as very dangerous in the Apartheid era. 2 0 0 2 Daily Life - Possession of banned material resulted in long prison sentences. 1 0 0 1 Daily Life - Prisoners were not immediately charged. 1 0 0 1 Daily Life - Prisoners were only taken to Robben Island after being charged. 2 0 0 2 Daily Life - Rebellion still took place in the midst of hope for positive change. 1 0 0 1 Daily Life - Soldiers would raid the houses of African men in order to remove all objects they deemed dangerous or a potential weapon. 2 0 0 2 Daily Life - Some activists were killed. 2 0 0 2 Daily Life - Some who were caught were held up to 6 months with no trial. 0 1 0 1 Daily Life - The generation who grew up in Apartheid developed a sense of anger towards the soldiers as they witnessed how their fathers were being treated. 2 0 0 2 Daily Life - The living conditions are compared to that of a war zone. 5 0 0 5 Daily Life - The passes were a big source of resentment within the black community. 5 0 0 5 Daily Life - The police infiltrated the resistance in order to get information and proof for trials against prisoners. 0 2 0 2 Daily Life - The political leaders were given longer sentences. 1 0 0 1

Daily Life - The radio was a main source of information for the black community during the Apartheid years. 3 0 0 3 Daily Life - The solidarity marches were organised events and not violent marches. 3 0 0 3 Daily Life - Those deemed dangerous were ostracised by the community to prevent intimidation of others. 2 0 0 2 Daily Life - While awaiting trial, individuals were tortured and interrogated. 0 2 0 2 Daily Life - Young children were deeply impacted by what they witnessed in the Apartheid era. 1 0 0 1 TOTALS: 53 5 0 58 As seen in Table 7.8, one of the most frequently addressed codes related to the fact that the living conditions of the time resembled that of a war zone. From the given data, it is also evident to see that this topic is exclusively discussed with the participant of the interview. The information supplied by P5 about daily life in Apartheid supports general information on the period that is available in historic literature. Code Excerpt 4 shows the responses of the participant of the interview that related to the living conditions in the Apartheid era. Code Excerpt 7.4: Participant's responses related to living conditions in the Apartheid era. Daily Life - The living conditions are compared to that of a war zone. Interview - 4:4 [But I remember during this par..] (6:6) (Super) Codes: [Daily Life - The living conditions are compared to that of a war zone. - Family: Daily Life in Apartheid] No memos But I remember during this particular time of day, of days, there were a lot of uhm, helicopters around, around us, lot of canons as you were saying, soldiers, all, all over, all the shops were closed, because we could not get fo-, uhm, food, and to the extent that there were, there was a time that we had to be given, like there would be cars that would give the, the food for, for, for, for the household, because no shops were, were allowed. Interview - 4:5 [No no, in, in, in, in where I ..] (8:8) (Super) Codes: [Daily Life - The living conditions are compared to that of a war zone. - Family: Daily Life in Apartheid] No memos No no, in, in, in, in where I was staying in Nyanga East. Ya. Ya. Because nothing was happening. It was, it was, it was like this, it was like uhm, a war. It was like a war because you didn't see riots, like at a later stage where young people would riot. Now there was a clash between the, the soldiers and our fathers. I mean the main people who were, who were, who were active during the sixties, it was those that, if you are six years old, you see your fathers being, being, being ac-, being active. So for us it was our fathers versus the soldiers. Interview - 4:16 [at one stage it was so quiet a..] (10:10) (Super) Codes: [Daily Life - Men would hide in their houses after hearing of a shooting or violent incident to avoid the risk of being imprisoned. - Family: Daily Life in Apartheid] [Daily Life - The living conditions are compared to that of a war zone. - Family: Daily Life in Apartheid] No memos at one stage it was so quiet after the shooting, but all the men were inside the house. If they were caught on in the house they would be taken to prison. Interview - 4:18 [and then I also remember but, ..] (10:10) (Super) Codes: [Daily Life - Soldiers would raid the houses of African men in order to remove all objects they deemed dangerous or a potential weapon. - Family: Daily Life in Apartheid] [Daily Life - The living conditions are compared to that of a war zone. - Family: Daily Life in Apartheid] No memos and then I also remember but, uhm, what, these soldiers uhm, kicking the, the doors, breaking the doors and then coming in just to search everything that is there. The bread knife, you, you should not have the bread knife and, and all those things. Interview - 4:20 [And also the anger, the anger ..] (12:12) (Super) Codes: [Daily Life - The generation who grew up in Apartheid developed a sense of anger towards the soldiers as they witnessed how their fathers were being treated. - Family: Daily Life in Apartheid] [Daily Life - The living conditions are compared to that of a war zone. - Family: Daily Life in Apartheid] [Youth - The younger generation of the Apartheid era would take part in the riots. - Family: Youth in the Apartheid Era] No memos And also the anger, the anger of seeing this young soldier intimidating your father, the anger of not being able to walk freely outside, but more than anything even in your own house, The participants recalled detailed events of life during the uprisings against Apartheid in South Africa and compared it to living within a warzone. From the excerpts given above, it is clear to see that the ex-political prisoners viewed their lives before incarceration as those of victims of war. They felt as though their fathers were in constant conflict with the soldiers of the time. This angered the ex-political prisoners and inspired them to take action in order to overcome the regime. 7.4.1.1 Conclusions drawn on Daily life in Apartheid The researcher believes that it is very important to address the events that occurred in the day-to-day lives of those living during Apartheid. This is in order to achieve a narrative that interests the reader as well as a character the reader cares about. By incorporating the experiences of ex-political prisoners that served as a call to action for them, the researcher will be able to stimulate emotions and interest in the reader. Furthermore, by providing a viable background story with attention-grabbing conflicts with the world around him, the character will become a more believable and vivid human being with which readers will be able to relate. 7.4.2 Theme 2: Youth in the Apartheid era The researcher believes that it is important to portray the world-views of the youth of the Apartheid era to the target audience of the young adults today. The youth played an important role during the Apartheid era. Many of the revolutions and uprisings were as a result of their actions. There were many facets to the contribution of the youth towards the abolishment of Apartheid. This theme was represented mainly in the interview with a total of 33 code occurrences. The researcher included codes that contained both the world-views views of the youth at the time as well as the actions of the youth into the Youth in the Apartheid Era code family. Table 7.9 demonstrates the code occurrence frequencies for each code in the Youth in the Apartheid Era code family. Table 7.9: Code occurrence frequencies for codes in the Youth in the Apartheid era code family. Interview FG 1 FG 2 TOTALS: Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. 10 0 0 10 Youth - Beginning of the youth uprisings. 8 0 0 8 Youth - The young children felt that their parents were not handling the situation correctly. 3 0 0 3 Youth - The young people were angry about the continuous changes in the teaching medium in schools. 4 0 0 4 Interview FG 1 FG 2 TOTALS: Youth - The younger generation of the Apartheid era would take part in the riots. 7 0 0 7 Youth - Youth felt marginalised with no real future. 1 0 0 1 TOTALS: 33 0 0 33 The most prominent code in this family is deals with the fact that the youth during the time of Apartheid viewed their bad living conditions as a norm. This led to the youth becoming resentful of the laws and upholders of the Apartheid regime. Due to the fact that they had grown up watching their fathers taking on soldiers on a nearly daily basis, it was considered as normal amongst the community to

rebel against their so-called oppressors in the hope of achieving a better future. Code Excerpt 5 shows participants' responses relating to the way that youth growing up in the Apartheid era viewed bad living conditions as a norm. Code Excerpt 7.5: Participants' responses related to how the youth viewed bad living conditions as the norm during Apartheid. Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. Interview - 4:8 [Now there was a clash between ..] (8:8) (Super) Codes: [Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. - Family: Youth in the Apartheid Era] No memos Now there was a clash between the, the soldiers and our fathers. Interview - 4:9 [if you are six years old, you ..] (8:8) (Super) Codes: [Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. - Family: Youth in the Apartheid Era] No memos if you are six years old, you see your fathers being, being, being ac-, being active. Interview - 4:10 [So for us it was our fathers v..] (8:8) (Super) Codes: [Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. - Family: Youth in the Apartheid Era] No memos So for us it was our fathers versus the soldiers. Interview - 4:11 [But at the same time as a youn..] (8:8) (Super) Codes: [Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. - Family: Youth in the Apartheid Era] No memos But at the same time as a young person, it was like a fun, it was like a joke, because as, when you are six years old it's nice, you want to play. So the soldiers would come and then like we would scream, 'oh, they've gone away, you've hide your, your things', you see. Interview - 4:14 [our fathers would switch on, s..] (10:10) (Super) Codes: [Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. - Family: Youth in the Apartheid Era] No memos our fathers would switch on, so there was a way of switching to that, yeah Interview - 4:19 [as a young child in the sixtie..] (10:10) (Super) Codes: [Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. - Family: Youth in the Apartheid Era] No memos as a young child in the sixties, this is what you would observe as a person. Interview - 4:33 [Because instead of enjoying li..] (32:32) (Super) Codes: [Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. - Family: Youth in the Apartheid Era] [Youth - Beginning of the youth uprisings. - Family: Youth in the Apartheid Era] [Youth - The young people were angry about the continuous changes in the teaching medium in schools. - Family: Youth in the Apartheid Era] No memos Because instead of enjoying life as a six-, as, as a young child, you are exposed into the prison, and all these things and all these things, and also the education, which is limited as a black child, in Sou-, in, in Cape Town, where you'll find most of these children would end, would have to end up having to go to Eastern Cape to do their professional training because there's no professional training in Cape Town for black people Interview - 4:34 [To be angry and to say, okay l..] (34:34) (Super) Codes: [Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. - Family: Youth in the Apartheid Era] No memos To be angry and to say, okay let, let me do something about this because it affects me directly, whether I like, whether I close my eyes or not, wherever I go Interview - 4:36 [you go back now to other thing..] (34:34) (Super) Codes: [Daily Life - The generation who grew up in Apartheid developed a sense of anger towards the soldiers as they witnessed how their fathers were being treated. - Family: Daily Life in Apartheid] [Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. - Family: Youth in the Apartheid Era] [Youth - Beginning of the youth uprisings. - Family: Youth in the Apartheid Era] [Youth - The younger generation of the Apartheid era would take part in the riots. - Family: Youth in the Apartheid Era] No memos you go back now to other things that were happening, Steve Biko, that happens around this young child, which has, which has already kind of formed. But also there were lots of other things that were happening which might help form the, the resistance, the anger, and also, because if you remember, the young children felt that the parents were not radical enough. Interview - 4:40 [because you could not escape....] (36:36) (Super) Codes: [Daily Life - A sense of fear gripped those who were living in the Apartheid era. - Family: Daily Life in Apartheid] [Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. - Family: Youth in the Apartheid Era] No memos because you could not escape.. 7.4.2.1 Conclusions from the Youth in the Apartheid Era This is in order to portray the world-views that governed their actions and to enforce the fact that their struggle was one of extraordinary circumstances. The incorporation of these world-views will help to sculpt the personality and world-views of the main character of the digital graphic novel in order to make him more relatable to the target audience of young adults. In addition, it will provide a platform for the inclusion of struggles that are both internal to the character as well as external with the world around him. 7.4.3 Theme 3: Life in Robben Island Prison The third theme discovered amongst the data is that of life inside Robben Island Prison. This code family is the largest of all the code families as it is comprised of 38 codes. This theme was represented mainly in the second focus group with a total of 33 code occurrences. All codes relating to experiences and events occurring within Robben Island Prison were grouped into the Life in Robben Island Prison code family. Table 7.10 presents all code occurrence frequencies for each code in the Life inside Robben Island Prison family. Table 7.10: Code occurrence frequencies for codes in the Life in Robben Island Prison code family. Interview FG 1 FG 2 TOTALS: Life in Robben Island Prison - Once inspection is complete, the prisoners queue for food. 0 0 1 1 Life in Robben Island Prison - Prison cells were opened at 07:00. 0 0 1 1 Life in Robben Island Prison - Prisoners from different sections would alternate work areas. 0 0 2 2 Life in Robben Island Prison - Prisoners must be ready for inspection when the wardens come in. 0 0 2 2 Life in Robben Island Prison - Prisoners would queue for inspection every morning. 0 0 1 1 Life in Robben Island Prison - Some prisoners were submissive to the authorities in Robben Island while others were not. 0 0 1 1 Life in Robben Island Prison - The prisoners were kept in their section groups even while working on the island. 0 0 1 1 Life in Robben Island Prison - The prisoners worked in the lime quarry. 0 0 1 1 Life in Robben Island Prison - The prisoners worked in the stone quarry. 0 0 1 1 Life in Robben Island Prison - There were different labour tasks on the island. 0 0 1 1 Interview FG 1 FG 2 TOTALS: Life in Robben Island Prison - After eating, prisoners queued to be sent to different parts of the prison. 0 0 1 1 Life in Robben Island Prison - Children were

imprisoned on Robben Island. 0 0 2 2 Life in Robben Island Prison - Even though there were attempts to create separation between the race groups in Robben Island, the inmates did not dwell on it and always stood together. 3 0 1 4 Life in Robben Island Prison - Not all prisoners were made to work in the stone quarry. 1 0 0 1 Life in Robben Island Prison - Prison officials laid charges against prisoners who were in sections that were not stipulated on their ID cards. 0 2 0 2 Life in Robben Island Prison - Prison officials would check if the beds in the cells were properly made. 0 1 0 1 Life in Robben Island Prison - Prison wardens gave prisoners a briefing of the prison before the prisoners were sent to their relevant sections. 0 0 1 1 Life in Robben Island Prison - Prisoners had to keep their prison cards with them at all times. 0 1 0 1 Life in Robben Island Prison - Prisoners in the single cells would wake up when the lights went on in order to clean their cells. 0 1 0 1 Life in Robben Island Prison - Prisoners used to wake each other up to ensure that everything is ready for inspection and that they will not be punished. 0 0 1 1 Life in Robben Island Prison - Prisoners waited on Jetty One to be loaded onto the boat and taken to Robben Island Prison. 0 1 0 1 Life in Robben Island Prison - Prisoners were divided into sections after interrogation by the wardens. 0 0 1 1 Life in Robben Island Prison - Prisoners were found guilty in most cases filed against them in Robben Island Prison. 0 0 2 2 Life in Robben Island Prison - Prisoners were given prison cards that were completed for them. 0 1 0 1 Life in Robben Island Prison - Prisoners were given the prison clothes of Robben Island Prison at the registration office. 0 1 0 1 Life in Robben Island Prison - Prisoners were moved from open sections to single cells if they were seen as too dangerous to be left in the open sections. 0 0 1 1 Life in Robben Island Prison - Prisoners were not allowed to see their families in Robben Island no matter what they were charged with. 0 0 1 1 Life in Robben Island Prison - Prisoners were taken to the registration after arrival. 0 2 0 2 Life in Robben Island Prison - Prisoners woke up around 04:00 or 05:00 to shower. 0 0 1 1 Life in Robben Island Prison - Some open sections were deemed to be worse than the single cells because they contained the so-called 'radicals'. 0 1 1 2 Life in Robben Island Prison - Some prisoners assaulted guards because of the manner in which they were treated. 0 0 1 1 Life in Robben Island Prison - Some prisoners were not given privacy to change into their prison clothes. 0 3 0 3 Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. 0 4 5 9 Life in Robben Island Prison - There was a punishment section in Robben Island Prison. 0 0 1 1 Life in Robben Island Prison - Upon arrival, prisoners were made to wait at the reception to be booked into the prison. 0 0 1 1 TOTALS: 4 18 33 55 There is a wide variety of topics discussed within this theme. The most prominent code in the Life in Robben Island Prison family relates to the fact that the ballie used by Nelson Mandela was not the same as the one that was used by the rest of the prisoners. A ballie was a metal bucket with a lid provided to prisoners to use as a toilet. The prisoners felt that it was important to note that the taller ballie as displayed in Nelson Mandela's prison cell Robben Island Prison was not the same as the ones that the prisoners were given Robben Island Prison. Nelson Mandela was granted the use of a taller ballie after special instruction from a doctor due to his height. Code Excerpt 6 shows the participants' responses relating to the ballie. Code Excerpt 7.6: Participants' responses relating to the ballie. B Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. Focus Group 1 - 5:22 [Because even now, the ballie t..] (107:107) (Super) Codes: [Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. - Family: Life in Robben Island Prison] No memos Because even now, the ballie that we have in Mandela's cell is not the same ballie that we are using in this prison. The ones that we are using in this prison were greyish and a little bit smaller. Focus Group 1 - 5:23 [We all, all of us we agree, it..] (109:109) (Super) Codes: [Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. - Family: Life in Robben Island Prison] No memos We all, all of us we agree, it's not the one that we are using in this prison. Focus Group 1 - 5:24 [You, you go to I'm sure E-sect..] (112:112) (Super) Codes: [Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. - Family: Life in Robben Island Prison] No memos You, you go to I'm sure E-section, but uhm they only I would say difference uhm, in terms of, of the ballie, the short one and the long one… Focus Group 1 - 5:25 [hm, cause they are using that ..] (114:114) (Super) Codes: [Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. - Family: Life in Robben Island Prison] No memos hm, cause they are using that is the, the short ballies, but uhm, it was difficult for Nelson Mandela that is to use that is the shorter one and then he decided that is to apply, to apply, and then he was offered the one that is longer than the others. Focus Group 2 - 6:28 [It is not the original ballie] (92:92) (Super) Codes: [Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. - Family: Life in Robben Island Prison] No memos It is not the original ballie Focus Group 2 - 6:29 [It's, it was a very short ball..] (94:94) (Super) Codes: [Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. - Family: Life in Robben Island Prison] No memos It's, it was a very short ballie… Focus Group 2 - 6:30 [then Mandela had to go to a do..] (96:96) (Super) Codes: [Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. - Family: Life in Robben Island Prison] No memos then Mandela had to go to a doctor, to be prescribed a bucket, a bigger bucket because of his le-, uhm, his height. Focus Group 2 - 6:31 [Then they gave him that, that ..] (98:98) (Super) Code: [Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. - Family: Life in Robben Island Prison] No memos Then they gave him that, that bucket. Others were using the same, uhm, small one. Focus Group 2 - 6:32 [he was granted by, permission ..] (100:100) (Super) Codes: [Life in Robben Island Prison - The ballie that Mandela used was not the same as the others. - Family: Life in Robben Island Prison] No memos he was granted by, permission by the doctor. 7.4.3.1 Conclusions from Life in Robben Island Prison Many experiences and events occurred in Robben Island that made a distinct impression of the ex-political prisoners. The researcher found that although some of these recollections may seem trivial, they played a significant role in the lives of the ex-political prisoners. The researcher believes that including many of the aspects of Life in Robben Island Prison will benefit both the ex-political prisoners and the readers. The ex-political prisoners will feel as though their experiences have been truthfully portrayed, while the readers will be given an

interesting and historically accurate storyline. Furthermore, the experiences of the ex-political prisoners will help to further shape a more authentic character. 7.4.4 Theme 4: Exercise in Robben Island Prison Exercise in Robben Island Prison is another theme that arose from the data. This theme links closely to the second key factor (F2) identified by the Mandela27 project team. The prisoners used their allocated exercise time to ensure that they kept their bodies fit and healthy. For those who were allowed to exercise together, it was used as both a recreational and social time as they were allowed to play team sports. This theme was represented mainly in the second focus group with a total of 14 code 207 | Chapter 7: Diagnosis occurrences. All codes relating to exercise or sports were grouped under the Exercise in Robben Island code family. Table 7.11 shows the code occurrence frequencies for each code in the Exercise in Robben Island family. Table 7.11: Code occurrence frequencies for codes in the Exercise in Robben Island Prison code family. Interview FG 1 FG 2 TOTALS: Exercise - Each prisoner was allowed 30 minutes of exercise time. 0 0 1 1 Exercise - Prisoners broke world records in their internal 'Olympic Games'. 0 0 3 3 Exercise - Prisoners used the exercise time and sports for various reasons. 0 0 1 1 Exercise - Single cell prisoners were taken to exercise one at a time. 0 0 1 1 Exercise - Sports provided a channel for communication between prisoners. 0 0 1 1 Exercise - Sports served as a platform for building relationships within and outside of prison sections. 0 0 1 1 Exercise - Sports was a form of stress relief. 0 0 1 1 Exercise - Sports were used as a medium through which prisoners could speak to authorities about their living conditions on the island. 0 0 2 2 Exercise - Team sports were played amongst prisoners. 0 0 2 2 Exercise - The prisoners formed their own 'Olympic Games' on the island. 0 0 1 1 TOTALS: 0 0 1 4 14 The most prominent code in the Exercise in Robben Island code family relates to the fact that prisoners on the Island managed to break the world records of their time. However, due to their incarceration, they were never credited with the achievement. Their achievements took place inside the prison and were not broadcasted to the outside world. The researcher believes that although this claim is important to the ex- political prisoners, its incorporation into the digital graphic novel will depend on the ability to substantiate these claims with proof. In the event that no proof can be sourced, this claim will be omitted from the digital graphic novel in order to preserve its historical accuracy. Code Excerpt 7 shows the participants responses relating to the breaking of Olympic records within Robben Island Prison. Code Excerpt 7.7: Participants' responses related to the breaking of Olympic records within Robben Island Prison. Exercise - Prisoners broke world records in their internal 'Olympic Games'. P 6: Focus Group 2 - 6:86 [World records. We have statist..] (293:293) (Super) Codes: [Exercise - Prisoners broke world records in their internal 'Olympic Games'. - Family: Exercise in Robben Island Prison] No memos World records. We have statistics of that. P 6: Focus Group 2 - 6:87 [SPEAKER: Yes, uhm, for instanc..] (295:297) (Super) Codes: [Exercise - Prisoners broke world records in their internal 'Olympic Games'. - Family: Exercise in Robben Island Prison] No memos P5: Yes, uhm, for instance, Lewis, from America, the uhm, athlete? INTERVIEWER: Yes, yes, Carl Lewis yes. P5: Ya. Uhm, one prisoner broke his record. P 6: Focus Group 2 - 6:88 [. And so many of them broke th..] (301:301) (Super) Codes: [Exercise - Prisoners broke world records in their internal 'Olympic Games'. - Family: Exercise in Robben Island Prison] No memos And so many of them broke the records of the world records. 7.4.4.1 Conclusions on Exercise in Robben Island Prison Exercise inside Robben Island Prison served both as an opportunity to maintain physical fitness, but also as a channel of communication, socialisation and stress relief. The researcher believes that this theme should be included in the digital graphic novel in order to develop the narrative and the character's interactions with others through the medium of exercise in Robben Island Prison. 7.4.5 Theme 5: Meals in Robben Island Prison Meals in Robben Island Prison served as a very important experience for the inmates of Robben Island Prison. This theme was represented mainly in the second focus group with a total of eight code occurrences. Each code relating to meals in Robben Island Prison was incorporated into the Meals in Robben Island Prison family. Table 7.12 shows the code occurrence frequencies for each code in the Meals in Robben Island Prison family. Table 7.12: Code occurrence frequencies for codes in the Meals in Robben Island Prison code family. Interview FG 1 FG 2 TOTALS: Meals - Prisoners did not receive real coffee. 0 1 0 1 Meals - Prisoners prepared and served the meals. 0 0 1 1 Meals - The inmates shared their food with each other even though each race group was assigned their own menu. 2 2 2 6 Meals - Were eaten in the courtyard. 0 2 1 3 Meals - Were eaten in the passage at first and then were allowed in cells in later years. 0 0 4 4 TOTALS: 2 5 8 15 One of the most prominent codes relate to the fact that inmates shared their food with each other regardless of race. For the prisoners, this was the opportunity to demonstrate their unity. Although different races in Robben Island Prison were given different rations, they all brought their food together and shared it amongst themselves. For them, it was a symbol of unity in the midst of trial. Code Excerpt 8 shows the responses of participants regarding the sharing of food in Robben Island Prison. Code Excerpt 7.8: Participants' responses related to the sharing of food in Robben Island Prison. Meals - The inmates shared their food with each other even though each race group was assigned their own menu. Interview - 4:79 [although we did not get bread,..] (274:274) (Super) Codes: [Meals - The inmates shared their food with each other even though each race group was assigned their own menu. - Family: Meals in Robben Island Prison] No memos although we did not get bread, but other comrades would share their bread with us. Interview - 4:81 [then said you don't have bread..] (278:278) (Super) Codes: [Meals - The inmates shared their food with each other even though each race group was assigned their own menu. - Family: Meals in Robben Island Prison] No memos then said you don't have bread but okay, you can half of my sugar. You don't have sugar, you can have half of my sugar. Focus Group 1 - 5:8 [Then when you are back in your..] (33:33) (Super) Codes: [Meals - The inmates shared their food with each other even though each race group was assigned their own menu. - Family: Meals in Robben Island Prison] No memos Then when you are back in your cell, it will depend whether your inmates have spared something that is for you, so you can… Focus Group 1 - 5:10 [veryone who was taken out and ..] (35:35) (Super) Codes: [Meals - The inmates shared their food with each other even though each race group was assigned their own menu. - Family: Meals in Robben Island Prison] No memos Everyone

who was taken out and taken that is to the isolation cell when you'll be there, that is the whole day, and then they'll bring you later, when they, when they, they knew that, all the meals have been served, now you're not going to get anything, then it will depend, that is your inmates, if they spare something that is for you that is, to, to have something Focus Group 2 - 6:44 [when you were here, you would ..] (145:145) (Super) Codes: [Life in Robben Island Prison - Even though there were attempts to create separation between the race groups in Robben Island, the inmates did not dwell on it and always stood together. - Family: Life in Robben Island Prison] [Meals - The inmates shared their food with each other even though each race group was assigned their own menu. - Family: Meals in Robben Island Prison] No memos when you were here, you would not notice that the coloured is get-, getting different from you. You only notice when they get the [inaudible], the bread with the jam on. But uhm, what they used to do is they used to share it equally amongst ourselves. Uhm, the spirit was one. Because they were also brought into the camp where uhm, this other groups that were brought onto Robben Island, the coloured, Asians, and Africans. So there was no way that we could have, uhm, different from one another. So everything, they done it together. Even if you belong to that political persuasion, things were done together. Focus Group 2 - 6:46 [You would also not note when a..] (147:147) (Super) Codes: [Meals - The inmates shared their food with each other even though each race group was assigned their own menu. - Family: Meals in Robben Island Prison] No memos You would also not note when a person is getting G diet. There's a diet which is, was called G diet. That's a doctor prescription diet. It, it, uhm, because people share, they just wanted to share amongst themselves. It rotate also. 7.4.5.1 Conclusions of Meals in Robben Island Prison The researcher believes that the unity demonstrated by prisoners in Robben Island regarding the meals is an important theme to demonstrate. The ration card was developed to create inequality within Robben Island Prison, the very thing against which those inside its walls were fighting. In order to combat this, the inmates shared their food with each other, once again cementing their unity and their struggle for equality. The incorporation of this theme into the digital graphic novel will contribute towards both the narrative and character by further enhancing the world-views and subsequent actions of those incarcerated in Robben Island Prison. 7.4.6 Theme 6: Hunger strikes in Robben Island Prison Hunger strikes were often used as a method of protest in Robben Island Prison. Prisoners of Robben Island Prison used it to protest against living conditions, visitation policies and education in Robben Island Prison. This theme was mainly represented in the second focus group with a total of 19 code occurrences. All codes regarding the hunger strikes that took part in Robben Island Prison were grouped into the Hunger strikes in Robben Island Prison code family. The code occurrence frequencies for each code in the Hunger Strikes in Robben Island Prison family is given in Table 7.13. Table 7.13: Code occurrence frequencies for codes in the Hunger strikes in Robben Island Prison code family. Interview FG 1 FG 2 TOTALS: Hunger Strikes - Prison officials intimidated and ridiculed prisoners taking part in hunger strikes. 0 0 1 1 Hunger Strikes - Prisoners gave each other signs to indicate the start of a hunger strike. 0 0 3 3 Hunger Strikes - Prisoners performed hunger strikes at the same time. 0 0 2 2 Hunger Strikes - Were a common occurrence in Robben Island Prison. 0 0 1 1 Hunger Strikes - Were organised through secret messages. 0 0 1 1 Hunger Strikes - Were successfully used to amend the visiting policies on Robben Island prison. 0 0 1 1 Hunger Strikes - Were successfully used to attain permission for prisoners to study beyond matric level. 0 0 3 3 Hunger Strikes - Were successfully used to change the diet in Robben Island prison. 0 0 2 2 Hunger Strikes - Were used by prisoners in order to improve their living conditions in Robben Island prison. 0 0 2 2 Hunger Strikes - Were used to attain permission for lawyers to visit their clients in Robben Island Prison. 0 0 2 2 Hunger Strikes - Were used to demand the release of prisoners. 0 0 1 1 TOTALS: 0 0 1 9 19 One of the most prominent codes in the Hunger Strikes in Robben Island Prison family relates to the successful use of hunger strikes to attain permission for prisoners to study beyond matric level. Code Excerpt 9 shows the responses of participants relating to the successful use of hunger strikes to attain permission for prisoners to study beyond matric. Code Excerpt 7.9: Participant's responses related to the successful use of hunger strikes to attain permission for prisoners to study beyond matric. Hunger Strikes - Were successfully used to attain permission for prisoners to study beyond matric level. Focus Group 2 - 6:76 [It had a great, uhm, achieveme..] (257:257) (Super) Codes: [Hunger Strikes - Were successfully used to attain permission for prisoners to study beyond matric level. - Family: Hunger strikes in Robben Island Prison] No memos It had a great, uhm, achievement, because uhm, for the first time uhm, workers, I mean the prisoners were allowed to study beyond matric level in that hunger strike, uhm. Focus Group 2 - 6:103 [Then the hunger strike of '81,..] (339:339) (Super) Codes: [Hunger Strikes - Were successfully used to attain permission for prisoners to study beyond matric level. - Family: Hunger strikes in Robben Island Prison] No memos Then the hunger strike of '81, actually made it possible, for, for, for, for students who were at matric to study beyond matric le-, level… Focus Group 2 - 6:104 [Yes. Correspond. You could onl..] (343:343) (Super) Codes: [Hunger Strikes - Were successfully used to attain permission for prisoners to study beyond matric level. - Family: Hunger strikes in Robben Island Prison] No memos Yes. Correspond. You could only correspond when you already at university through Unisa. Ya. Now we, that was a, a point where people had to s-, be stuck there at the level of matric. But uhm, broaden their scope with different kinds of book from the library, but uhm, and that 1982 made it possible for us to go beyond matric level. 7.4.6.1 Conclusions from Hunger Strikes in Robben Island Prison In an environment in which they did not have any authority, one of the prisoners' only methods to enforce change was hunger strikes. The researcher believes that hunger strikes in Robben Island Prison played an important role in the lives of the ex-political prisoners of Robben Island Prison and should therefore be included in the narrative of the digital graphic novel. 7.4.7 Theme 7: Censorship Although there were only a few codes relating to censorship, the researcher felt that it should have its own theme as the censorship of information in Robben Island Prison was the third key factor (F3) identified by the Mandela27 project team. Censorship took place in the form of crossing out information in letters and the prohibition of prisoners to discuss certain topics with their visitors. This theme was mainly represented in the second focus group with a total of three code occurrences. All

codes relating to censorship were grouped into the Censorship code family. The code occurrence frequencies for each code in the Censorship code family is shown in Table 7.14. Table 7.14: Code occurrence frequencies for codes in the Censorship code family. Interview FG 1 FG 2 TOTALS: Censorship - Letters found with forbidden content were destroyed. 0 0 1 1 Censorship - Letters were censored if prisoners asked questions about anyone else besides the person to whom they were writing. 0 0 1 1 Censorship - Prisoners were not allowed to discuss other people with their visitor during their visiting session. 0 0 1 1 TOTALS: 0 0 3 3 One of the forms of censorship that were present in Robben Island Prison was the censorship of letters. If the inmates were writing to a specific person, they were not allowed to ask any questions about anyone besides the person to whom the letter is addressed. This rule must have been especially hard on fathers or inmates who left sick family members behind. Code Excerpt 10 shows the response of a participant regarding the censorship of letters. Code Excerpt 7.10: Participant's responses related to the censorship of letters. Censorship - Letters were censored if prisoners asked questions about anyone else besides the person to whom were writing. Focus Group 2 - 6:106 [To, to, to be honest sometimes..] (357:357) (Super) Codes: [Censorship - Letters were censored if prisoners asked questions about anyone else besides the person they were writing to. - Family: Censorship] No memos To, to, to be honest sometimes, and also not looking on their side, although you were ignorant of that. When you are s-, you're writing your letter and say pass my greetings to my neighbour, that was not allowed. You could not talk about your neighbours or somebody in your area. But if you say 'how is so and so at, at, at home', your mother, or your father, or part of the relatives, it, uhm, I'm definitely sure although I was not with them when they do this thing, they will censor that part. 7.4.7.1 Conclusions of Censorship Being in Robben Island Prison and leaving behind loved ones for what you believe is for the best of the country was a challenge that many prison inmates faced. The inability to communicate with certain loved ones and the missed opportunity of seeing those dear to them weighed heavily on the hearts of inmates. The researcher believes that it is important to capture these emotions and experiences in the digital graphic novel in order to add richness to the storyline and to shape the personal struggles of characters in the story. 7.4.8 Theme 8: Punishment in Robben Island Prison There were many forms of punishment in Robben Island Prison. Prison officials used punishment to deter any behaviour that they deemed to be 'inappropriate'. This theme was mainly represented in the second focus group with a total of 10 code occurrences. All codes relating to punishment in Robben Island were grouped in to the Punishment in Robben Island Prison code family. Table 7.15 shows the code occurrence frequencies for the all the codes in the Punishment in Robben Island Prison code family. Table 7.15: Code occurrence frequencies for codes in the Punishment in Robben Island Prison code family. Interview FG 1 FG 2 TOTALS: Punishment - Disrespecting or assaulting a warden resulted in prisoners receiving 'spare diet'. 0 0 1 1 Punishment - Prisoners did not like being disrespected in front of people by wardens and would retaliate which lead to punishment. 0 0 1 1 Punishment - Prisoners were given 'spare diet' if they were found guilty of misconduct within the prison. 0 0 2 2 Punishment - Prisoners were not given food and placed in isolation for an entire day as punishment (only water was provided). 0 4 0 4 Punishment - Right to letters were taken away for a certain period. 0 0 1 1 Punishment - Right to study was taken away for a certain period. 0 0 1 1 Punishment - Right to visitors was taken away for a certain period. 0 0 2 2 Punishment - Was given to prisoners in the single quarters. 0 0 2 2 TOTALS: 0 4 1 0 14 One of the prominent codes in the Punishment in Robben Island code family relates to the punishment in which prisoners were not given food and placed in isolation for an entire day as punishment with only water being provided to them. A prisoner who received this punishment will not receive the three meals of the day. This punishment could result from many different actions. Code Excerpt 11 shows the responses of participants relating to the aforementioned punishment. Code Excerpt 7.11: Participants' responses related to the punishment in which they did not receive food for a day whilst placed in isolation. Punishment - Prisoners were not given food and placed in isolation for an entire day as punishment (only water was provided). Focus Group 1 - 5:5 [what is happening is that ther..] (27:27) (Super) Codes: [Punishment - Prisoners were not given food and placed in isolation for an entire day as punishment (only water was provided). - Family: Punishment in Robben Island Prison] No memos what is happening is that there was a punishment that was called "drie maaltye13"… Focus Group 1 - 5:6 ["drie maaltye", that is where ..] (29:29) (Super) Codes: [Punishment - Prisoners were not given food and placed in isolation for an entire day as punishment (only water was provided). - Family: Punishment in Robben Island Prison] No memos "drie maaltye", that is where you're missing that is your three meals and you'll be taken that is in a, in isolation cell. Focus Group 1 - 5:7 [Only you'll be supplied with w..] (32:32) (Super) Codes: [Punishment - Prisoners were not given food and placed in isolation for an entire day as punishment (only water was provided). - Family: Punishment in Robben Island Prison] No memos Only you'll be supplied with water Focus Group 1 - 5:38 [everyone who was taken out and..] (35:35) (Super) Codes: [Punishment - Prisoners were not given food and placed in isolation for an entire day as punishment (only water was provided). - Family: Punishment in Robben Island Prison] No memos everyone who was taken out and taken that is to the isolation cell when you'll be there, that is the whole day, and then they'll bring you later, when they, when they, they knew that, all the meals have been served, now you're not going to get anything 7.4.8.1 Conclusion of Punishment in Robben Island Prison Prison officials used punishment to ensure that prisoners behaved in what they deemed to be an appropriate manner. The researcher believes that the punishment experienced in Robben Island Prison should be included in the narrative of the digital graphic novel in order to portray the emotional climate of life in Robben Island Prison. 13 'Drie maaltye' is an Afrikaans phrase that translates into 'three meal times'. 7.4.9 Theme 9: Lawyers in Robben Island Prison Although there were only two codes relating to lawyers in Robben Island Prison, the researcher believed that it belonged in its own theme because access to a lawyer was a basic human right that ex-political prisoners of Robben Island Prison were not always granted. This theme was mainly represented in the second focus group with a total of two code occurrences. Codes relating to the role of lawyers in Robben Island Prison were grouped into the code family Lawyers in Robben

Island Prison. Table 7.16 shows the code occurrences of each code in the Lawyers in Robben Island Prison code family. Table 7.16: Code occurrence frequencies for codes in the Lawyers in Robben Island Prison code family. Interview FG 1 FG 2 TOTALS: Lawyers - Were allowed to represent the prisoners in cases occurring inside the prison. 0 0 1 1 Lawyers - Were not so powerful within Robben Island Prison. 0 0 1 1 TOTALS: 0 0 2 2 Contrary to the air of authority that most lawyers hold, the lawyers in Robben Island Prison did not have much power. Lawyers were allowed to represent prisoners in cases against prison officials, but in most of these cases, the prisoner's lawyers lost the case. Code Excerpt 12 shows the response of a participant relating to lawyers in Robben Island Prison. Code Excerpt 7.12: Participant's responses related to lawyers in Robben Island Prison. Lawyers - Were not so powerful within Robben Island Prison. Focus Group 2 - 6:21 [The lawyers was not, so powerf..] (58:58) (Super) Codes: [Lawyers - Were not so powerful within Robben Island Prison. - Family: Lawyers in Robben Island Prison] No memos The lawyers was not, so powerful, uhm, in, in, in actually winning the cases in most cases. 7.4.9.1 Conclusions on Lawyers in Robben Island Prison The researcher believes that it is important to include lawyers in Robben Island in the narrative of the digital graphic novel. The juxtaposition of a powerless lawyer may serve for as an interesting element. On the other hand, lawyers may be included in the digital graphic novel for a different role completely. Key factor 3 (F3) states that some documents from the loved ones of prisoners were smuggled into the prison. The researcher believes that the lawyers can be incorporated into the narrative of the digital graphic novel as the link between the prisoners and the outside world. 7.4.10 Theme 10: Secret messages in Robben Island Prison Secret messages were a prominent aspect in Robben Island Prison. Due to the separation of inmates into sections, incarcerated political leaders had to rely on secret messages to communicate with their comrades and inform them of any actions that they planned on taking – for example, hunger strikes. This theme was mainly represented in the second focus group with a total of 24 code occurrences. All codes relating to secret messages in Robben Island Prison were grouped into the Secret Messages in Robben Island Prison code family. The code occurrence frequencies for each code in the Secret Messages in Robben Island code family is given in Table 7.17. Table 7.17: Code occurrence frequencies for codes in the Secret Messages in the Robben Island Prison code family. Interview FG 1 FG 2 TOTALS: Secret messages - Each section had an inmate who was the assigned contact person to receive the secret messages. 0 0 4 4 Secret messages - Enabled leaders in each prison section to communicate with each other. 0 0 1 1 Secret messages - Messages were spread to inmates in other sections by those working in the kitchen via the pots. 0 0 4 4 Secret messages - Messages were wrapped in plastic and placed under the porridge. 0 0 1 1 Secret messages - There were only a few people who knew who they people involved in carrying messages were. 0 0 4 4 Secret messages - Those transporting the message did not know you it was for in particular. 0 0 0 0 Secret messages - Those transporting the secret messages did not know what they said or who they were from or to in order to prevent the exposure of the content. 0 0 4 4 Secret messages - Were encoded in another language. 0 0 2 2 Secret messages - Were encoded so that prison officials were unable to read it if found. 0 0 1 1 Interview FG 1 FG 2 TOTALS: Secret messages - Were spread via tennis balls that were hit across sections. 0 0 1 1 Secret messages - Prisoners could be pen-friends with other prisoners. 0 0 2 2 TOTALS: 0 0 2 4 24 One of the most prominent codes in the Secret Messages in Robben Island Prison code family relates to the spreading of secret messages via pots by the inmates who worked in the kitchen. Hiding messages in pots was one of the most inconspicuous ways of spreading messages as all prisoners were granted meal times. Code Excerpt 13 shows the responses of participants that relate to the spreading of secret messages via pots. Code Excerpt 7.13: Participants' responses related to the spreading of secret messages via pots. Secret messages - messages were spread to inmates in other sections by those working in the kitchen via the pots Focus Group 2 - 6:49 [I happened to work in the kitc..] (163:163) (Super) Codes: [Secret messages - messages were spread to inmates in other sections by those working in the kitchen via the pots - Family: Secret messages in Robben Island Prison] No memos I happened to work in the kitchen, uhm, so we were instrumental in disseminating information in the pots. Focus Group 2 - 6:50 [No, what happened is that if I..] (167:167) (Super) Codes: [Secret messages - each section had an inmate who was the assigned contact person to receive the secret messages - Family: Secret messages in Robben Island Prison] [Secret messages - messages were spread to inmates in other sections by those working in the kitchen via the pots - Family: Secret messages in Robben Island Prison] [Secret messages - messages were wrapped in plastic and placed under the porridge - Family: Secret messages in Robben Island Prison] No memos No, what happened is that if I involve in disseminating information, I don't know what is happening inside that, that spoed. We called it spoed because it's called speed. Spoed in Afrikaans means speed. So, it is wrapped in that plastic and put underneath the porridge. So each and every section you've got a contact person in that section. Focus Group 2 - 6:51 [so when information came, you ..] (169:169) (Super) Codes: [Secret messages - each section had an inmate who was the assigned contact person to receive the secret messages - Family: Secret messages in Robben Island Prison] [Secret messages - messages were spread to inmates in other sections by those working in the kitchen via the pots - Family: Secret messages in Robben Island Prison] No memos so when information came, you will bring the pots along and so, and then you, as you put the pot, that person already is around in the, in the courtyard, so he knows what, which pot. He, uhm, we don't know what is he going to do with it. Focus Group 2 - 6:61 [the person at the kitchen will..] (187:187) (Super) Codes: [Secret messages - messages were spread to inmates in other sections by those working in the kitchen via the pots - Family: Secret messages in Robben Island Prison] No memos the person at the kitchen will tell me, this is the, uhm, pot. That you, uhm, as a person who deliver. 7.4.10.1 Conclusions on Secret Messages in Robben Island Prison The spreading of secret messages in Robben Island Prison was a very well thought out process. There were specific individuals who had specific jobs and no one person knew anything more than they needed to. However, incorporating the entire process of the secret messages may violate the narrative principle given by Lutz & Huitt (2003:3), which states that complex information should not be presented in

the narrative. To account for this, the researcher believes that the easiest method of incorporating the secret messages will be to replicate the spreading of them in the pots. 7.4.11 Theme 11: Education in Robben Island Prison Education was very important to the prisoners incarcerated in Robben Island Prison. This was also identified as a key factor (F5). The importance of education to the inmates of Robben Island was so much so that they fought for the right for education through hunger strikes. This theme was mainly represented in the second focus group with a total of 13 code occurrences. All codes relating to education in Robben Island Prison were grouped into the Education in Robben Island Prison code family. The code occurrence frequencies for each code in the Education in Robben Island Prison code family is given in Table 7.18. Table 7.18: Code occurrence frequencies for codes in the Education in Robben Island code family. Interview FG 1 FG 2 TOTALS: Education - Certain prisoners taught certain subjects. 0 0 1 1 Education - Prison officials invigilated the exams to make sure that no messages were being passed. 0 0 1 1 Education - Prisoners in Robben Island had varying levels of education. 0 0 1 1 Education - Prisoners learned in groups. 0 0 1 1 Education - Prisoners placed a high degree of importance on education. 0 0 1 1 Interview FG 1 FG 2 TOTALS: Education - Prisoners taught each other how to read and write in the quarry in order to help them read and write letters to loved ones. 0 0 1 1 Education - Prisoners were allowed to write external exams. 0 0 2 2 Education - Prisoners who had a more advanced education shared their knowledge with other prisoners. 0 0 1 1 Education - Prisoners who were allowed to study through the education department educated their fellow prisoners in their cells at night. 0 0 2 2 Education - Those imprisoned for political reasons were not allowed to study electronics as it could be used for terrorist activity. 0 0 1 1 Education - Viewed as a method of empowering prisoners. 0 0 1 1 TOTALS: 0 0 1 3 13 One of the most prominent codes in the Education in Robben Island code family relates to the fact that prisoners who were allowed to study educated their fellow prisoners at night. According to key factor five (F5), this is how many of the inmates learnt how to read and write. Code Excerpt 14 gives participants' responses related to prisoners teaching their comrades that which they have learnt. Code Excerpt 7.14: Participant's responses related to prisoners teaching their comrades that which they have learnt. Education - Prisoners who were allowed to study through the education department educated their fellow prisoners in their cells at night. Focus Group 2 - 6:98 [people who were allowed to buy..] (321:321) (Super) Codes: [Education - Prisoners who were allowed to study through the education department educated their fellow prisoners in their cells at night. - Family: Education in Robben Island Prison] No memos people who were allowed to buy their books when they enroll with the education department, I mean the study office here, were allowed to, to, to apply for their studies, then you will be granted permission to study. Then after they, you were granted permission to study, they will go then to the section, and these leaders will take them through the process. At night there will be classes that were conducted in different corners. Focus Group 2 - 6:99 [Ya, yes they are selected by t..] (323:323) (Super) Codes: [Education - Certain prisoners taught certain subjects. - Family: Education in Robben Island Prison] [Education - Prisoners who were allowed to study through the education department educated their fellow prisoners in their cells at night. - Family: Education in Robben Island Prison] No memos Ya, yes they are selected by the leaders [inaudible]. You're supposed, you know this so you're supposed to uhm, teach, uhm, prisoners in this level. Other would teach English, others would teach, uhm, teach this, and this. Then the end of the year, you will go and write your exams, uhm, as you were taught by these people. 7.4.11.1 Conclusions of Education in Robben Island Education played an important role for the inmates in Robben Island Prison as it was seen as a method for empowering prisoners. The researcher believes that the importance that the political prisoners placed on education is a powerful message to relay to the target audience of young adults. The researchers feels that the camaraderie exhibited by prisoners with a more advanced education in imparting their knowledge to others will contribute to the narrative by introducing different characters an imparting a positive experience of learning in Robben Island Prison. 7.4.12 Theme 12: Views of Ex-political Prisoners During the analysis of the focus groups and interview, the researcher identified specific views that the ex-political prisoners had. These views ranged from advice for the future generation to what they think should be included in the design of the digital graphic novel. The researcher felt that it was important to include these views into their own theme in accordance with the answer provided to the first boundary question dealing with the sources of legitimation given in Table 7.2. In other words, the ex-political prisoners should be among the affected who are involved in the design of the digital graphic novel. This theme was mainly represented in the interview with a total of 14 code occurrences. All codes relating to the views of ex-political prisoners were grouped into the Views of Ex-political Prisoners code family. Table 7.19 shows the code occurrence frequency for each code in the Views of Ex-political Prisoners code family. Table 7.19: Code occurrence frequencies for codes in the Views of ex-political prisoners code family. Interview FG 1 FG 2 TOTALS: Views of ex-political prisoners - Ex-political prisoners recall hearing 'Stilte in die gang!' and 'Keep quiet!' and believe they should be included. 0 3 0 3 Views of ex-political prisoners - In the single cells, prison officials would shout 'Word wakker! Wake up!' in the mornings and this is an important sound. 0 1 0 1 Views of ex-political prisoners - Knocking and banging of doors is an important sound to include. 0 2 0 2 Interview FG 1 FG 2 TOTALS: Views of ex-political prisoners - People should learn from South Africa's struggle for freedom rather than repeat it. 1 0 0 1 Views of ex-political prisoners - Robben Island symbolises the triumph of the human spirit to the ex-political prisoner. 3 0 0 3 Views of ex-political prisoners - South Africans should move forward as 'good people'. 3 0 0 3 Views of ex-political prisoners - The actual ration card should be shown in the digital graphic novel. 1 0 0 1 Views of ex-political prisoners - The digital graphic novel should incorporate as much real-life items as possible. 1 0 0 1 Views of ex-political prisoners - The events that transpired as a result of Apartheid should not happen in another country. 1 0 0 1 Views of ex-political prisoners - The importance of guarding one's spirit is emphasised. 1 0 0 1 Views of ex-political prisoners - There is a sense of pride in achieving equality without resorting to civil war. 3 0 0 3 TOTALS: 14 6 0 20 Code Excerpt 7.15 provides an example of the view of ex-political prisoners regarding the fact that people should learn from South Africa's struggle for freedom

rather than repeat it. Code Excerpt 7.15: Example of a view of an ex-political prisoner. Views of ex-political prisoners - People should learn from South Africa's struggle for freedom rather than repeat it. Interview - 4:52 [it is actually what, what the,..] (62:62) (Super) Codes: [Views of ex-political prisoners - People should learn from South Africa's struggle for freedom rather than repeat it. - Family: Views of Ex-political Prisoners] [Views of ex-political prisoners - Robben Island symbolises the triumph of the human spirit to the ex-political prisoner. - Family: Views of Ex-political Prisoners] [Views of ex-political prisoners - South Africans should move forward as 'good people'. - Family: Views of Ex- political Prisoners] [Views of ex-political prisoners - The events that transpired as a result of Apartheid should not happen in another country. - Family: Views of Ex-political Prisoners] No memos it is actually what, what the, it is the significance of Robben Island and also it's based on what people like Mandela and people like Ntate Sisulu said, after, after all their years on Robben Island it, it was for them they were saying what happened on Robben Island, it should not, like Mandela would say, what happened on this land of ours, should never be repeated. In, and, and Ntate Sisulu saying it should be turned around to be the education. 7.4.12.1 Conclusions of Views of Ex-political Prisoners The researcher believes that in keeping with critical social heuristics, it is important for the views and opinions of the affected to be heard and addressed by including the ex- political prisoners in the design of the digital graphic novel. The incorporation of these views will not only serve to benefit the ex-political prisoners, but will also contribute towards the authenticity of the digital graphic novel as a true portrayal of the emotional social phenomenon. 7.5 Summary The diagnosis phase of the action research cycle of this study was discussed in this chapter. The chapter began with a review of the initial answers to the boundary questions and their impact upon the study and certain aspects in this phase. The research design phase was then addressed in which the interview development, data analysis and conclusions from the data was examined. Key isolated factors identified by the Mandela27 project team were coupled with principles for the design of the narrative and characters in a digital graphic novel in order to develop the questions that would be asked in the focus groups and interviews. The data was then analysed according to the eight step process for performing content analysis given by Zhang and Wildemuth (2009:3). In this process, code families were identified and transformed into themes from which conclusions were drawn regarding the content of the digital graphic novel. In the following chapters, the identified themes in this chapter will be combined with the proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical social heuristics and HCI principles given in Chapter 6. The aforementioned will be used to inform the creation a digital graphic novel portraying an emotional social phenomenon. 8 Chapter Eight: Action Planning and Action Taking 8.1 Introduction The aim of this study is to formulate a set of guidelines to aid in the development of digital graphic novels that will be used to portray emotional social phenomena using critical social heuristics and HCI principles. In this chapter, the proposed set of guidelines given in Chapter 6 will be combined with answers to Ulrich's 12 boundary questions discussed in Chapter 7 in order to create a digital graphic novel. The creation of the digital graphic novel takes part within the Action Planning and Action Taking phases of the research structure of this study (Figure 8.1). The chapter will follow the steps of the design science research process as described by Peffers et al. (2006:93). The chapter will begin with the problem identification in Section 8.2. The motivation for the creation of the digital graphic novel will be discussed in the Section 8.3. The objectives the digital graphic novel will then be discussed according to the definition of objectives of a system as given by Checkland and Scholes (1999:39) and the answers to the corresponding boundary questions given by Ulrich (Section 8.4). The design and development of the digital graphic novel will be discussed in Section 8.5. Also in Section 8.5, the literature reviews of digital graphic novels (Chapter 4), HCI principles (Chapter 5) and emotion and emotional social phenomena (Chapter 6) will be incorporated into the design science research process as descriptive and prescriptive knowledge. Examples of the development process of the digital graphic novel will also be given in Section 8.5. The chapter will conclude with a summary in Section 8.6. 225 | Chapter 8: Action Planning and Action Taking Figure 8.1: An adaptation of the action research cycle (Baskerville, 1999:14) and the design science research process (Peffers et al., 2006:93) to represent the research structure of this study. Chapter 8: Action Planning and Action Taking | 226 8.2 Problem identification According to the founders of the Mandela27 project, little is known in the European Union about historic cultural events in South African and vice versa, although most people are familiar with the Apartheid regime that inspired many of the aforementioned cultural events. The Mandela27 projects aims to promote intercultural dialogue amongst the European Union and South Africa. In order to draw interest to the project, the Mandela27 project consists of a physical display of Nelson Mandela's cell that will house three screens and photographic displays around the cell. The screens will display a digital cultural timeline that can be edited by those who have stories to share surrounding cultural events in the European Union and South Africa. Another screen will provide a virtual tour of Robben Island Prison. The third screen will display a digital graphic novel that should inform young adults about the conditions of prison life during the time of Nelson Mandela's incarceration in a medium that they find engaging and entertaining. Only the digital graphic novel will be reported on in this chapter. 8.3 Motivation for the development of a digital graphic novel The medium of a digital graphic novel was chosen due to the popularity of comic books and digital media amongst young adults. Besides other benefits discussed in Chapter 4, an added advantage of presenting the stories of ex-political prisoners in digital form is the ability to immerse the reader in the story through sounds and movement. By interacting with the digital graphic novel, readers will be able to hear sounds that the prisoners themselves experienced during their incarceration. The camera movement between frames is also a fresh break away from the static pages of a digitised comic book. The digital medium of the digital graphic novel also lends itself to the seamless dissemination between all the partners in the Mandela27 project as well as the rest of the world. Unlike comic books, which need to be printed and physically distributed, the digital graphic novel can be downloaded on Windows, Apple and Android devices. 8.4 Objectives of a solution Checkland and Scholes (1999:39) define the objectives of a system as the measure

of performance of a system in terms of efficacy (the systems does what it is supposed to do), efficiency (the use of resources is optimised), and effectiveness (achieves the higher goals). The researcher will discuss the objectives of the digital graphic novel with regard to its efficacy, efficiency and effectiveness. In order to guarantee the efficacy of the digital graphic novel, the researcher needs to ensure that the digital graphic novel does what it is meant to do. According to the answers provided to the 12 boundary questions in Chapter 3 and Chapter 7, the identified purposes of the digital graphic novel being developed are: ? The fair portrayal of the experiences of the ex-political-prisoners in Robben Island Prison. ? An exciting medium through which to learn about emotional social phenomena. The researcher will ensure that the experiences of the ex-political prisoners are fairly portrayed by incorporating the themes identified in Chapter 7 into the storyline of the digital graphic novel. The researcher will also create a digital graphic novel that will serve as an engaging medium for the target audience by applying the guidelines isolated from the literature reviews conducted in Chapters 4, 5 and 6. In order to preserve efficiency whilst attempting to achieve the identified measures of success of the digital graphic novel, the researcher will also have to account for and optimally use the resources present in the environment of the digital graphic novel. According to the answers provided to Ulrich's sixth boundary question in Chapter 7, the resources that form part of the environment of the digital graphic novel are: ? The period addressed in the storyline. ? The accounts given by the ex-political-prisoners. In order to optimise on the period that should be addressed in the storyline of the digital graphic novel, the researcher found prisoners incarcerated between 1970 and 1990. This period was chosen by the Mandela27 project team as is coincides with the period in which Nelson Mandela was incarcerated in Robben Island Prison. The accounts given by the ex-political prisoners were optimised by the means in which the focus groups and interviews were structured in Chapter 7 in order to achieve richness of the data. Finally, the researcher abided by the Mandela27 project deadlines and ensured that the development of the digital graphic novel would be based on sound methodological guidelines. The digital graphic novel will be evaluated in Chapter 9 in order to determine its effectiveness in achieving its higher goals of the fair portrayal of ex-political prisoners of Robben Island Prison and providing an engaging medium for young adults to learn about emotional social phenomena. 8.5 Design and development In this phase of the design science research process, concepts isolated from a literature review of digital graphic novel design (Chapter 4), HCI principles (Chapter 5) and emotion (Chapter 6) will be implemented in the design and development of the digital graphic novel. In order to study the research topic under investigation, the researcher needs to identify what is known about the environment, as well as what existing knowledge can be drawn upon in order to further understand the environment. As discussed in Chapter 2, knowledge that is known about an environment is called descriptive knowledge (Ω knowledge) and existing knowledge that is drawn upon in order to aid the research process is called prescriptive knowledge (Λ knowledge). The descriptive knowledge (Ω knowledge) that will inform the design and development of the digital graphic novel will be the guidelines for creating digital graphic novels (presented in Chapter 4). The prescriptive knowledge (Λ knowledge) that will be incorporated in the design and development of the digital graphic novel will be the guidelines isolated from the literature reviews of HCI principles (Chapter 5) and emotion (Chapter 6). The aforementioned guidelines are given in Table 6.2. The role of the researcher in the design and development of the digital graphic novel was to: ? Identify and study a suitable methodology to guide the design and development of the digital graphic novel (action research) (Chapter 2). ? Take ownership of the execution of the selected methodology (All chapters). ? Conduct a thorough literature review that results in guidelines o Digital graphic novels (Chapter 4) • N1-N3, C1-C5, P1-P7, A1-A4 o Human-computer interaction (Chapter 5) 229 | Chapter 8: Action Planning and Action Taking • N4-N7, P8-P13, I1-I14, S1-S2 o Emotions and emotional social phenomena (Chapter 6) • E1-E17 ? ? ? ? Create the narrative after analysing the data collected in the Diagnosing phase of the study (Chapter 7). Manage the design and development of the digital graphic novel (Chapter 8). Propose changes and implement them based on the evaluations of the digital graphic novel (Chapter 9). Facilitate focus groups consisting of young adults who tested the digital graphic novel and analyse the data collected from the focus groups (Chapter 9). ? Specify final guidelines for creating digital graphic novels portraying emotional social phenomena using critical systems heuristics and HCI principles (Chapter 10). Although the researcher was responsible for the design and development of the digital graphic novel, it was important to include experts in the process to compensate for skills that the researcher lacked. For example, although the researcher conceptualised and guided the artwork that belonged in each frame, the talents of an art student were required to draw the images. Therefore, in order to ensure an artefact of the highest quality, the researcher incorporated an array of experts into the design and development of the digital graphic novel. These experts and their expertise are listed in the answer to Ulrich's eighth boundary question discussed in Chapter 7. The experts included in the design of the digital graphic novel also contributed to the incorporation of the suggested guidelines (Table 8.1) into the digital graphic novel. Table 8.2 maps each expert to the guidelines that they assisted the researcher in implementing as well as how they were involved in the process. Table 8.1: Roles of each expert in the design of the digital graphic novel. Expert Role played in the design of the digital graphic novel Historical Consultant N1 – assisted the researcher in determining the emotions and worldviews that were incorporated into the narrative. N2 – assisted the researcher in deciding which content would give more emotional pull to the narrative. C1 – assisted the researcher to formulate the conflicts that the main character would engage in with either himself or the world around him. C2 – assisted the researcher in creating characters that are believable and vivid human beings by offering historical insight during the storyboarding process. S2, E10 – assisted the researcher in identifying sounds that ex- political prisoners would have experienced during incarceration. Language Consultant N2, N3, N4, N5, N6, N7 – assisted the researcher in determining the content and flow of the narrative. C1, C2 – assisted the researcher in scripting interesting internal and external character conflicts resulting in the creation of believable characters. E1, E12, E16 – assisted the researcher in incorporating emotional content into the storyboard of the digital graphic novel. HCI Scholar I1,

I3, I4, I5, I6, I7, I8, I9, I10, I11, I12, I13 – advised the researcher about the correct application of HCI principles within a digital graphic novel. E2, E3 – advised the researcher about the overall look-and-feel of the digital graphic novel. Art Student A1, A2, A3, A4 – worked closely with the researcher to create images that effectively communicated the content and emotional climate of the digital graphic novel. C2, C3, C4, C5 – worked closely with the researcher to create vivid, believable characters. P3, P8, P9, P10, P11 – worked closely with the researcher to draw panels and frames that elicit emotion from the reader and are visually stimulating to the reader. E2, E3, E4, E6, E7, E8, E9, E12, E13, E14, E15, E14 – worked closely with the researcher to portray the emotions of the emotional social phenomena through design, colour, and imagery. Programmer I1, I3, I4, I5, I6, I7, I8, I9, I10, I11, I12, I13 – assisted the researcher in implementing HCI principles into the digital graphic novel. S1, S2 – assisted the researcher by ensuring that the sounds were coded into the right places in the digital graphic novel and at the right volumes. E2, E3, E10, E11 – assisted the researcher by creating the emotional and affective qualities of the digital graphic novel by programming sounds, colours and other components of the overall look-and-feel of the digital graphic novel. To further increase the accuracy of the digital graphic novel, the researcher incorporated photos of Robben Island taken by the Mandela27 team into certain frames of the digital graphic novel. The incorporation of these images not only provide 231 | Chapter 8: Action Planning and Action Taking a fair representation of the experiences of ex-political prisoners of Robben Island Prison, but are also recognisable entities that readers who subsequently visit Robben Island will be able to identify. Figure 8.2 illustrates the incorporation of actual entities into the digital graphic novel. Figure 8.2: Example of the incorporation of actual entities on Robben Island in the digital graphic novel. The development of the digital graphic novel took part frame by frame and then page by page. Figure 8.3 shows the development of the first frame and Figure 8.4 shows the development of a page by combing frames. Both figures are followed by a brief summary that addresses the themes, codes and principles that informed their design and development. Figure 8.3: The first frame of the digital graphic novel. Themes: Daily Life in Apartheid, Youth in the Apartheid era Codes: Daily Life - Marches in solidarity with other freedom fighters were held, Daily Life - Young children were deeply impacted by what they witnessed in the Apartheid era, Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm. Principles incorporated: N5, N2: The author aims to make the readers care about the narrative by presenting the first frame from the viewpoint of a participant in the march. In doing so, readers feel part of the march as they look at the young boy watching on from the entrance of his shack. N3: Many young adults in South Africa and abroad can identify with historic marches against oppressive governments, ideals and laws. N4, N6: This frame clearly encapsulates the essence of the three codes it represents through a combination of carefully selected words and imagery. 233 | Chapter 8: Action Planning and Action Taking N5, N7, E16: The words of the narrative in this frame elicit a feeling of sympathy towards the child who had to grow up amongst this unrest. C1, C5, A3, E12, E14, E15: The raised fists of the characters in the march show their determination and anger. In contrast, the child leaning against the door of his shack shows his uncertainty and fear to be outside his home. This frame represents the character's personal struggle as a child growing up in this emotional climate. P3, P5, A1, A2: The images used in this frame represent an aspect and moment that is important to the narrative. This aspect and moment of the young child looking on as crowds of adults took part in a protest march was carefully selected in order to both elicit emotions from the readers and portray emotions to the readers. A4: An intersecting combination of images and the narrative text is used. In this frame, the words state that it was the only kind of life that the child had ever known. The image paints the picture of the kind of life to which the child is referring. E6, E7, E8: Shades of orange were used in order to portray the distressed and upset child and members of the riot. Black was incorporated into the frame to represent the bad conditions against which protesting and the grim emotional climate. This is the first frame of the digital graphic novel. In this frame, the main character is introduced as a child. The story begins with the main character explaining his youth. In this frame, the researcher incorporated the themes and codes mentioned above either through explicit references or through the artwork in the frame. For the first iteration of the digital graphic novel, there were no sounds as the researcher wanted to confirm whether sounds would be distracting to the readers. At this stage, the researcher made use of powerful images and strong sentences within the narrative to attempt to elicit emotion from the reader. The researcher and the artist agreed to not use too much detail at first in order to give the feel of the frames a hazy, memory-like feel. This frame would be incorporated into the first page of the digital graphic novel. Figure 8.4: The first page of the digital graphic novel. Themes: Daily Life in Apartheid, Youth in the Apartheid era Codes: Daily Life - Marches in solidarity with other freedom fighters were held, Daily Life - Young children were deeply impacted by what they witnessed in the Apartheid era, Daily Life - Soldiers would raid the houses of African men in order to remove all objects they deemed dangerous or a potential weapon, Participation in riots resulted in long term sentences, Rebellion still took place in the midst of hope for positive change, Youth - a generation grew up during the midst of Apartheid and viewed bad living conditions as a norm, Youth - Beginning of the youth uprisings, Youth - the younger generation of the Apartheid era would take part in the riots. Principles incorporated: N2, N5, E12: The author aims to make the reader care about the narrative through the choice of words and images used in the page. The series of images shows the growth of the character from child to young adult. N3: Young adults in South Africa and abroad can identify with historic marches against oppressive governments, ideals and laws. Many may have learnt about the actions of their parents and grandparents against sources of oppression as well as the resulting punishment. N4, N6: The frames in this page capture many facets of the themes Daily life in Apartheid and Youth in the Apartheid era through the use of carefully selected narrative text and imagery. N5, N7, E16: The narrative on this page of the digital graphic novel was written in a manner that showcased the events from the character's childhood until awaiting incarceration at Jetty One. The inclusion of this sequence of events promotes meaningfulness as it provides a look into the events in early that shaped the life of the character. C1, C2, C3, C5, E1, E17: This allows the reader to witness the conflicts that the

character has with both himself and the world around him as he decides to join in the fight for freedom. The facial expressions and body language of the character in the frames of this page further enhance the emotional climate as they show his confusion as a child, determination as a young adult, and sadness as a prisoner awaiting incarceration. The combination of the aforementioned aspects help shape the character into a believable human being that readers can relate to. P1, P2, P7: The panels (frames) in the page flow easily from one to the other as the narrative progresses. The page also makes use of the standard left-to-right and top- to-bottom flow that readers are accustomed to. P3, P5, A1, A2: The images in each frame represent aspects and moments that are important to the narrative. These aspects are moments were carefully selected in order to both elicit emotions from the readers and portray emotions to the readers. The images clearly and compelling tell the story of the important life events that led to the character's decision to take part in the fight for freedom and his subsequent incarceration. P6, E12, E13: The first four frames of the novel as more or less the same size while the last frame spans the width of the page. The first four frames are almost equal in size as they all represent memories that were of equal importance to the character. The last slide spans the width of the page because it represents a major turning point in the character's life and the wide view symbolises his last view of freedom while awaiting incarceration on Jetty One. P8, P11: Characters in the frames are drawn at different sizes to represent their positions in 3-dimensional space. For example, in the third frame, the little child cowering behind the couch is in the background hiding from the action occurring in the foreground of the picture. P12, P13: The text of the digital graphic novel is presented in a negative contrast and with standard capitalisation rules in order to simplify the reading process. A3, E12, E13 E14, E15: The pictures used in the frames of the page were used to evoke specific emotions to create a sense of immersion in the digital graphic novel. In the first two frames, the reader feels part of the march while looking on in sympathy with the confused young child standing at the door of his shack. In the third frame, the reader as though they are inside the house that the soldiers have entered. The fourth frame is from the viewpoint of a member of the march looking up to the confident, determined character. In the final frame, the reader feels like one of the prisoners awaiting incarceration along with the main character. A4: An intersecting combination of images and the narrative text is used. In this page, the narrative text states important aspects of the story, while the images paint a clearer picture of what they entailed. For example, in the third frame, the narrative text states that the character did not feel safe in his own home. This could have been for various reasons, such as: 237 | Chapter 8: Action Planning and Action Taking ? The structure of the shack could have been unstable. ? The character could have been afraid of the marches that took place outside his doorstep. The picture clears up the meaning of the narrative text and contributes towards the narrative by illustrating that as a child, the character did not feel safe in his own home when it was penetrated by soldiers. E6, E7, E8: Shades of orange were used in order to portray the distressed and upset child, members of the riot, occupants in the house and prisoners awaiting incarceration. Black was incorporated into the frame to represent the bad conditions against which protesting and the grim emotional climate. The incorporation of blues in the final frame not only symbolise the ocean, but the fact that the character witnessed his last blue sky on the shores of freedom as he awaited his incarceration. Figure 8.4 is the first page of the digital graphic novel. At this stage, the researcher incorporated guidelines pertaining to the panels and pages of a digital graphic novel. A variety of other codes were incorporated into the page, but the overarching themes (Daily life in Apartheid and Youth in the Apartheid Era) remained similar in each frame. At this point, the researcher and all experts who were involved in the design of the digital graphic novel felt that the first page was complete and ready to be tested by the readers. Due to time constraints, the researcher decided to develop only one page of the digital graphic novel for the demonstrations and evaluations of the target audience. Once the themes of the recommendations are identified and implemented, development of the entire digital graphic novel will take place. A more comprehensive demonstration of the completed digital graphic novel will take place in Chapter 9. 8.6 Summary of Chapter 8 The Action Planning and Action Taking phases of the research study were discussed in this chapter. The problem that will be addressed by the creation of the digital graphic novel was discussed in Section 8.2. The motivation for the development of the digital graphic novel was given in Section 8.3 and the objectives of the digital graphic novel were discussed according to the answers to the relevant boundary questions in Section 8.4. Finally, the design and development of the digital graphic novel was discussed in Section 8.5 The demonstration and evaluation of the digital graphic novel will be discussed in Chapter 9. 9 Chapter Nine: Demonstration and Evaluation 9.1 Introduction The objective of the research conducted in this study is to develop guidelines for creating digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles. In this chapter, a digital graphic novel created using the guidelines proposed in Chapter 6 will be demonstrated and evaluated. The demonstration phase falls under the design science research process which forms part of the Action Taking and Action Planning phases of the overarching action research cycle incorporated in this study (Figure 9.1). The Evaluation phase falls under both the design science research cycle as well as the action research cycle adopted in this study. Data was collected through focus groups held with participants from the target audience of the digital graphic novel. The development of the questions posed in the focus groups will be discussed in Section 9.2. The data collection process will be discussed in Section 9.2.1. The methods of data analysis that will be used in the Evaluation phase will be discussed in Section 9.2.2. The demonstration of the first version will be reported on Section 9.3. This section will include a report on the coding and themes identified in the data as well as the improvements identified from the data analysis process. The second and third versions will be reported on Section 9.4. This section will include a demonstration of the improvements made to the original version, a report on the coding and themes identified in the data as well as the further improvements identified from the data analysis process. The incorporation of the themes identified in the data analysis process of all focus groups will be discussed in Section 9.5. The final version of the digital graphic novel will be demonstrated in Section 9.6. This will be followed by a report on the implementation of the digital graphic

novel in Section 9.7. The chapter will conclude with a summary in Section 9.8. A copy of the Mandela27 digital graphic novel is included in the Data CD. The digital graphic novel is saved as Windows and iOS application files. Chapter 9: Demonstration and Evaluation | 240 Figure 9.1: An adaptation of the action research cycle (Baskerville, 1999:14) and the design science research process (Peffers et al., 2006:93) to represent the research structure of this study. 241 | Chapter 9: Demonstration and Evaluation 9.2 Research design – Evaluating phase The Evaluating phase is the fifth stage of the design science research cycle, and the fourth stage of the action research cycle. In this phase, the views of members of the target audience concerning the digital graphic novel are determined. This correlates with proposed guideline I1 which states that the interface of a digital graphic novel should be tested on a member of the target audience and then altered to accommodate their preferences. The views of members of the target audience will be determined by conducting focus groups. The identified views will help to inform the design and development of the digital graphic novel as the recommendations collected from each focus group regarding the first developed page of the digital graphic novel will be considered and implemented in the subsequent version. The literature review conducted in Chapter 2 guided the researcher in further understanding the data that is collected through the interpretive methods. At the end of this phase, the identified themes in the data that should be addressed in the design and development of the digital graphic novel portraying emotional social phenomena created in this study. 9.2.1 Data collection The researcher made use of the focus groups to address issues of importance regarding the design and development of the digital graphic novel. Although every effort was taken to produce an artefact that incorporated the identified guidelines (Chapter 9 Section 6.7), it was important to address particular issues with members of the target audience. The questions for the focus groups were structured around the main headings of the proposed guidelines given in Chapter 6 Section 6.7. Table 9.1 links each of the five open-ended questions posted to participants of the focus groups to the heading with which it corresponds. Table 9.1: List of questions mapped to headings of proposed guidelines. Question Heading 1 What do you think of the design of the digital graphic novel? Pages and Panels 2 What are your opinions on the artwork? Artwork 3 What are you opinions on the camera movement? Interface 4 What are you opinions on the addition of sound/narration in the digital graphic novel? Sound 5 Would you enjoy reading this digital graphic novel? Emotion Although the questions posed during the focus groups appear broad, it was deemed necessary to pose the questions in order to avoid prompting the participants by asking guideline specific questions. For example, although the fifth question in Table 9.1 asks a participant whether they would enjoy reading the digital graphic novel, the real purpose of the question is to determine whether a participant experienced a certain emotion without prompting. As in Chapter 7, subsets of the questions given in Table 9.1 were posed in the focus groups. 9.2.1.1 Process and participants Once the questions were structured and finalised, focus groups with members of the target audience were held. The process followed for the focus groups is given in Section 9.2.1.2 and the details of the participants are given in Section 9.3.1 and Section 9.3.2. 9.2.1.2 Focus group process One focus group was held after the first development of the first page (which contained five frames) of the digital graphic novel in order to inform the design and development of the artefact. The second and third focus groups were held after the second development of the first page of the digital graphic novel in order to identify whether the changes made to the first version were acceptable to other members of the target audience. The recommendations identified from the second and third focus groups provided further insight for the development of the digital graphic novel as a whole. The first focus group was held in the hall of a high school in Three Rivers, Vereeniging. The remaining two focus groups were held in the development labs of the Serious Games Institute – South Africa at the North-West University (Vaal Triangle Campus) in Vanderbijlpark. Each focus group consisted of participants who were between the ages of 16 and 25. Participants in the first focus group knew each other and were a little more casual in their responses in comparison to the participants of the second and third focus groups. In general, however, there was a lack of feedback from the participants in the focus groups conducted in this phase of the study. The researcher suggests that the age group of the participants was one that lent itself heavily to peer pressure. As a result, many participants were too shy to offer long, detailed answers and many responded 243 | Chapter 9: Demonstration and Evaluation with a simple ‘yes’, ‘no’ or nod of agreement. In these cases, conclusions were made based on statements made that led to the responses of the participants. In order to compensate for the social climate within the focus groups, a relaxed environment was created in which the participants felt comfortable to share their views. This was accomplished in many ways including thanking participants for their valuable input, giving each participant an opportunity to respond and sometimes by even talking about ‘awesome comic book hero movies’. In some cases where the respondents were especially shy, possible answers were offered in order to encourage participants to formulate their own. Once again, open-ended and semi-structured focus groups were used to allow participants to talk amongst themselves. Participants were also free to digress from initial questions as the researcher believes that it is important to allow participants to speak freely about all ideas stemming from the original question as this contributes towards a richness in the data. As mentioned previously, some respondents were extremely shy to answer a question directly. In these cases, a question was asked and then a possible answer was given after waiting for a sufficient amount of time. Some participants were unable to formulate their thoughts into arguments or comments. These participants found it helpful to agree or disagree with an answer provided by the researcher. Although out of the ordinary, the aforementioned methods allowed the participants to engage in a conversation with the researcher and other participants regarding the digital graphic novel. 9.2.2 Data analysis The content analysis of the data collected in the focus groups will be done in a directed manner. The number of theories on a phenomenon may be limited and may increase upon further study. Directed content analysis focuses on the description and validation of theories on a phenomenon (Hsieh & Shannon, 2005:1279). The textual analysis of the data in this study will by cyclic in nature. In this study, the whole body of text that will be analysed will be the focus groups and interview. The parts of this whole will be the

questions, a specific participant's response and the responses of other participants. Characteristics of the focus groups conducted in the evaluation phase were: Chapter 9: Demonstration and Evaluation | 244 ? Simple statements of agreement or disagreement such as 'yes' or 'no'. ? Incomplete sentences that could either be a statement or an incomplete thought. For example, one of the responses received by a participant was "I like." In order to understand whether this was a statement or an incomplete thought, the researcher had to look at the statement made before the response. A review of the transcript showed that the researcher asked the participants if they are satisfied with what they have seen of the digital graphic novel. Also, to be certain that it was not an incomplete thought, the researcher returned to the audio files and listened to the focus group in order to hear the intonation with which the response was made. After reviewing the transcript and listening to the audio file, the researcher was able to determine that the participant was expressing approval of the overall design of the digital graphic novel. Therefore, by understanding each individual part of the focus groups, the researcher will be able to gain a better understanding of the text as a whole and vice versa. Each response in the focus group will be analysed in chronological order with the aim of reconstructing the meaning of each response. The overall climate of the focus group will also be used to interpret certain responses. This process reflects the ideas of hermeneutics. The data analysis in this study took place according to the eight step process of performing content analysis as proposed by Zhang and Wildemuth (2009:3). Table 9.2 provides an overview of the eight steps proposed by Zhang and Wildemuth (2009:3) as well as how each step has been applied in this research. Table 9.2: Adapted summary of the content analysis process as summarised from Zhang and Wildemuth (2009:3). 1. Prepare the Data This step was completed by transcribing the focus groups and removing any identifying data as discussed in Section 9.2.2.1. 2. Define the unit of analysis The chosen unit of analysis for this research is response per participant per question as discussed in Section 9.2.2.2. 3. Develop categories and a coding scheme Questions are derived from elements of the principles for the design of a digital graphic novel (Section 9.2.1). The bulk of the categorisation takes place in the coding phase discussed in Section 9.3.1., 9.4.1. 4. Test your coding on a sample of text The researcher gained experience in applying this method in Chapter 7 and was able to code the text of each focus group. 5. Code all the text All focus groups were coded. A summary of all codes per focus group is given in Section 9.3.1 and 9.4.1. 6. Assess your coding consistency The researcher coded the data once and then set the codes and transcripts aside for two weeks. After two weeks, the researcher once again coded all the data again and compared the codes of the second round of coding with that of the first. Differences in codes were investigated. Codes that were not picked up in the first or second round of coding were included in the final list and codes that were similar were merged into one code. 7. Draw conclusions from the coded data Once the codes were grouped into code families, the researcher isolated themes which are further discussed in Section 9.3.3 and 9.4.3. 8. Report your method and findings Chapters 2, 7 and 10 serve as the report of the methods and findings. 9.2.2.1 Prepare the data The first of the eight steps proposed by Zhang and Wildemuth (2009:3) was completed as described in Table 9.2 and discussed in Section 9.2.1. The focus groups and interview were transcribed and edited in order to ensure that no identifiable data was present in any of the responses. The transcriptions of the focus groups and interview do not contain any changes in terms of grammar or colloquialisms in an attempt to make the environment of the focus groups and interview transparent to the reader. 9.2.2.2 Define the unit of analysis The next step in the data analysis process was to define a unit of analysis. This step corresponds to Step 2 in Table 9.2. Due to the fact that not all questions were asked to all participants, the researcher will analyse each answer with respect to the other answers given by the participants and the general discussion in the focus group. 9.2.2.3 Develop categories and a coding scheme Although the categories of the proposed guidelines served as categorisation of the questions, final categories could only be developed once the content analysis was completed. 9.2.2.4 Test your coding on a sample of text The researcher made used of the coding experience acquired in Chapter 7 and applied it to the coding of each of the focus groups. 9.3 First demonstration The digital graphic novel was developed in the Unity game engine. The proposed guidelines from Chapter 6 were combined with the stories of the ex-political prisoners (Chapter 7) in order to develop the digital graphic novel. Due to the time constraints imposed by the Mandela27 project deadlines, the researcher was unable to develop multiple iterations of the entire digital graphic novel for each evaluation. In order to compensate for this, the researcher opted to develop five frames, test them on a focus group consisting of the target audience and then redevelop the frames according to the themes discovered in the evaluation. Figures 9.2 – 9.6 demonstrates each frame of the first page of the digital graphic novel. Figure 9.7 demonstrates the first page of the digital graphic novel as shown to the participants of the focus groups. Figure 9.2: The first frame of the demo page. Figure 9.4: The third frame of the demo page. Figure 9.3: The second frame of the demo page. Figure 9.5: The fourth frame of the demo page. Chapter 9: Demonstration and Evaluation | 248 Figure 9.6: The fifth frame of the demo page. Figure 9.7: The first version of the demo page. 249 | Chapter 9: Demonstration and Evaluation 9.3.1 Participant detail The first focus group consisted of high school learners of a school in Three Rivers, Vereeniging. This school was selected because the environment is known to the researcher. Her familiarity with the school allowed her to obtain permission to conduct a focus group with the students and her familiarity with the students motivated many participants to attend as they were not intimidated by the researcher. The participants of the first focus group consisted of the principal and seven female senior high school students. Permission was obtained from the school principal to conduct the focus group. A written letter of consent is presented in Appendix A. The focus group was conducted in the hall of the school with the principal present at all times. The participants were given context of the Mandela27 project. The participants were shown a demo page which contained five frames. The participants were asked questions after the demonstration in order to assist the researcher in refining the digital graphic novel into an exciting medium through which the target audience can learn about an emotional social phenomenon. 9.3.2 Code all the text Responses from the first focus group were coded according to their relative topics. Table 9.3:

Summary of all codes from the first focus group. Focus Group 1 TOTALS: Artwork - Finer detail would be preferred in the artwork. 2 2 Artwork - The chosen art style works well for the target audience. 2 2 Camera Movement - between frames is too distracting. 1 1 Camera Movement - Makes reading difficult. 1 1 Camera Movement - Needs to be more subtle. 1 1 Camera Movement - Suggested that the player controls the timing of the camera movement themselves. 1 1 Camera Movement - The angles during movement distorts text. 1 1 Camera Movement - The camera zooms in and out too much. 1 1 Camera Movement - Timing between frames need to be slowed down as it transitions too fast. 3 3 Character - Enjoys the character. 1 1 Colours - Feels that the colours should remain the same. 1 1 Colours - Helped elicit emotions mirroring the ominous nature of the content. 1 1 Colours - In favour of the colours used. 1 1 Colours - Indifferent to colours used. 1 1 Colours - Would prefer a wider array of colours. 4 4 Design - Approves of the overall look and feel of the digital graphic novel. 4 4 Design - Approves of the simulated 3D effect of the graphics. 1 1 Design - The digital graphic novel communicates better to the target audience than plain audio or text. 2 2 Design - Would like to select their own character 2 2 Narration - feels that subtitles should accompany the narration. 2 2 Sounds - Prefer higher volumes at more intense scenes. 1 1 9.3.3 Assess the coding consistency The researcher coded the data once and then set the codes and transcripts aside for two weeks. After two weeks, the researcher once again coded all the data again and compared the codes of the second round of coding with that of the first. Differences in codes were investigated. Codes that were not picked up in the first or second round of coding were included in the final list and similar codes were merged into one code. In the coding process, many codes related to similar topics. In order to prevent these from becoming inconsistencies, codes were grouped together into families. Families are codes that are grouped according to their similar topics. 9.3.4 Conclusions from the data Step 7 of the content analysis process according to Zhang and Wildemuth (2009:3) is to draw conclusions from the coded data. By making use of code families as discussed in the previous section, the researcher was able to distinguish six themes that were present in the data. These themes are discussed in the sub-sections of this section. The discussion of each theme will begin with a short summary of the theme. The codes that support this theme and form part of its code family are then presented in table format along with the number of their occurrences in each primary document. One of the most frequently occurring codes is discussed and finally, conclusions are drawn from the analysis of the data. 9.3.4.1 Theme 1: Artwork The participants of the focus groups expressed their views toward the art style used in the digital graphic novel. The art style relates to the way in which all the graphic content is presented. The researcher chose to discuss colour and artwork separately as it seemed that the participants treated them as different entities in their responses. For example, a participant may have approved of the art style but not of the colours. An example of this is taken from the second focus group and presented in Code Excerpt 9.1. Code Excerpt 9.1: Example of a participant's separation of artwork and colour. P 3: Evaluation - Focus Group 2 - 3:15 [R7: Uhm, I like the [inaudible..] (75:75) (Super) Codes: [Colours - Would prefer a wider array of colours. - Family: Colour] [Design - Approves of the overall look and feel of the digital graphic novel. - Family: Design] No memos R7: Uhm, I like the cartoony stuff, but can't there be like more colours? The researcher combined all codes relating to the artwork and art style into the code family called Artwork. Table 9.4 demonstrates the code occurrence frequencies for each code in the Artwork code family. Table 9.4: Code occurrence frequencies for codes in the Artwork code family. Focus Group 1 TOTALS: Artwork - Finer detail would be preferred in the artwork. 2 2 Artwork - The chosen art style works well for the target audience. 2 2 TOTALS: 4 4 There were equal occurrences of each code in the Artwork code family. The code that offered a recommendation for refining the digital graphic novel will be discussed. Although some participants enjoyed the art style, other responses indicated that the artwork of the digital graphic novel would benefit from incorporating finer detail. Code Excerpt 9.2 shows participants' responses regarding the need for finer detail in the artwork of the digital graphic novel. Code Excerpt 9.2: Participants' responses regarding the need for finer detail in the artwork of the digital graphic novel. P 1: Evaluation - Focus Group 1 - 1:4 [Are the characters gonna be mo..] (92:92) (Super) Codes: [Artwork - Finer detail would be preferred in the artwork. - Family: Artwork] No memos Are the characters gonna be more detailed than that or is that the… P 1: Evaluation - Focus Group 1 - 1:21 [Does he have hair? Is he bald?..] (176:176) (Super) Codes: [Artwork - Finer detail would be preferred in the artwork. - Family: Artwork] No memos Does he have hair? Is he bald? 9.3.4.1.1 Conclusions from Artwork The art style used in the digital graphic novel should be more detailed in order to cater to the preferences of the target audience. By adding more detail to the current art style, the digital graphic novel will appeal to a larger portion of the target group. This will increase the size of the audience to which the stories of the ex-political prisoners of Robben Island Prison will be relayed. 9.3.4.2 Theme 2: Camera Movement The participants of the focus groups expressed their views toward the camera movement incorporated within in the digital graphic novel. The camera movement relates to the way in which the reader's view is guided from frame to frame in the digital graphic novel. The researcher combined all codes relating to the camera movement into the code family called Camera Movement. Table 9.5 demonstrates the code occurrence frequencies for each code in the Camera Movement code family. Table 9.5: Code occurrence frequencies for codes in the Camera Movement code family. Focus Group 1 TOTALS: Camera Movement - between frames is too distracting. 1 1 Camera Movement - Makes reading difficult. 1 1 Camera Movement - Needs to be more subtle. 1 1 Camera Movement - Suggested that the player controls the timing of the camera movement themselves. 1 1 Camera Movement - The angles during movement distorts text. 1 1 Camera Movement - The camera zooms in and out too much. 1 1 Camera Movement - Timing between frames need to be slowed down as it transitions too fast. 3 3 TOTALS: 9 9 The most prominent code in the Camera Movement code family deals with the fact that the camera movement between frames is too fast for readers. Code Excerpt 9.3 shows participants' responses regarding the need for slower camera movement in the digital graphic novel. Code Excerpt 9.3: Participants' responses regarding the need for slower camera movement in the digital graphic novel. Evaluation - Focus Group 1 - 1:13 [Like, it went on the first one..] (139:139) (Super) Codes: [Camera Movement - Timing between frames

need to be slowed down as it transitions too fast.] No memos Like, it went on the first one, and then it moves to the second, but then it goes away, and then it goes back to the third one. Evaluation - Focus Group 1 - 1:12 [The movements are too, too fas..] (137:137) (Super) Codes: [Camera Movement - Timing between frames need to be slowed down as it transitions too fast.] No memos The movements are too, too fast. Evaluation - Focus Group 1 - 1:10 [Ya, it's distracting. The firs..] (132:132) (Super) Codes: [Camera Movement - between frames is too distracting.] [Camera Movement - Timing between frames need to be slowed down as it transitions too fast.] No memos Ya, it's distracting. The first one was a bit hectic. 9.3.4.2.1 Conclusions from Camera Movement The researcher included camera movement into the digital graphic novel in order to guide the view of the reader. The responses from the focus group indicate that the camera movement is not optimised as it is perceived as distracting and too fast. The camera movements will have to be readjusted in order to facilitate a smooth flow from frame to frame and to allow for a positive reading experience. 9.3.4.3 Theme 3: Character Although there was only one response that covered the topic of the character, the researcher believed that it was important to report on it as a theme on its own. This is attributed to the fact that guidelines relating to characters in a digital graphic novel are in a category of their own. The researcher created the code family called Character to contain the code relating to the main character of the digital graphic novel. Table 9.6 demonstrates the code in the Character code family. Table 9.6: Code occurrence frequencies for codes in the Character code family. Focus Group 1 TOTALS: Character - Enjoys the character. 1 1 TOTALS: 1 1 Code Excerpt 9.4 shows the participant's response regarding the main character of the digital graphic novel. Code Excerpt 9.4: Participant's response regarding the main character of the digital graphic novel. P 1: Evaluation - Focus Group 1 - 1:28 [you've got a good character he..] (225:225) (Super) Codes: [Character - Enjoys the character. - Family: Character] No memos you've got a good character here… 9.3.4.3.1 Conclusions from Character Even though there were no questions posed surrounding the character of the digital graphic novel, a participant expressed satisfaction with the character. The researcher believes that this is an important response as it demonstrates the fact that members of the target audience enjoy the manner in which the main character is portrayed. Therefore, the author, designer and artist need to ensure that the method of portrayal of the main character remains the same style throughout the digital graphic novel. 9.3.4.4 Theme 4: Colours The participants of the focus groups expressed their views toward the colours used in the digital graphic novel. As stated earlier, the researcher chose to discuss colour and artwork separately as it seemed that the participants treated them as different entities in their responses. The researcher combined all codes relating to the colours in the digital graphic novel into the code family called Colours. Table 9.7 demonstrates the code occurrence frequencies for each code in the Colours code family. Table 9.7: Code occurrence frequencies for codes in the Colours code family. Focus Group 1 TOTALS: Colours - Feels that the colours should remain the same. 1 1 Colours - Helped elicit emotions mirroring the ominous nature of the content. 1 1 Colours - In favour of the colours used. 1 1 Colours - Indifferent to colours used. 1 1 Colours - Would prefer a wider array of colours. 3 3 TOTALS: 7 7 The most prominent code in the Colours code family deals with the fact that participants would prefer a wider range of colours in the frames of the digital graphic novel. Code Excerpt 9.5 shows participants' responses regarding the need for the use of a wider array of colours in the digital graphic novel. Code Excerpt 9.5: Participants' responses regarding the need for the use of a wider array of colours in the digital graphic novel. P 1: Evaluation - Focus Group 1 - 1:29 [R4: is the colour scheme gonna..] (119:121) (Super) Codes: [Colours - Would prefer a wider array of colours.] No memos R4: is the colour scheme gonna stay this brown black and white? R5: It should stay like that. R4: No P 1: Evaluation - Focus Group 1 - 1:8 [I think it's good like that, b..] (123:123) (Super) Codes: [Colours - Would prefer a wider array of colours.] [Design - Approves of the overall look and feel of the digital graphic novel.] No memos I think it's good like that, but if it changes it would be even… P 1: Evaluation - Focus Group 1 - 1:15 [Ya, I don't like the colour.] (165:165) (Super) Codes: [Colours - Would prefer a wider array of colours.] No memos Ya, I don't like the colour. P 1: Evaluation - Focus Group 1 - 1:16 [You must have more orange] (171:171) (Super) Codes: [Colours - Would prefer a wider array of colours.] No memos You must have more orange 9.3.4.4.1 Conclusions from Colours The colours used in the digital graphic novel were selected with the aim of portraying the sombre, ominous emotions felt by the ex-political prisoners. However, many participants of the focus group felt that there should be a wider array of colours used. Different hues will be incorporated into the next version of the first page of the digital graphic novel in order to make the colour scheme more appealing to members of the target audience. 9.3.4.5 Theme 5: Design The participants of the focus groups expressed their views regarding the design of the digital graphic novel. The researcher combined all codes relating to the design of the digital graphic novel into the code family called Design. Table 9.8 demonstrates the code occurrence frequencies for each code in the Design code family. Table 9.8: Code occurrence frequencies for codes in the Design code family. Focus Group 1 TOTALS: Design - Approves of the overall look and feel of the digital graphic novel. 4 4 Design - Approves of the simulated 3D effect of the graphics. 1 1 Design - The digital graphic novel communicates better to the target audience than plain audio or text. 2 2 Design - Would like to select their own character 2 2 TOTALS: 9 9 The most prominent code in the Design code family deals with the fact that participants approve of the overall design of the digital graphic novel. Most of the responses regarding the design of the digital graphic novel were positive. There was a recommendation for further improving the design of the digital graphic novel by allowing the readers to select their own character. However, the researcher believes that doing so will complicate the digital graphic novel and violate proposed guideline N4 which states that complex information should not be presented in the narrative. Code Excerpt 9.6 shows participants' responses regarding their approval of the overall design of the digital graphic novel. Code Excerpt 9.6: Participants' responses regarding their approval of the overall design of the digital graphic novel. P 1: Evaluation - Focus Group 1 - 1:5 [It's really good.] (117:117) (Super) Codes: [Design - Approves of the overall look and feel of the digital graphic novel.] [Design - The digital graphic novel communicates better to the target audience than plain audio or text.] No memos It's really

good. P 1: Evaluation - Focus Group 1 - 1:8 [I think it's good like that, b..] (123:123) (Super) Codes: [Colours - Would prefer a wider array of colours.] [Design - Approves of the overall look and feel of the digital graphic novel.] No memos I think it's good like that, but if it changes it would be even… P 1: Evaluation - Focus Group 1 - 1:22 [I like …] (52:52) (Super) Codes: [Artwork - The chosen art style works well for the target audience. - Family: Artwork] [Design - Approves of the overall look and feel of the digital graphic novel.] No memos I like … P 1: Evaluation - Focus Group 1 - 1:1 [R4: It's really cool [others c..] (17:18) (Super) Codes: [Artwork - The chosen art style works well for the target audience. - Family: Artwork] [Design - Approves of the overall look and feel of the digital graphic novel.] No memos R4: It's really cool [others chorus agreement]. 9.3.4.5.1 Conclusions from Design Many participants of the first focus group approved of the overall design of the digital graphic novel. Therefore, it is important to ensure that the design of the following version of the first page of digital graphic novel is consistent with the design demonstrated at the focus group. 9.3.4.6 Theme 6: Sound The participants of the focus groups expressed their views regarding the use of sound within the digital graphic novel. The participants were asked about their views about the inclusion of narration. The researcher combined all codes relating to the use of sound within the design of the digital graphic novel into the code family called Sound. Table 9.9 demonstrates the code occurrence frequencies for each code in the Sound code family. Table 9.9: Code occurrence frequencies for codes in the Sound code family. Focus Group 1 TOTALS: Narration - feels that subtitles should accompany the narration. 2 2 Sounds - Prefer higher volumes at more intense scenes. 1 1 TOTALS: 3 3 The researcher mentioned the fact that there were plans to implement narration in the digital graphic novel. The most prominent code in the Sound code family relates to fact that narration incorporated in the digital graphic novel should be accompanied by subtitles. Code Excerpt 9.7 shows participants' responses regarding their views of narration and subtitles in a digital graphic novel. Code Excerpt 9.7: Participants' responses regarding their views of narration and subtitles in a digital graphic novel. P 1: Evaluation - Focus Group 1 - 1:18 [I was gonna ask uhm, with the ..] (227:227) (Super) Codes: [Narration - feels that subtitles should accompany the narration. - Family: Sound] No memos I was gonna ask uhm, with the narrate, narrating, are you gonna have subtitles? Cause sometimes you can't hear properly and then it's starts to be… P 1: Evaluation - Focus Group 1 - 1:20 [And for deaf people.] (229:229) (Super) Codes: [Narration - feels that subtitles should accompany the narration. - Family: Sound] No memos And for deaf people. 9.3.4.6.1 Conclusions from Sound The researcher interpreted the word 'subtitles' to mean text boxes which were already implemented in the digital graphic novel. Therefore, the researcher concluded that although the narrative may be narrated to the reader, it is still important to have a textual representation of the narrative being told through text boxes. This helps to cater to users who may have difficulty hearing. 9.3.5 Improvements identified through the data analysis of the first evaluation The researcher viewed each code and theme in order to identify possible improvement areas for the digital graphic novel. The identified areas of improvement for the first page of the digital graphic novel were: 1. Add more detail to the images. 2. Camera movement should be optimised. 3. Text should be legible throughout camera movement. 4. The reader should control the camera movement. 5. A wider array of colours should be used. 6. Sounds at more intense scenes should be increased. 9.4 Demonstration of second version Before the changes were made, the researcher reflected on the changes in terms of the literature. This was to observe how the proposed changes correlated to the proposed guidelines and to develop ideas for the improvement of the second version of the first page of the digital graphic novel. Table 9.10 maps each proposed change to the proposed guideline with which it correlates. Table 9.10: Proposed changes and the guidelines to which they correlate. Proposed change Guideline Add more detail to the images. C3, Camera movement should be optimised. P1, P5, I1 Text should be legible throughout camera movement. I1, I13 The reader should control the camera movement I9 A wider array of colours should be used E4, Sounds at more intense scenes should be increased S1, S2, E10 The aforementioned recommended improvements were made in the second version of the first page of the digital graphic novel. Figure 9.8 – Figure 9.11 show the changes made to the frames of the first version of the first page of the digital graphic novel. Figure 9.12 illustrates the second version of the first page of the digital graphic novel. Figure 9.8: Changes made to the colours of the first frame of the digital graphic novel. Figure 9.9: Changes made to the colours and detail in the second frame of the digital graphic novel. 261 | Chapter 9: Demonstration and Evaluation Figure 9.10: Changes made to the colours and detail in the third frame of the digital graphic novel. Figure 9.11: Changes made to the colours of the fourth frame of the digital graphic novel. Chapter 9: Demonstration and Evaluation | 262 Figure 9.12: The second version of the demo page. 263 | Chapter 9: Demonstration and Evaluation In Figure 9.8 - 9.11, the addition of more detail and a wider array of colours to the frames are demonstrated. The detail added to the frames is in the form of darker outlines of the facial features of characters as opposed to the orange outlines used before. This keeps with the hazy, shadowy look-and-feel of an early memory as the main character recalls memories of his past. Other changes made that are not evident in the figures include: 1. The path of the camera angle between frames was made to be more subtle. 2. The camera angles ensured that the text was always visible. 3. The reader was granted control of the camera movement through the incorporation of navigation arrows on the screen and navigation through the arrow keys on the keyboard. 4. The volume of the sound in the first screen was increased. 9.4.1.1 Participant detail The second and third focus groups were held on the same day. These focus groups were conducted during a mini-open day at the North-West University: Vaal Triangle Campus. Individuals who expressed interest in the Serious Games Institute – South Africa (SGI-SA) were asked if they would be willing to participate in the focus groups. The second focus group consisted of four male high school learners. The third focus group consisted of two female and six male high school learners. Participants of these focus groups signed consent forms. An example of these consent forms can be found in Appendix B. The focus groups were held in the SGI-SA labs. This demonstration was held after changes were made to the first page of the digital graphic novel according to the feedback received from the first focus group. The redesigned version of the first page of the digital graphic novel was demonstrated to each

of the focus groups on plasma TVs. The participants were asked questions after the demonstration in order to assist the researcher in further refining the digital graphic novel into an exciting medium through which the target audience can learn about an emotional social phenomenon. 9.4.2 Code all the text The second and third focus groups were analysed together as they were conducted on the same day. Responses from the second and third focus groups were also coded according to the their relative topics. Table 9.11: Summary of all codes from the second and third focus groups. Focus Group 2 Focus Group 3 TOTALS: Artwork - Finer detail would be preferred in the artwork. 4 0 4 Artwork - The chosen art style works well for the target audience. 4 2 6 Camera Movement - Keeps the attention of the reader. 0 1 1 Camera Movement - Makes reading difficult. 5 1 6 Camera Movement - Text should remain in a static position while camera moves. 1 2 3 Camera Movement - The angles during movement distorts text. 1 0 1 Camera Movement - Timing between frames need to be slowed down as it transitions too fast. 2 0 2 Colours - Helped elicit emotions mirroring the ominous nature of the content. 1 0 1 Colours - Would prefer a wider array of colours. 1 1 2 Design - Approves of the overall look and feel of the digital graphic novel. 2 0 2 Design - Approves of the simulated 3D effect of the graphics. 1 0 1 Design - Would prefer movement in the frames of the digital graphic novel. 0 2 2 Narration - feels that subtitles should accompany the narration. 0 2 2 Narration - If narration is used, certain text can be omitted from the frames. 0 1 1 Narration - In favour of the use of narration in the digital graphic novel. 2 2 4 Sound - Would prefer sounds to accompany frames. 0 1 2 TOTALS: 24 15 39 9.4.3 Assess the coding consistency The coding consistency was assessed according to the methods discussed in Section 9.3.3. 265 | Chapter 9: Demonstration and Evaluation 9.4.4 Conclusions from the data Step 7 of the content analysis process according to Zhang and Wildemuth (2009:3) is to draw conclusions from the coded data. By making use of code families as discussed in the previous section, the researcher was able to distinguish five themes that were present in the data. These themes are discussed in the sub-sections of this section. All themes identified in the second and third focus groups were present in the data analysis of the first focus group. The discussion of each theme will begin with a short summary of the theme. The codes that support this theme and form part of its code family are then presented in table format along with the number of their occurrences in each primary document. One of the most frequently occurring codes are discussed and finally, conclusions are drawn from the analysis of the data. 9.4.4.1 Theme 1: Artwork The participants of the focus groups expressed their views toward the art style used in the digital graphic novel. The art style relates to the way in which all the graphic content is presented. As mentioned earlier, the researcher chose to discuss colour and artwork separately as it seemed that the participants treated them as different entities in their responses. An example of this is given in Section 9.4.3.1. The researcher combined all codes relating to the artwork and art style into the code family called Artwork. Table 9.12 demonstrates the code occurrence frequencies for each code in the Artwork code family. Table 9.12: Code occurrence frequencies for codes in the Artwork code family. Focus Group 2 Focus Group 3 TOTALS: Artwork - Finer detail would be preferred in the artwork. 4 0 4 Artwork - The chosen art style works well for the target audience. 4 2 6 TOTALS: 8 2 10 The most prominent code in the Artwork code family deals with the fact that the chosen art style works well for readers. Although more detail was added to the frames of the first page of the digital graphic novel, participants still requested that more detail be added. It is also interesting to note that although the participants recommended more Chapter 9: Demonstration and Evaluation | 266 detail in the artwork, many expressed satisfaction with the current art style. Code Excerpt 9.9 shows participants' responses regarding their approval of the chosen art style. Code Excerpt 9.8: Participants' responses regarding their approval of the chosen art style. P 2: Evaluation - Focus Group 3 - 2:4 [I like, I like the drawing sty..] (16:16) (Super) Codes: [Artwork - The chosen art style works well for the target audience. - Family: Artwork] No memos I like, I like the drawing style. I, I speak from experience, it's not easy to get a sort of drawing style that looks real. P 2: Evaluation - Focus Group 3 - 2:5 [Uhm, I like the drawings and s..] (38:38) (Super) Codes: [Artwork - The chosen art style works well for the target audience. - Family: Artwork] [Camera Movement - Keeps the attention of the reader.] No memos Uhm, I like the drawings and stuff. I'm not too big a reader, so I like to speed read through things, and uhm, if, if it catches my attention I'll read it, and this kind of catches my intentions because it's a unique drawing style, and uhm, the way it moves, keeps my eye busy on it. P 3: Evaluation - Focus Group 2 - 3:3 [But then the art, I think it's..] (19:19) (Super) Codes: [Artwork - The chosen art style works well for the target audience. - Family: Artwork] No memos But then the art, I think it's nice for me. I P 3: Evaluation - Focus Group 2 - 3:9 [I really liked your artwork, e..] (52:52) (Super) Codes: [Artwork - The chosen art style works well for the target audience. - Family: Artwork] [Colours - Helped elicit emotions mirroring the ominous nature of the content.] No memos I really liked your artwork, especially the colours of it, It gives a, an ominous feel to it, at that time, how his life was. P 3: Evaluation - Focus Group 2 - 3:13 [Uhm, the graphics [inaudible]...] (58:58) (Super) Codes: [Artwork - Finer detail would be preferred in the artwork. - Family: Artwork] [Artwork - The chosen art style works well for the target audience. - Family: Artwork] No memos Uhm, the graphics is ok. But their heads, those people I don't like their heads. P 3: Evaluation - Focus Group 2 - 3:18 [And I'm going to differ with t..] (81:81) (Super) Codes: [Artwork - The chosen art style works well for the target audience. - Family: Artwork] No memos And I'm going to differ with this guy who said he wants to see the hair and everything, the comic feel is all about, it's abstract, it's plain, it's not going to be too vivid, because then it loses the comic feel. 9.4.4.1.1 Conclusions from Artwork There is a large are occurrence of codes relating to the satisfaction of participants regarding the art style used in the digital graphic novel. However, participants still require a higher level of detail in the images. By analysing the two versions of the first page of the digital graphic novel, the researcher determined that the detail that participants wanted was not only the use of darker colours in facial features, but rather the outlines of each of the elements within the image. 9.4.4.2 Theme 2: Camera Movement The participants of the focus groups expressed their views toward the camera movement incorporated within in the digital graphic novel. The camera movement relates to the way in which the reader's view is guided from frame to frame in the digital graphic novel. All codes relating to the

camera movement were combined into the code family called Camera Movement. Table 9.13 demonstrates the code occurrence frequencies for each code in the Camera Movement code family. Table 9.13: Code occurrence frequencies for codes in the Camera Movement code family. Focus Group 2 Focus Group 3 TOTALS: Camera Movement - between frames is too distracting. 0 0 0 Camera Movement - Keeps the attention of the reader. 1 0 1 Camera Movement - Makes reading difficult. 1 5 6 Camera Movement - Needs to be more subtle. 0 0 0 Camera Movement - Suggested that the player controls the timing of the camera movement themselves. 0 0 0 Camera Movement - Text should remain in a static position while camera moves. 2 1 3 Camera Movement - The angles during movement distorts text. 0 1 1 Camera Movement - The camera zooms in and out too much. 0 0 0 Camera Movement - Timing between frames need to be slowed down as it transitions too fast. 0 2 2 TOTALS: 4 9 13 The most prominent code in the Camera Movement code family deals with the fact that the camera movement makes reading difficult for readers. Although the camera movement between the frames of the first page of the digital graphic novel were made to be more subtle, participants still found reading to be difficult. Code Excerpt 9.10 shows participants' responses regarding their difficulty reading because of the camera movement. Chapter 9: Demonstration and Evaluation | 268 Code Excerpt 9.9: Participants' responses regarding their difficulty reading because of the camera movement. P 3: Evaluation - Focus Group 2 - 3:11 [And if I can make a suggestion..] (52:52) (Super) Codes: [Camera Movement - Makes reading difficult.] [Camera Movement - Text should remain in a static position while camera moves.] No memos And if I can make a suggestion about the camera. I think, I like it when it turns, but if you do it that if the background turns, like the words still stay the same, then it does this whole thing with it. That will make it really nicer. P 3: Evaluation - Focus Group 2 - 3:2 [Definitely with that (?), caus..] (17:17) (Super) Codes: [Camera Movement - Makes reading difficult.] [Camera Movement - The angles during movement distorts text.] No memos Hyper-Links: 3:1 Uhm, the camera, how it moves,.. <supports> Definitely with that (?), cause it's hard, it's hard to read, I cannot, like see clearly. You can see the first paragraph but then when you come to the next one you cannot see, P 3: Evaluation - Focus Group 2 - 3:1 [Uhm, the camera, how it moves,..] (11:11) (Super) Codes: [Camera Movement - Makes reading difficult.] No memos Hyper-Links: <supports> 3:2 Definitely with that (?), caus.. Uhm, the camera, how it moves, uhm, it's uhm, not easy to read. So, just, like that one now, uhm, when it turns, it goes to, uhm, the side, so it's uhm, hard to read. P 3: Evaluation - Focus Group 2 - 3:4 [the camera movement] (27:27) (Super) Codes: [Camera Movement - Makes reading difficult.] No memos the camera movement P 3: Evaluation - Focus Group 2 - 3:16 [Okay I'm gonna agree with Mehi..] (81:81) (Super) Codes: [Camera Movement - Makes reading difficult.] [Camera Movement - Timing between frames need to be slowed down as it transitions too fast.] No memos Okay I'm gonna agree with [name omitted], sorry if I pronounce, pronounce it wrong, [speaking at once]. Okay, uhm, the speech bubbles, they move too fast so you don't get enough time to read it, so maybe if you could just determine the reading speed of the person who's going to read this comic beforehand, that would be good. 9.4.4.2.1 Conclusions from Camera Movement Although the camera movement was made to be more subtle during frame changes, it may be necessary to change the camera angles so that the readers see the text boxes in a 'front-view' rather than at a slightly off-centred angle. Also, the camera should keep the frame's text in view at all times to accommodate readers who may not read fast. 9.4.4.3 Theme 3: Colours The participants of the focus groups expressed their views toward the colours used in the digital graphic novel. As stated earlier, the researcher chose to discuss colour and artwork separately as it seemed that the participants treated them as different entities in their responses. All codes relating to the colours in the digital graphic novel were combined into the code family called Colours. Table 9.14 demonstrates the code occurrence frequencies for each code in the Colours code family. Table 9.14: Code occurrence frequencies for codes in the Colours code family. Focus Group 2 Focus Group 3 TOTALS: Colours - Helped elicit emotions mirroring the ominous nature of the content. 0 1 1 Colours - Would prefer a wider array of colours. 1 1 2 TOTALS: 1 2 3 The most prominent code in the Colours code family deals with the fact that participants would still prefer the use of a wider array of colours in the digital graphic novel. Code Excerpt 9.11 shows participants' responses regarding their preference for a wider array of colours. Code Excerpt 9.10: Participants' responses regarding their preference for a wider array of colours. P 2: Evaluation - Focus Group 3 - 2:6 [Okay, uhm, I would have prefer..] (40:40) (Super) Codes: [Colours - Would prefer a wider array of colours. - Family: Colours] No memos Okay, uhm, I would have preferred a bit more colour. It's a bit grey. P 3: Evaluation - Focus Group 2 - 3:15 [R7: Uhm, I like the [inaudible..] (75:75) (Super) Codes: [Colours - Would prefer a wider array of colours. - Family: Colours] [Design - Approves of the overall look and feel of the digital graphic novel. - Family: Design] No memos R7: Uhm, I like the cartoony stuff, but can't there be like more colours? 9.4.4.3.1 Conclusions from Colours Although more colours were added to the images of the digital graphic novel, the participants still felt the need for the incorporation of a wider variety of colours in the digital graphic novel. By analysing the two versions of the first page of the digital Chapter 9: Demonstration and Evaluation | 270 graphic novel, the researcher determined that the participants not only wanted more colours, but they wanted brighter more saturated colours in particular. 9.4.4.4 Theme 4: Design The participants of the focus groups expressed their views regarding the design of the digital graphic novel. All codes relating to the design of the digital graphic novel were combined into the code family called Design. Table 9.15 demonstrates the code occurrence frequencies for each code in the Design code family. Table 9.15: Code occurrence frequencies for codes in the Design code family. Focus Group 2 Focus Group 3 TOTALS: Design - Approves of the overall look and feel of the digital graphic novel. 0 2 2 Design - Approves of the simulated 3D effect of the graphics. 0 1 1 Design - Would prefer movement in the frames of the digital graphic novel. 2 0 2 TOTALS: 2 3 5 Once again, participants expressed approval of the overall design of the digital graphic novel. One of the most prominent codes in the Design code family deals with the recommendation for the incorporation of movement within the frames of the digital graphic novel. Due to the involvement of the Serious Games Institute – South Africa in the creation of the digital graphic novel, Mandela27 team members wanted to add a slight gaming element to the digital graphic novel

by allowing users to move and interact within a frame. The researcher decided to acquire the opinions of participants regarding movement within the frames. Code Excerpt 9.12 shows participants' responses regarding the incorporation of movement in the digital graphic novel. Code Excerpt 9.11: Participants' responses regarding the incorporation of movement in the digital graphic novel. P 2: Evaluation - Focus Group 3 - 2:13 [So, uhm, okay, one more thing ..] (66:67) (Super) Codes: [Design - Would prefer movement in the frames of the digital graphic novel. - Family: Design] No memos I: So, uhm, okay, one more thing that we wanna say is that we're also gonna add a little bit of motion into the picture, so like, when you get to the frame, if there is action, he will come and he'll like push her. R1: Ya, that would be nice. P 2: Evaluation - Focus Group 3 - 2:16 [Ya. If, if you can make it, wi..] (69:69) (Super) Codes: [Design - Would prefer movement in the frames of the digital graphic novel. - Family: Design] No memos Ya. If, if you can make it, with the 3D effect or just normal 9.4.4.4.1 Conclusions from Design Participants are satisfied with the overall design of the digital graphic novel. Participants are also keen to have movement within frames. More interactive scenes can be incorporated within the digital graphic novel. 9.4.4.5 Theme 5: Sound The participants of the focus groups expressed their views regarding the use of sound within the digital graphic novel. The researcher took the opportunity to ask participants about their views about the inclusion of narration. All codes relating to the use of sound within the design of the digital graphic novel were combined into the code family called Sound. Table 9.16 demonstrates the code occurrence frequencies for each code in the Sound code family. Table 9.16: Code occurrence frequencies for codes in the Sound code family. Focus Group 2 Focus Group 3 TOTALS: Narration - feels that subtitles should accompany the narration. 2 0 2 Narration - If narration is used, certain text can be omitted from the frames. 1 0 1 Narration - In favour of the use of narration in the digital graphic novel. 2 2 4 Sound - Would prefer sounds to accompany frames. 1 0 1 TOTALS: 6 2 8 Narration was now included in a few of the frames of the first page of the first page of the digital graphic novel. The most prominent code in the Sound code family deals with the fact that participants prefer the use of narration within the digital graphic novel. Code Excerpt 9.13 shows participants' responses regarding their preference for narration in the digital graphic novel. Code Excerpt 9.12: Participants' responses regarding their preference for narration in the digital graphic novel. P 2: Evaluation - Focus Group 3 - 2:17 [Would you enjoy having him tel..] (55:56) (Super) Codes: [Narration - In favour of the use of narration in the digital graphic novel. - Family: Sound] No memos Would you enjoy having him tell you the story while the frames go past, or would you… [respondents saying "yes", "ya", talking together] P 2: Evaluation - Focus Group 3 - 2:18 [The lazy people who don't like..] (58:58) (Super) Codes: [Narration - In favour of the use of narration in the digital graphic novel. - Family: Sound] No memos The lazy people who don't like to read… P 3: Evaluation - Focus Group 2 - 3:6 [Narration is always a good ide..] (35:35) (Super) Codes: [Narration - In favour of the use of narration in the digital graphic novel. - Family: Sound] No memos Narration is always a good idea. P 3: Evaluation - Focus Group 2 - 3:19 [What we're also gonna plan to ..] (32:33) (Super) Codes: [Narration - In favour of the use of narration in the digital graphic novel. - Family: Sound] No memos What we're also gonna plan to do is put some narration in, so the guy like tells you the story while the frames are playing. Who, who, do you guys think it's a good idea or a bad idea if we were to talk about… R3: It's a good idea. 9.4.4.5.1 Conclusions from Sound Participants expressed great approval of the inclusion of narration into the digital graphic novel. Each text box or speech bubble in the digital graphic novel should be narrated in order to maintain consistency. Furthermore, the participants would like sounds to be incorporated in all frames as opposed to only certain frames. The inclusion of narration within the digital graphic novel may serve to satisfy this recommendation. 9.4.5 Improvements identified through the data analysis of the second evaluation The researcher viewed each code and theme in order to identify possible improvement areas for the digital graphic novel. The identified areas of improvement for the digital graphic novel were: 1. The outlines of each element with an image must be more pronounced. 2. The camera angles should be altered to render text in a 'front-view'. 3. The camera should keep the frame's text in view at all times to accommodate for readers with slower reading speeds. 4. Brighter, more saturated colours must be used in the images of the digital graphic novel. 5. Interactive scenes can be incorporated into the digital graphic novel. 6. Narration should be included throughout the digital graphic novel. 9.5 The incorporation of the identified themes into the digital graphic novel All pages except the first page of the digital graphic novel were design and developed to incorporate the themes identified in the Evaluation phase of this study. The motivation for the exclusion of the first page was to preserve the feeling of the character relating a hazy, distant memory. As the narrative progresses to the present, the pages make use of the themes identified in the Evaluation phase. The following sections discuss the manner in which each theme was incorporated into the design of the digital graphic novel. 9.5.1 Incorporation of the Artwork theme The overall art style of the digital graphic novel was preserved. The only change made to the artwork was the greater definition of the outlines of each element within the image. 9.5.2 Incorporation of the Camera Movement theme The camera movement of the digital graphic novel was slowed down in order to assist the reader in following the path taken when being guided to the next frame. The camera was also stopped at each frame in order to provide a favourable reading environment for the reader. Readers are in control of resuming the camera movement once they are done with a frame by clicking on the navigation icons or by using the corresponding arrow keys on the keyboard. 9.5.3 Incorporation of the Character theme The way in which the character was portrayed through the narrative was maintained as it appealed to members of the target audience. The story is told from the character's point of view and the narrative is written in the first person. 9.5.4 Incorporation of the Colours theme A wider array of colours is used in the digital graphic novel. The colours used are brighter and more saturated in order to give the readers a more pleasurable experience. This supports principle E5 which states that brighter and more saturated colours elicit more pleasure from users. 9.5.5 Incorporation of the Design theme The overall look and feel of the digital graphic novel was maintained as approved by the participants of the focus groups. Interactive scenes were incorporated into the digital graphic novel in order to provide an added layer of movement and immersion. 9.5.6 Incorporation of the Sound theme Sounds

from the actual prison and surrounding environments were recorded and incorporated into the digital graphic novel. Narration and dialog were also recorded for the entire narrative and incorporated into each frame and interactive scene. 9.6 Final version of the digital graphic novel Screenshots from the final version of the digital graphic novel will be demonstrated in this section. Each screenshot will be discussed in terms of the Diagnosis theme and code with which it correlates as well as the guidelines which it incorporates. This final version of the digital graphic novel was approved by the Mandela27 project stakeholders. 9.6.1 Interface Design The design of the main menu interface was not based on any theme or code identified in focus groups, but rather on the guidelines gathered in Chapter 5. The interface was tested by an HCI expert who fell within the target audience. Figure WHATEVER and Figure WHATEVER will be discussed in terms of their implementation of the proposed guidelines for the creation of the interface of a digital graphic novel as given in Chapter 6 and their incorporation of themes and codes identified in the focus groups. Figure 9.13: The main menu of the digital graphic novel. Theme: None Codes: None Guidelines incorporated: I1, I2, 13, 14, 16, I10, I11, I12, I13: The target audience of the Mandela27 digital graphic novel are young adults in South Africa and across the European Union. Due to the language differences, the researcher decided to keep the menu navigation as simple as possible by using simple menu options and graphics to guide the user. For example, each scene in the digital graphic novel is chronologically represented with icons. Tutorials have a question mark for an icon. Users can only advance scenes by completing them. The locks indicate scenes that the user has not yet unlocked. When users hover over an image, its border is highlighted to show interactivity. The title of the scene also appears at the bottom of the screen when the user hovers over an image. For locked scenes, the word ‘locked’ is displayed at the bottom of the screen. When the user clicks on an unlocked scene, the camera zooms into the icon to indicate selection and navigation. The researcher chose a simple font for the menu options in order to enable all intended users to read it clearly. I14: The design of the menu interface was evaluated by an HCI expert who fell within the age group of the target audience. Figure 9.14: An example of the interface within the digital graphic novel. Themes: None Codes: None Guidelines incorporated: I1, I2, I3, I5, I6, I7, I8, I9, I10, I12, I13: The navigation between the frames of the digital graphic novel itself remained consistent. Left and right arrows were displayed on the top left of the screen. Users were able to navigate between frames by either clicking on these arrows or by pressing the corresponding arrow keys on their keyboards. The incorporation of these arrows in the navigation between frames of the digital graphic 277 | Chapter 9: Demonstration and Evaluation novels catered to the need for users to feel in control as stated in the proposed guidelines and identified in the focus groups. I14: The design of the menu interface was evaluated by an HCI expert who fell within the age group of the target audience. 9.6.2 Daily Life in Apartheid Screenshots of frames depicting the Diagnosis theme Daily Life in Apartheid have already been demonstrated in Chapter 8 and will therefore be excluded from this chapter. 9.6.3 Youth in Apartheid Screenshots of frames depicting the Diagnosis theme Youth in Apartheid have already been demonstrated in Chapter 8 and will therefore be excluded from this chapter. 9.6.4 Life inside Robben Island Prison Figure 9.15: An interactive scene portraying life inside Robben Island Prison. Diagnosis code: Life in Robben Island Prison - Prisoners must be ready for inspection when the wardens come in. Chapter 9: Demonstration and Evaluation | 278 Guidelines incorporated: N2, E12: The author aims to make the reader care about the narrative by presenting this interactive scene in which the reader views the world through the eyes of the main character and feels locked inside a prison cell. N6: A simple sentence is used to communicate the fact that ex-political prisoners had to ensure that their cells were neat before they were inspected and allowed to go into the courtyard. P5, P6, P8, P11, E12, E13: Although the reader has a panoramic view within the interactive scenes, the placement of the speech bubble guides the reader’s focus to the inmate across the hall. Once the inmate finishes speaking, the speech bubble disappears and the bed becomes highlighted when the reader hovers over it. The use of depth of field helps create the illusion that the other inmate is across the hall. The variation of this panel into an interactive scene is used to elicit a feeling of being imprisoned. A1, A4, E5, E12: By using the images of the prison doors and an inmate’s hands wrapped around the bars, the reader feels as though they are looking out of their prison cell to another cell across the hall. The pictures and narrative are used in an intersecting manner as the pictures illustrate the fact that the reader is inside a prison cell, while the narrative guides the reader on what needs to be done before prisoners could leave their cells. I1, I3, I7, I9, I10: The interface of the interactive scene is kept simple in order to guide the user to what tasks need to be completed and when while still allowing the reader to feel in control. S2, E10: The sound used in this scene is that of an inmate whispering instructions to the reader. In this way, the reader feels that the inmate sees the reader as a new prisoner and is trying to prevent the reader from getting punished. The inmate is whispering instructions so as not to be heard by the guards which shows willingness to help the reader with the risk of being reprimanded. 9.6.5 Exercise in Robben Island Prison Figure 9.16: An interactive scene portraying exercise in Robben Island Prison. Diagnosis code: Exercise - prisoners broke world records in their internal 'Olympic Games'. Guidelines incorporated: N2, E12: The author aims to make the reader care about the narrative by presenting this interactive scene in which the reader views the world through the eyes of the main character and feels present in the courtyard amongst other inmates. The reader is able to interact with the other inmates. N3: The narrative exploits the shared experiences of family and friendship present in human beings. The narrative elicits emotions regarding these shared experiences through the main character’s interaction with the other characters in the courtyard. N4, N6: The most prominent code in the Exercise in Robben Island code family relates to the fact that prisoners on the Island managed to break the world records of their time. However, it would be too bold to state that world records were broken without providing evidence. In order to avoid the incorporation of complex information, the dialog between characters was written to refer only to personal records of prisoners. N5, N7, E12: The narrative in this interactive scene was written in a manner that presented the feelings and experiences that inmates of Robben Island prison were subjected to within the walls of the prison. P5, P6, P8, P11, E12, E13: Although

the reader has a panoramic view within the interactive scenes, the placement of the speech bubble guides the reader's focus to the selected inmate. Once the inmate finishes speaking, the speech bubble disappears and the other interactive characters and elements are highlighted when the reader hovers over it. The use of depth of field helps create the illusion that prisoners are located at different areas of the courtyard. The variation of this panel into an interactive scene is used to elicit a feeling of interaction with other prisoners in the courtyard of Robben Island Prison. C2, C3, C5, A1, A4, E1, E5, E12, E17: By using the images of prisoners in various poses, the reader feels as though they are observing and interacting with distinct individuals. The pictures and narrative are used in a duo-specific manner as the pictures illustrate the demeanour of the characters, while the narrative reveals the thoughts of the characters in written and spoken form. I1, I3, I7, I9, I10: The interface of the interactive scene is kept simple in order to guide the user to what tasks need to be completed, while still allowing the user to feel in control. S2, E10: The sounds used in this scene are the voices of various different inmates interacting with each other. In this way, the reader feels as though they are observing and interacting with the various characters in the scene. 9.6.6 Meals in Robben Island Prison Figure 9.17: An interactive scene portraying meals in Robben Island Prison. Diagnosis code: Meals - The inmates shared their food with each other even though each race group was assigned their own menu. Guidelines incorporated: N2, E12: The author aims to make the reader care about the narrative by presenting this interactive scene in which the reader views the world through the eyes of the main character and feels present in the courtyard amongst other inmates. The reader is able to interact with the other inmates and elements. In this case, the reader clicked on the bowl. N3: The narrative exploits the shared culture of Ubuntu,14 which is well known in South Africa. N4, N6: The most prominent code in the Meals in Robben Island code family relates to the fact that prisoners shared their food with each other despite the differing rations per race. This fact is present simply by a prisoner informing the reader about the practice. 14 Ubuntu is a term used in South African culture that means 'humanity towards others'. Chapter 9: Demonstration and Evaluation | 282 N5, N7, E12: The narrative in this interactive scene was written in a manner that highlighted the camaraderie between prisoners. P5, P6, P8, P11, E12, E13: Although the reader has a panoramic view within the interactive scenes, the placement of the text box guides the reader's focus to the selected bowl. The text box disappears when the user clicks and the other interactive characters and elements are highlighted when the reader hovers over it. A1, A4: The bowl is used to represent meals inside Robben Island Prison. The bowl and narrative are used in a word-specific manner as the narrative presents all the information that the reader needs to know while the picture of the bowl forms part of the scene. I1, I3, I7, I9, I10: The interface of the interactive scene is kept simple in order to guide the user to what tasks need to be completed, while still allowing the user to feel in control. S2, E10: The sounds used in this scene are the voice of an inmate talking to the main character (reader). The reader feels part of a dialog with a fellow inmate who is explaining everyday life inside Robben Island Prison. 9.6.7 Hunger Strikes in Robben Island Prison Figure 9.18: An frame portraying hunger strikes in Robben Island Prison. Diagnosis code: Hunger Strikes - Were successfully used to obtain permission for prisoners to study beyond matric level. Guidelines incorporated: N2, E12: The author aims to make the reader care about the narrative by making the reader aware of the inner feelings of joy felt by the main character as well as the revelation that the main character experienced at that precise moment. N4, N6: The most prominent code in the Hunger Strikes in Robben Island Prison Island code family relates to the fact hunger strikes were successfully used to obtain permission for prisoners to study beyond matric level. This fact is simply stated in the first text box as though it was the character's thought. N5, N7, E12: The narrative in this interactive scene presented with the main character awaiting treatment after falling ill while participating in a hunger strike. The character hears the good news while he was not feeling well and the reader gets the chance to experience his joy overcome his pain. C1, C2, C3, A1, A4, E1, E17: In this frame, the character is seen from the side as though the reader were sitting next to him in the waiting room of the clinic. The facial expression of the character shows his surprise and almost disbelief at the news he had just heard. The images and narrative are presented in an intersecting manner. P3, P5, E12, E13: The specific moment selected for this frame was the instant the main character heard that the hunger strike was successful. The view of the frame guides the reader to the main character's face which expresses the surprise and almost disbelief that he feels at this moment. S2, E10: The sound used in this scene is the voice of the main character fondly recalling this specific moment in time. The intonation in his voice communicates the joy he experience during this time. 9.6.8 Censorship in Robben Island Prison Figure 9.19: A frame portraying censorship in Robben Island Prison. Diagnosis code: Censorship - Letters were censored if prisoners asked questions about anyone else besides the person they were writing to. Guidelines incorporated: N2, E12: One of the forms of censorship that was present in Robben Island Prison was the censorship of letters. If the inmates were writing to a specific person, they were not allowed to ask any questions about anyone besides the person to whom the letter is addressed. The author aims to make the reader care about the narrative by making the reader aware of the struggles faced by fathers and inmates who left behind families on the mainland. N4: This complex process of censorship in Robben Island Prison is simply portrayed as another inmate's recollection of events stated in the first text box as though it was the character's thought. N5, N7, E12: The narrative of this scene is presented with the image of an unknown figure either pulling a letter out of his coat or hiding an envelope in his coat. With this 285 | Chapter 9: Demonstration and Evaluation view, the reader is not certain as to whether this is a protagonist or antagonist and thus shares the feelings of confusion and helplessness experienced by the main character. C1, C2, C3, A1, A4, E1, E17: In this frame, a mysterious character is seen either pulling out an envelope from his coat or hiding an envelope in this coat. His body language and the manner in which his face is drawn show that he does not want to be identified in the process. The images and narrative are combined word-specific manner. P3, P5, E12, E13: The specific moment selected for this frame was the instant the mysterious character either pulled out an envelope from his coat or hid an envelope in this coat. The selection of this specific moment was chosen as it leaves the reader intrigued

about the role that this new character plays in the story. S2, E10: The sound used in this scene is the voice of another inmate recalling this specific moment in time. The intonation in his voice communicates the difficulty of this time for him. 9.6.9 Punishment in Robben Island Prison Figure 9.20: A frame portraying punishment in Robben Island Prison. Diagnosis code: Punishment - Prisoners were not given food and placed in isolation for an entire day as punishment (only water was provided). Guidelines incorporated: N2, E12: One of the forms of punishment that was present in Robben Island Prison was the being put into isolation. The narrative explains the reason behind why the main character got himself into trouble as well as the fact that the isolation section was not a pleasant place to be. This was done to enable the reader to feel the character's simultaneous determination and apprehensions as he battled between what was good for himself and what was good for all the inmates in Robben Island Prison. N4: This complex process of prisoners purposefully getting themselves put into isolation in order to organise mass movements was represented in a single frame. Although isolation consisted of a prisoner being placed in a cell for an entire day without food, the researcher believed that this information did not add to the main storyline and would therefore complicate the narrative. As a result of this, the aforementioned fact was excluded from the narrative. N5, N7, E12: The narrative of this scene is presented in such a way as to show the reader the willingness of an inmate to put himself through punishment in order to accomplish something that would benefit all inmates of Robben Island Prison. C1, C2, C3, A1, A4, E1, E17: In this frame, the main character is seen being escorted towards the isolation cells by two prison guards. The body language of the guards shows their authority while the body language of the main character shows that he has yielded to his fate. The images and narrative are combined in a word-specific manner. P3, P5, E12, E13: The specific moment selected for this frame was the instant the main character is taken to isolation. The sight of the guards escorting the main character to his punishment aims to elicit feelings of anticipation, anxiety and suspense from readers. S2, E10: The sound used in this scene is the voice of the main character recalling this specific moment in time. The intonation in his voice communicates the difficulty of this time for him. 9.6.10 Lawyers in Robben Island Prison Figure 9.21: A frame portraying lawyers in Robben Island Prison. Diagnosis code: Lawyers - Were not so powerful within Robben Island Prison. Guidelines incorporated: N2, N5, N7, E12: From the data analysed in the Diagnosis phase, it was found that lawyers were not very powerful within Robben Island Prison. Key factor 3 (F3) discussed in the Diagnosis phase states that some documents from the loved ones of prisoners were smuggled into the prison. The researcher incorporated lawyers into the narrative of the digital graphic novel as the link between the prisoners and the outside world. This was also done to promote the view that the fight against Apartheid was not one race against another, but rather one worldview against another. N4, N6: This frame shows that the fight against Apartheid was not one race against another, but rather one worldview against another. It shows the smuggling in of personal documents for prisoners as well as the shared worldview amongst different races with a simple image symbolising all of the aforementioned. Chapter 9: Demonstration and Evaluation | 288 C1, C2, C3, A1, A4, E1, E17: This frame is the progression of the frame discussed in Section 9.7.10. The only difference is that now the reader knows that the mysterious character who seen either pulling out an envelope from his coat or hiding an envelope in this coat is in fact a lawyer smuggling personal documents to an inmate. His body language and the manner in which his face is drawn show that he does not want to be identified in the process. The images and narrative are combined in an intersecting manner. P3, P5, E12, E13: The specific moment selected for this frame was the instant the lawyer pulled the personal documents out of his coat. This view was used to show the reader the great risks that the lawyers were taking in smuggling in these forbidden documents. S2, E10: The sound used in this scene is the voice of another inmate fondly recalling this specific moment in time. The intonation in his voice communicates the great impact that this event had on him. 9.6.11 Secret messages in Robben Island Prison Figure 9.22: An interactive scene portraying secret messages in Robben Island Prison. Diagnosis code: Secret messages - Messages were wrapped in plastic and placed under the porridge. Guidelines incorporated: N2, E12: The author aims to make the reader care about the narrative by presenting this interactive scene in which the readers view the world through the eyes of the main character and therefore feel as though they are cleaning dishes in the kitchen when thy stumble upon a secret message. N4, N6: The complex process of passing secret messages within Robben Island Prison is portrayed simply by this interactive scene which the reader finds a hidden secret message a bowl that is about to be washed. P5, P6, P8, P11, E12, E13: Although the reader has a panoramic view within the interactive scenes, the highlighted hidden note guides the reader's focus to the secret message when the reader uncovers it amongst the dishes while washing. A1, E5, E12: By using the interactive images of the bowls which, when clicked, move from the soapy water, to the clean water and are then stacked, the narrative of washing dishes before uncovering the secret message is brought to life for the reader. When the reader discovers the message, the same sense of surprise as the main character will be experienced. I1, I3, I7, I9, I10: The interface of the interactive scene is kept simple in order to guide the user to what tasks need to be completed, while still allowing the reader to feel in control. S2: The sound used in this scene is that of running water and dishes being washed in order to increase the level of immersion. 9.6.12 Education in Robben Island Prison Figure 9.23: A frame portraying education in Robben Island prison. Diagnosis code: Education - Prisoners who were allowed to study through the education department educated their fellow prisoners in their cells at night. Guidelines incorporated: N2, E12: The narrative is written in such a way as to show the reader the amount of dedication it took to study while in prison. It also puts the learning process in perspective as learning took place slower than usual due to the limited amount of time that prisoners had to study. The portrayal of this act of dedication is aimed at helping the target audience experience the amount of importance prisoners placed on educating themselves. N4: This process of learning while in Robben Island prison is demonstrated simply in this single frame. N5, N7, E12: The narrative of this scene is presented in such a way as to show the reader the willingness of inmates to sacrifice their rest time in order to educate other prisoners or to be further educated. 291 | Chapter 9: Demonstration and Evaluation C1, C2,

C3, A1, A4, E17: In this frame, the main characters are involved in a teaching and learning scenario. The body language of the inmate who is learning makes him appear confused and struggling to grasp the content being taught to him. The body language of the inmate who is teaching makes him appear to be patiently explaining the concepts to the learner. P3, P5, E12, E13: The specific moment selected for this frame was the instant the main character was struggling to grasp a concept. The sight of the other inmate calmly explaining the content to the main character shows the willingness of the more educated inmates to educate others. While the sight of the main character struggling with the content but not giving up aims to elicit sympathy from readers. S2, E10: The sound used in this scene is the voice of the main character recalling this specific moment in time. The intonation in his voice communicates the difficulty of this time for him. 9.6.13 Views of ex-political prisoners Figure 9.24 An interactive scene that incorporates views of ex-political prisoners. Diagnosis code: Views of ex-political prisoners - Ex-political prisoners recall hearing 'Stilte in die gang!'15 and 'Keep quiet!' and believe they should be included. Guidelines incorporated: N2, E12: The author aims to make the reader care about the narrative by presenting this interactive scene in which the readers view the world through the eyes of the main character who is locked in his prison cell at night. He is communicating with another prisoner when the warden hears and orders them to be quiet. N4, N6: In the Diagnosis phase it was identified that the ex-political prisoners felt that the phrase 'Stilte in die gang!' should be incorporated into the digital graphic novel, as it was a phrase they heard often. However, the phrase is in Afrikaans and would confuse and complicate the reading experience for those not familiar with the language. In order to eliminate complex information, the researcher translated this phrase into English and inserted into the digital graphic novel. P5, P6, P8, P11, E12, E13: Although the reader has a panoramic view within the interactive scenes, the placement of the speech bubble guides the reader's focus to the inmate across the hall. When the warden hears the talking, the inmate's speech bubble disappears and a speech bubble for the warden appears in the direction in which he is sitting. Once again, the use of depth of field helps create the illusion that the other inmate is across the hall. The variation of this panel into an interactive scene is used to elicit a feeling of being imprisoned. A1, E5, E12: By using the interactive images of the bowls which, when clicked, move from the soapy water, to the clean water and are then stacked, the narrative of washing dishes before uncovering the secret message is brought to life for the reader. When the reader discovers the message, the same sense of surprise as the main character will be experienced. I1, I3, I7, I9, I10: The interface of the interactive scene is kept simple in order to guide the user to the tasks that need to be completed, while still allowing the reader to feel in control. 15 'Stilte in die gang!' is an Afrikaans phrase that can be translated into 'Silence in the passage!' 293 | Chapter 9: Demonstration and Evaluation S2: The sounds used in this scene are that of the inmate across the hall communicating with the main character and the yell of prison warden ordering the prisoners to be quiet. 9.7 Implementation Once the completed digital graphic novel received the approval of the Mandela27 project stakeholders, the digital graphic novel was placed onto the Mandela27 website with options for users to download either Windows or iOS application files so that they do not need to be online to read the digital graphic novel. The digital graphic novel was exhibited on screens and tablets/laptops accompanying the Mandela27 exhibits in venues and museums across the world including: ? Robben Island Museum – Cape Town, South Africa ? Kwa-Zulu Natal – Pietermaritzburg, South Africa ? Belvue Museum – Brussels, Belgium ? National Library of South Africa – Pretoria, South Africa 9.8 Summary In this chapter, the demonstration and evaluation of the digital graphic novel was discussed. The chapter began with an introduction of the research design used within the Evaluation phase. Data collection and analysis methods were then discussed in Section 9.2.1 and Section 9.2.2. The first page of the digital graphic novel that was demonstrated to the first focus group was shown in Section 9.3. Also in Section 9.3, the transcript from the focus group was coded and themes were drawn from the data. The recommended improvements concluded from the data in Section 9.3 were then implemented and demonstrated in the second version of the first page. This version was demonstrated to the second and third focus groups (Section 9.4). Once again, the text was coded and themes were drawn from the data. In Section 9.5, the incorporation of the identified themes into the digital graphic novel was discussed. Section 9.6 presented screenshots from the final version the digital graphic novel. A screenshot was presented for each theme identified from the Diagnosis phase. An explanation of the proposed guidelines incorporated within each screenshot was also given. The implementation of the final digital graphic novel was discussed in Section 9.7. The final phase in the action research cycle, Specifying Learning, will be discussed in the following chapter. The next chapter will also serve as the final phase in the design science research cycle, 'Communication'. 295 | Chapter 9: Demonstration and Evaluation 10 Chapter Ten: Specifying Learning 10.1 Introduction This is the final chapter of the dissertation. The aim of this study was to formulate a set of guidelines to aid in the development of digital graphic novels that will be used to portray emotional social phenomena using critical social heuristics and HCI principles. In this chapter, the research aims and objectives of the study will be reflected upon in Section 10.2. This will be followed by an evaluation of the research in Section 10.3. The research will be discussed in terms of the guidelines proposed in Chapter 6 (Section 10.4). The final set of proposed guidelines will be presented in Section 10.5. Limitations of the study will be discussed in Section 10.6 and further study considerations will be proposed in Section 10.7. The chapter will conclude with a summary of the chapter in Section 10.8. 10.2 Reflection on research aims and objectives The primary objective of this study was to develop guidelines for the design and development of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles. A digital graphic novel was developed to portray the experiences of political prisoners in Robben Island Prison from 1960 - 1990. Achieving the secondary objectives below ensured that this primary objective was achieved. The discussion that follows lists these secondary objectives and how they were accomplished. 10.2.1 Secondary objectives in the Diagnosing phase The first secondary objective in the Action Planning phase was: To understand how critical systems heuristics can guide the process of understanding of the experiences of the ex-political prisoners (Chapter 3

and 7). Chapter 10: Specifying Learning | 296 This objective was accomplished through a literature review conducted in Chapter 3 and the application of the answers to the boundary questions in each phase of the action research cycle (Table 3.3). The boundary questions that discuss the manner in which critical systems heuristics guided the process of understanding the experiences of the ex-political prisoners in the Diagnosing phase of this study are implemented in Chapter 7. The answers to the boundary questions which were mapped to the Diagnosing phase of the study helped the researcher to determine the beneficiaries, purpose, measure of success, decision takers, components, environment, expertise, guarantors, witnesses representing the affected, degree and method of emancipation of the affected and the worldviews incorporated in the Diagnosing phase of this study. The second secondary objective in the Action Planning phase was: To understand the experiences of the ex-political prisoners who were incarcerated on Robben Island (Chapter 7). The researcher was able to understand the experiences of the ex-political prisoners who were incarcerated on Robben Island through the application of interpretive methods. The interpretive data collection methods used were focus groups and an interview. The interpretive data analysis used was directed content analysis using the content analysis process proposed by Zhang and Wildemuth (2009:3). Table 7.5 provides an overview on the manner in which the content analysis process was implemented in Chapter 7. At the end of the Diagnosing phase, the researcher determined twelve themes regarding the experiences of the ex-political prisoners in Robben Island Prison. These themes are: 1. Daily Life in Apartheid 2. Youth in the Apartheid Era 3. Life in Robben Island Prison 4. Exercise in Robben Island Prison 5. Meals in Robben Island Prison 6. Hunger strikes in Robben Island Prison 7. Censorship 297 | Chapter 10: Specifying Learning 8. Punishment in Robben Island Prison 9. Lawyers in Robben Island Prison 10. Secret Messages in Robben Island Prison 11. Education in Robben Island Prison 12. Views of Ex-political Prisoners The aforementioned themes were incorporated into the narrative of the digital graphic novel. 10.2.2 Secondary objectives in the Action Planning phase The first secondary objective in the Action Planning phase was: To plan the first iteration of the digital graphic novel. The first version of the digital graphic novel was planned by combining the proposed guidelines for creating digital graphic novels given in Chapter 6 with the themes identified in the Diagnosis phase (Chapter 7). The action-planning phase helped the researcher to identify experts needed in the Action Taking phase of the study. The second secondary objective in the Action Planning phase was: To research the digital graphic novel genre and propose guidelines for creating a digital graphic novel portraying emotional social phenomena (Chapter 4). This was accomplished through a literature review conducted in Chapter 4. A set of guidelines for creating digital graphic novels were proposed at the end of the chapter. The third secondary objective in the Action Planning phase was: To study human-computer interaction (HCI) principles and further enrich proposed guidelines for creating a digital graphic novel portraying emotional social phenomena (Chapter 5). This was accomplished through a literature review conducted in Chapter 5. A set of HCI-enriched guidelines for creating digital graphic novels were proposed at the end of the chapter. The third secondary objective in the Action Planning phase was: To research emotion and further enrich proposed guidelines for creating a digital graphic novel portraying emotional social phenomena (Chapter 6). This was accomplished through a literature review conducted in Chapter 6. A set of emotion-enriched guidelines for creating digital graphic novels were proposed at the end of the chapter. 10.2.3 Secondary objectives in the Action Taking phase The secondary objective in the Action Taking phase was: To incorporate the proposed guidelines in the creation of a digital graphic novel that portrays the experiences of the ex-political prisoners of Robben Island Prison while serving as an engaging medium for the target audience (Chapter 8). The proposed guidelines for creating digital graphic novels given in Chapter 6 were combined with the themes identified in the Diagnosis phase in order to create a digital graphic novel that fairly portrays the experiences of the ex-political prisoners of Robben Island Prison while serving as an engaging medium for the target audience. Table 8.2 provides an overview on the manner in which each identified expert (except the researcher) contributed to the creation of the digital graphic novel in terms of the guidelines they helped incorporate. 10.2.4 Secondary objectives in the Evaluating phase The secondary objective in the Evaluating phase was: To interpret the reactions of South African members of the target audience toward the developed digital graphic novel in order to further refine it (Chapter 9). Three focus groups were held with members of the target audience. After the first focus group, identified improvements were made and the second version of the page of the digital graphic novel was demonstrated to the second and third focus groups. Recommendations for possible improvements identified in the second and third focus groups were applied to the final version of the digital graphic novel. 299 | Chapter 10: Specifying Learning 10.2.5 Secondary objectives in the Specifying Learning phase The secondary objective in the Specifying Learning phase was: To develop guidelines for the design of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles (Chapter 10). In this chapter, guidelines for the design of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles will be proposed. These guidelines were formed through literature reviews conducted in Chapters 4, 5 and 6. These guidelines incorporated human-computer interaction principles and were implemented in a digital graphic novel whose creation was guided by critical systems heuristics. 10.2.6 Primary objective of the study The achieving of these aforementioned secondary objectives resulted in the successful development of guidelines for the design and development of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles. A digital graphic novel was developed to portray the experiences of political prisoners in Robben Island Prison from 1960 – 1990 by incorporating the use of critical systems heuristics and the aforementioned principles. Both Windows and iOS application files of the digital graphic novel are attached on the Data CD. 10.3 Research evaluation As mentioned in Chapter 1, this study will be evaluated by determining whether the principles of Heikkinen et al. (2012:8), Klein and Meyers (1999:72) and Myers and Klein (2011:25) have been met. In this section, the researcher will reflect on how the aforementioned principles have been met in

this study. 10.3.1 Principles for validation of action research This section will address how the five principles for validation of action research as prescribed by Heikkinen et al. (2012:8) have been met. 10.3.1.1 Principle of historical continuity This principle evaluates topics such as the analysis of history, i.e. how the action evolved historically, as well as emplotment, i.e. how logically and coherently the narrative proceeds. This principle links to the seventh critical social theory principle as given by Harvey (1990:19), which states that in critical research, more emphasis is placed on the situations surrounding historical facts, rather than on the facts themselves (Chapter 2). In other words, the researcher needs to be aware of the history of the problem environment. History was a central theme in the study. The researcher took the history of graphic novels into account when developing guidelines for the design and development of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles (Chapter 4). As a team member of the Mandela27 project, the researcher learnt about life in Robben Island Prison during an important era in South Africa's history. The researcher allowed ex-political prisoners to widen her scope of the Apartheid era and life inside Robben Island Prison through focus groups and an interview held in the Diagnosing phase of this study (Chapter 7). The timeline and sequence of events in the study were discussed in the 'Data Collection' sections in Chapter 7 and Chapter 9. 10.3.1.2 Principle of reflexivity This principle evaluates topics such as subjective adequacy, i.e. the nature of the researcher's relationship with his/her object of research, ontologic and epistemologic presumptions, i.e. the researcher's presumptions of knowledge and reality, and transparency, the researcher's description of his/her material and methods. The researcher was employed by the Serious Games Institute – South Africa, and was part of the team responsible for the development of the digital graphic novel. Checkland and Holwell (1998:25) state that an action researcher is involved in the 301 | Chapter 10: Specifying Learning problem situation with the aim of bringing about improvement through change. Checkland and Holwell (1998:26) further state that the action researcher is capable of bringing about change by attempting to understand the problem situation through the identified framework of ideas (F) and methodology. The researcher achieved this by assisting in the creation of a digital graphic novel by proposing guidelines to develop guidelines for the design and development of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles. The development and application of these guidelines were guided by critical systems heuristics (F) and critical social research theory (M). The researcher incorporated the use of experts in the creation of the digital graphic novel. This was due to the fact that although the researcher was responsible for the design and development of the digital graphic novel, experts were needed in the process to compensate for skills that the researcher lacked. Table 8.2 maps the roles of each expert in the design of the digital graphic novel. The researcher did not conduct the focus groups in the Diagnosing phase herself. These focus groups were conducted by a facilitator who was a member of the Mandela27 project team. The researcher made use of directed content analysis and hermeneutics in order to identify themes in the data. Answers and portions of answers were coded and categorised into themes. The researcher listened to the audio files in order to determine the intonation and context of some of the participants' responses in order to ensure that the response was coded correctly. Once the entire text was coded, the first primary documents were recoded in order to ensure consistency. The researcher also ensured consistency by coding the data, leaving it aside for two weeks and then recoding it. Any discrepancies in the coding were investigated and corrected. All codes, code families and quotations are included in the Data CD. 10.3.1.3 Principle of dialectics This principle evaluates topics such as dialogue, i.e. how the researcher's insight developed in dialogue with others, polyphony, i.e. how the report presents different voices and interpretations, and authenticity, i.e. how authentic and genuine are the protagonists of the narrative. The embedded goal of critical systems heuristics is to give voice to various interpretations. Critical systems heuristics was used to guide the five phases of action research incorporated in this study (Table 3.3) Focus groups and interviews were held with ex-political prisoners of Robben Island Prison. A historical consultant was included in the Diagnosing and Action Taking phases in order to ensure the authenticity of the ex-political prisoners' recollections according to what is historically documented about experiences of prisoners in Robben Island Prison. The researcher included both ex-political prisoners incarcerated in the general section and maximum-security section in the focus groups and interview. The responses of each of the aforementioned discussions were summarised and discussed in Chapter 7. Focus groups were also held with members of the target audience during the Evaluating phase of the study. The focus groups were held in different locations and included a mixture of male and female participants. The responses of the focus groups were summarised and discussed in Chapter 9. 10.3.1.4 Principle of workability and ethics This principle evaluates topics such as pragmatic quality, i.e. how well does the research succeed in creating workable practices; criticalness, i.e. the kind of discussion the research provokes; ethics, i.e. the manner in which ethical problems are dealt with; empowerment, i.e. does the research make people believe in their own capabilities and possibilities to act and thereby encourage new practices and actions. The aim of this study is to develop guidelines for the design and development of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles. A digital graphic novel will be developed to portray the experiences of political prisoners in Robben Island Prison from 1960 - 1990. The proposed guidelines given in Chapter 6 were compiled after a review of literature on digital graphic novels (Chapter 4), human-computer interaction (Chapter 5) and emotion (Chapter 6). These proposed guidelines were incorporated into the design and development of a digital graphic novel portraying the experiences of political prisoners in Robben Island Prison during the Apartheid era. The digital graphic novel was designed and developed according to the five phases of action research. The content of the digital graphic novel was determined through focus groups and an interview held with ex-political prisoners of Robben Island during the Diagnosing phase of the study. By doing this, the researcher empowered the ex-political prisoners by granting them a platform on which to share their experiences with the rest of the world. The aforementioned is discussed in Chapter 7. Members

of the target audience were asked to evaluate the created digital graphic novel in the Evaluating phase of the digital graphic novel. In doing so, the researcher empowered members of the target audience by including them in the design of the digital graphic novel that is intended for their age group. Members of the target audience were excited with the concept of the digital graphic novel and were eager to give their recommendations on how the initial versions of the digital graphic novel could be refined. The aforementioned is discussed in Chapter 9. 10.3.1.5 Principle of evocativeness This principle evaluates the topic of evocativeness, i.e. how well does the research narrative evoke mental images, memories or emotions related to the theme. With the aim of this study being to develop guidelines for the design and development of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles and to develop a digital graphic novel, both emotion and evocativeness played a key role in this study. Ex-political prisoners were asked to talk about their mental images, memories and emotions in order to enable the researcher to understand their worldviews. Interpretive methods were purposefully chosen as they allowed the researcher to develop an understanding of the emotions of the ex-political prisoners. In the Evaluating phase, the researcher experienced difficulties with conducting focus groups with individuals between 16-25 years of age. However, the researcher was able to develop an understanding of what was required to awaken their emotions and encourage them to participate. 10.3.2 Principles for validation of critical research This section will reflect on how the principles of Myers and Klein (2011:25) have been met. Table 2.2 presents the application of principles for critical research proposed by Myers and Klein (2011:25). The principle of using core concepts from critical social theorists was applied by using critical social heuristics to guide the action research phase adopted in this study (Table 3.3). The researcher took a value position that ex-political prisoners will benefit from having their stories told through the medium of a digital graphic novel. Another value position taken by the researcher was that presenting emotional social phenomena in the form of a digital graphic novel would be more appealing for youth. The researcher revealed and challenged prevailing beliefs by social practices by presenting content of a serious nature in an entertaining form. Ex-political prisoners were emancipated by being given a medium through which to tell their stories. Young adults were emancipated by being granted the opportunity to learn about a serious topic through an engaging medium. The principle of improvements in society was applied by promoting historical awareness through the creation of a digital graphic novel portraying the experience of ex-political prisoners in Robben Island. This study demonstrated that critical social heuristics could be applied to the design and development of a digital graphic novel that portrays an emotional social phenomenon. 10.3.3 Principles for validation of interpretive research This section will reflect on how the principles of Klein and Meyers (1999:72) have been met. Table 2.3 presented the principles for interpretive field research proposed by Klein and Myers (1999:72). The fundamental principle of the hermeneutic circle was applied during the analysis of the data. During the analysis, participant response was interpreted by observing the statement made before the response and listening to the intonation with which it was said in the audio files. The responses were analysed chronologically in order to reconstruct the meaning of each individual response and were interpreted according to the overall climate of the discussion. In doing so, the researcher was able to understand the parts of the data, which enabled her to gain a better understanding of the whole and vice versa. By understanding each individual part of the focus groups, the researcher was able to gain a better understanding of the text as a whole and vice versa. The principle of contextualisation was applied by providing information about the participants in both the Diagnosing and Evaluating phases and about the researcher herself. The principle of interaction between the researcher and her participants were applied by discussing the process of the focus groups and interviews in the 'Data Collection' sections of Chapter 7 and Chapter 9. The principle of abstraction and generalisation was applied by content analysis in the interpretation, abstraction and generalisation of data in the Evaluating phase of the action research cycle adopted in this study. The principle of dialogical reasoning was applied by incorporating both existing theory and findings obtained in the analysis of the focus groups in the design and development of the digital graphic novel created in this study. The principle of multiple interpretations was applied by analysing the data twice and providing evidence for auditing purposes. Finally, the principle of suspicion was applied by accepting that all responses in the Diagnosis phase are a representation of a specific ex-political prisoner's reality that serves as a message that he would like to convey. 10.4 Research discussion The aim of this study was to develop guidelines for the design and development of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles. The researcher developed the guidelines presented in Table 10.1 after conducting literature reviews of digital graphic novels, human-computer interaction and emotion. These guidelines were incorporated in the design and development of a digital graphic novel portraying the experiences of political prisoners in Robben Island Prison during the Apartheid era. Table 10.1: Proposed guidelines for creating digital graphic novels portraying emotional social phenomena using critical systems heuristics and HCI principles. Narrative N1 The author should determine the emotions, worldviews and the purpose for developing the narrative (McCloud, 1994:170). N2 The author should make readers care about the narrative, either by the content itself or through the intensity of its presentation (McCloud, 2011:53). N3 The author should exploit the common experiences or heritage of the target group of the digital graphic novel to provoke emotions such as suspense, sadness and joy (McCloud, 2011:150). N4 Complex information should not be presented in the narrative (Lutz & Huitt, 2003:3). N5 A goal of the narrative should be to elicit a sense of meaningfulness from the reader (Lutz & Huitt, 2003:3). N6 The narrative text should be presented as concise sentences and not paragraphs (Dix et al., 2004:30). N7 The narrative should be well-written in order to elicit emotions and activate emotional memory in readers (Sprenger, 1999:76; Lutz & Huitt, 2003:6). Character C1 Characters should engage in novel and attention-grabbing conflicts with themselves, other characters and the world around them McCloud (2011:150). C2 Characters should be designed as believable and vivid human beings (McCloud, 2011:62). C3 Facial expressions of a character should be

used to portray a character's emotions to the reader as well as to elicit emotions from the reader (Eisner, 1990:111; McCloud, 2011:81). C4 A combination of and variation in the six basic emotional expressions should be used to represent more complex or intense emotions (McCloud, 2011:84). C5 The body language of the character should be used to communicate the emotions of a character (Eisner, 1990:113; McCloud, 2011:103). Pages and panels P1 Panels that enable the reader to easily follow the narrative should be used (McCloud, 2011:12). P2 Each panel should lead to and support the next (Eisner, 1990:25; McCloud, 2011:14). P3 The specific moment that is represented within a panel should serve to elicit emotions from readers or to portray emotion to readers (Eisner, 1990:46). P4 Movement represented in panels should be one of six different types as given in literature (McCloud, 1994:70; McCloud, 2011:15). Moment-to-moment – series of moments portrays a single action. Action-to-action – series of actions of a single subject (person, object, etc.). Subject-to-subject – single scene with changing subjects. Scene-to-scene – moments that transition over significant distances of space or time. Aspect-to-aspect – moments transition from one aspect of a mood, place or idea to another. Non-sequitur – series of seemingly unrelated images and/or words. P5 Frames should guide the reader's focus to aspects that are important to the narrative (McCloud, 2011:20). P6 The variation of the look-and-feel of panels should be manipulated in order to elicit specific emotions from readers (Eisner, 1990:46). P7 The flow of the digital graphic novel should adhere to the standard that readers will read frames from left-to-right and then top-to-bottom (Eisner, 1990:41; McCloud, 2011:32). P8 By making use of the familiarity principle depth of field can be simulated within the digital graphic novel (Dix et al., 2004:18). P9 The thickness of lines and spaces between lines in the digital graphic novel should not fall outside an individual's ability to perceive it (Dix et al., 2004:17). P10 Luminance increases an individual's visual acuity (Dix et al., 2004:17). P11 By varying the brightness, size and depth of images within the digital graphic novel, a 2- dimensional image can be projected as a 3-dimensional image within the digital graphic novel (Preece et al., 1994:83). P12 The text in the digital graphic novel should not be written in capital letters in order to promote legibility and accuracy in reading (Dix et al., 2004:22). P13 Negative contrast (e.g. black text on a white background) should be used to increase the legibility of the text in a digital graphic novel (Dix et al., 2004:23). Artwork A1 The artist should decide on images that brings the narrative to life for the reader (Eisner, 1990:89; McCloud, 2011:26). A2 Images should communicate the narrative clearly and compellingly (McCloud, 2011:26). A3 Pictures should be used to evoke specific emotions or sensual responses from readers in order to increase immersion within the narrative (McCloud, 2011:118). A4 Images should be combined with narrative text in seven distinct categories as given in McCloud (1994:153) and McCloud (2011:130). Word-specific – words describe everything that a reader needs to know while the pictures illustrate the scene described by the words. Picture-specific – opposite of word-specific; the pictures provide all the information that the reader needs while the words highlight certain aspects of the scene being shown. Duo-specific – the same message is portrayed by both words and pictures. Intersecting – both words and pictures make individual contributions to the scene while also working together in certain aspects to create the scene as a whole. Interdependent – neither the words nor the pictures would be able to convey the same message/idea on their own. Parallel – words and pictures do not seem to support each other or intersect. Montage – words and pictures are combined pictorially within a scene. Interface I1 Features such as button highlights and page turning animations should help users to consolidate kinesthesis without any physical feedback which may affect the performance and comfort of a user (Dix et al., 2004:26). I2 Research of the target audience of the digital graphic novel should be conducted in order for it to cater to their specific requirements, preferences and abilities (Dix et al., 2004:52). I3 The user should be able to determine what is going on and what to do next (Norman, 2002:188). I4 Affordances should made to account for a reader's physical, semantic, cultural and logical constraints (Norman, 2002:84). I5 The structure and design of the interface of a digital graphic novel should be consistent in order to resolve memory problems and promote predictability (Norman, 1983:257; Nielsen & Molich, 1990:249; Shneiderman & Plaisant, 2005:74; Stone et al., 2005:95; Johnson, 2007:8). I6 The interface of a digital graphic novel should cater to universal usability (Shneiderman & Plaisant, 2005:74). I7 The interface of a digital graphic novel should be designed so as so reduce errors (Norman, 1983:257; Shneiderman & Plaisant, 2005:74). I8 The interface of a digital graphic novel should allow for easy reversal of actions (Nielsen & Molich, 1990:249; Shneiderman & Plaisant, 2005:74). I9 The interface of a digital graphic novel should allow users to feel as though they are in control (Shneiderman & Plaisant, 2005:75). I10 The interface of a digital graphic novel should be task-focused and as simple as possible (Nielsen & Molich, 1990:249; Stone et al., 2005:170). I11 There should be a help menu to assist readers in understanding the functions of each interface element (Nielsen & Molich, 1990:249). I12 The content of the interface of a digital novel should be sensibly organised (Stone et al., 2005:170). I13 The interface of a digital graphic novel should enable all intended readers to read it regardless of environmental conditions or handicaps (Stone et al., 2005:177). I14 The interface of a digital graphic novel should be tested on member of the target audience and then altered to accommodate their preferences (Johnson, 2007:48). Sound S1 Sounds used within the novel should fall between the appropriate intensity and frequencies of human hearing while not being too similar or too loud (Dix et al., 2004:24; Te'eni et al., 2007:75). S2 A digital graphic novel should make use of sounds in order to elicit emotions and activate emotional memory in readers (Sprenger, 1999:76; Lutz & Huitt, 2003:6). Emotion E1 The six basic emotions sadness, happiness, fear, disgust, anger and surprise are universal, can be found in all cultures (Ekman, 1992b:170; Ekman, 1992a:550; Peter & Herbon, 2006:142) and should be incorporated into the characters of a digital graphic novel. E2 The designer should pay attention to the affective qualities of the beauty, overview, title, shape, structure, texture, menu, main images and colour of websites and screens (Zhang & Li, 2005:107). E3 The look and feel of the digital graphic novel should be pleasing to the reader in order to attain a positive user experience. (Jordan, 2000:13; Norman, 2005:2; Ortony et al., 2005:173). E4 The designer should make use of clean lines, balance, colour, shape and texture to enhance the look and feel of the digital graphic novel (Rogers et al., 2011:150). E5 More saturated and brighter

colours should be used to elicit greater pleasure from readers (Guilford & Smith, 1959:502). E6 Colours which are highly preferred should be linked to emotions which are highly preferred and vice versa (Terwogt & Hoeksma, 1995:11). Hues ranging from least preferred to most preferred are yellow, orange, red, violet, purple, green and blue (Guilford & Smith, 1959:490). E7 Colours should be associated with concepts such as (Wexner, 1954:433; Adams & Osgood, 1973:145): 1. Red = exciting, stimulating, strong, active 2. Blue = secure, comfortable, tender, soothing 3. Orange = disturbing, distressed, upset 4. Black = powerful, strong, masterful, bad E8 Colours that are less bright and more saturated should be incorporated as they are more emotionally arousing than others (Valdez & Mehrabian, 1994:398). E9 Large, still versions of images should be used as they are more emotionally arousing than small, still versions, small, motion versions and even large, motion versions of an image (Detenber & Reeves, 1996:77). E10 Sounds should be used to supply further affective information to and elicit emotions from readers (Juslin & Västfjäll, 2008:560). E11 Visual imperfections should be compensated for through the use of sound (Reeves & Nass, 1996; Tajadura-Jiménez & Västfjäll, 2008:69). E12 The designer, artist and author of a digital graphic novel portraying emotional social phenomena should strive to make a reader experience emotion salient enough for the reader to confide the emotional experience to others (Rimé et al., 1998:148). E13 Frames should be used to generate emotional involvement from the reader and portray a visual perspective of the emotional climate within which a certain action occurs through the variation of shape or treatment of frames (Eisner, 1990:46). E14 Pictures used within a digital graphic novel portraying emotional social phenomena should evoke an emotional response (McCloud, 2011:118). E15 The reader should be able to recognise both the meaning and emotional impact of the selected image used within a digital graphic novel portraying emotional social phenomena Eisner (1990:13). E16 The inner life of a character contains a character's life history which should help the reader emotionally connect with the character while also providing a platform from which differences in life experiences of the character and other characters can elicit stories worth being told (McCloud, 2011:65). E17 Facial expressions in comics are very important in order for the comic artist to portray the emotions of the characters to the readers as well as to provoke emotions in the readers themselves (McCloud, 2011:81). 10.4.1 Reflection on proposed guidelines During the design and development of the digital graphic novel, the researcher noted that there were guidelines that appeared to be similar and occurred together. Table 10.2 shows the guidelines incorporated in each screenshot of the digital graphic novel presented in this study. By observing the table, relationships between guidelines become evident, such as that between C1, C2, C3, A1, A4, E1, E17. Although these combinations of guidelines are often used together in order to capture emotion and bring the narrative to life for the reader, the researcher decided to keep the guidelines categorised according to the fundamental requirements for sequential art as given by Eisner (1990:159). This promotes ease of use as the designer of a digital graphic novel may apply these principles per requirement and may instruct his experts accordingly by presenting them with guidelines specific to their role. For example, the programmer (or interface designer) can be given guidelines specific to the interface, while the author can be given guidelines specific to the narrative. Both the programmer and author may also be given the guidelines specific to emotion. Table 10.2: Guidelines incorporated in each screenshot of the digital graphic novel presented in this study. Figure 8.3 Figure 8.4 Figure 9.13 Figure 9.14 Figure 9.15 Figure 9.16 Figure 9.17 Figure 9.18 Figure 9.19 Figure 9.20 Figure 9.21 Figure 9.22 Figure 9.23 Figure 9.24 N5, N2 N2, N5, E12 I1, I2, I3, I4, I6, I10, I11, I12, I13 I1, I2, I3, I5, I6, I7, I8, I9, I10, I12, I13 N2, E12 N2, E12 N2, E12 N2, E12 N2, E12 N2, E12 N2, E12 N2, E12 N2, N5, N7, E12 N2, E12 N2, E12 N2, E12 N3 N3 I14 I14 N6 N3 N3 N4, N6 N4 N4 N4, N6 N4, N6 N4 N4,N6 N4, N6 N4, N6 P5, P6, P8, P11, E12, E13 N4, N6 N4, N6 N5, N7, E12 N5, N7, E12 N5, N7, E12 C1, C2, C3, A1, A4, E1, E17 P5, P6, P8, P11, E12, E13 N5, N7, E12 P5, P6, P8, P11, E12, E13 N5, N7, E16 N5, N7, E16 A1, A4, E5, E12 N5, N7, E12 N5, N7, E12 C1, C2, C3, A1, A4, E1, E17 C1, C2, C3, A1, A4, E1, E17 C1, C2, C3, A1, A4, E1, E17 P3, P5, E12, E13 A1, E5, E12 C1, C2, C3, A1, A4, E1, E17 A1, E5, E12 C1, C5, A3, E12, E14, E15 C1, C2, C3, C5, E1, E17 I1, 13, I7, I9, I10 P5, P6, P8, P11, E12, E13 P5, P6, P8, P11, E12, E13 P3, P5, E12, E13 P3, P5, E12, E13 P3, P5, E12, E13 S2, E10 I1, I3, I7, I9, I10 P3, P5, E12, E13 I1, I3, I7, I9, I10 P3, P5, A1, A2 P1, P2, P7 S2, E10 C2, C3, C5, A1, A4, E1, E5, E12, E17 A1, A4 S2, E10 S2, E10 S2, E10 S2 S2, E10 S2 A4 P3, P5, A1, A2 I1, I3, I7, I9, I10 I1, I3, I7, I9, I10 S1, S2 P6, E12, E13 S2, E10 S2, E10 E6, E7, E8 P8, P11 P12, P13 A3, E12, E13, E14, E15 A4 S1, S2 E6, E7, E8 Chapter 10: Specifying Learning | 312 10.5 Limitations of the study The limitations of this study are: 1. The researcher was only able to attain a small number of participants for the Diagnosing phase. 2. The researcher was unable to conduct the focus groups and interview in the Diagnosing phase herself. 3. There were time limits on the focus groups and interview. 4. The researcher was unable to achieve saturation in the focus group and interview of the Diagnosing phase due to limited number of participants and time. However, the historical consultant was able to verify the stories told by the ex-political prisoners. 5. Due to the time constraints of the Mandela27 project, the researcher was only able to conduct two rounds of evaluation in the Evaluating phase. 10.6 Further study considerations Guidelines for the design and development of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer interaction principles were proposed and applied in this study. The proposed guidelines could be applied to the development of another digital graphic novel portraying an emotional social phenomenon. The list of proposed guidelines can also be reapplied and refined as newer technological developments broaden the horizon of possibilities in digital media. 10.7 Chapter summary The aims and objectives of this study were reflected on in Section 10.2. This was followed by an evaluation of the research in Section 10.3. The research was evaluated in terms of the principles for validation of action research (Section 10.3.1), critical research (Section 10.3.2) and interpretive research (Section 10.3.3). The proposed guidelines for the design and development of digital graphic novels portraying emotional social phenomena using critical systems heuristics and human-computer 313 | Chapter 1: Introduction to the Study interaction principles are presented in Section 10.4. The limitations of the study are discussed in Section 10.5 with further study considerations presented in Section 10.6. This chapter

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| 4 5 |

**Chapter 1: Introduction to the Study Chapter 1: Introduction to the Study** 7

| 6 7 |

**Chapter 1: Introduction to the Study Chapter 1: Introduction to the Study** 7

| 8 9 |

**Chapter 1: Introduction to the Study Chapter 1: Introduction to the Study** 7

| 10 11 |

**Chapter 1: Introduction to the Study Chapter 1: Introduction to the Study** 7

| 12 13 |

**Chapter 1: Introduction to the Study Chapter 1: Introduction to the** 7

Study

| 14 15 |

Chapter 1: Introduction to the Study 17 | Chapter 1: Introduction to the Study 7

Chapter 1: Introduction to the Study | 18 Chapter 1: Introduction to the Study 7

| 20 21 |

Chapter 1: Introduction to the Study Chapter 1: Introduction to the Study 7

| 22 23 |

Chapter 1: Introduction to the Study Chapter 1: Introduction to the Study 7

| 24 25 |

Chapter 1: Introduction to the Study Chapter 1: Introduction to the Study 7

| 26

Chapter 1: Introduction to the Study | 28 33 | Chapter 2: 148

Research Methodology Chapter 2: Research Methodology | 34 35 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 36 Chapter 2: Research Methodology | 38 39 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 40 41 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 42 43 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 44 45 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 46 47 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 48 49 | Chapter 2: Research Methodology 51 | Chapter 2: Research Methodology 53 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 56 57 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 58 Chapter 2: Research Methodology | 60 61 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 62 63 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 64 65 | Chapter 2: Research Methodology 67 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 68 69 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 70 71 | Chapter 14

2: Research Methodology 73 | Chapter 2: Research Methodology Chapter 2: Research Methodology | 74 Chapter 2: Research Methodology | 76 79 | Chapter 3: 68

Critical Systems Heuristics Chapter 3: Critical Systems Heuristics | 82 83 | Chapter 3: Critical Systems Heuristics Chapter 3: Critical Systems Heuristics | 84 Chapter 3: Critical Systems Heuristics | 86 87 | Chapter 3: Critical Systems Heuristics Chapter 3: Critical Systems Heuristics | 88 89 | Chapter 3: Critical Systems Heuristics Chapter 3: Critical Systems Heuristics | 90 91 | Chapter 3: Critical Systems Heuristics

Chapter 3: Critical Systems Heuristics | 92 93 | Chapter 3: Critical Systems Heuristics Chapter 3: Critical Systems Heuristics | 94 95 | Chapter 3: Critical Systems Heuristics Chapter 3: Critical Systems Heuristics | 96 97 | Chapter 3: Critical Systems Heuristics Chapter 3: Critical Systems Heuristics | 98 99 | Chapter 3: Critical Systems Heuristics Chapter 3: Critical Systems Heuristics | 100 101 | Chapter 3: Critical Systems Heuristics Chapter 3: Critical Systems Heuristics | 102 103 | Chapter 3: Critical Systems Heuristics Chapter 4: Digital Graphic Novels | 106 107 | Chapter 4: Digital Graphic Novels Chapter 4: Digital Graphic Novels | 108 109 | Chapter 4: Digital Graphic Novels 111 | Chapter 4: Digital Graphic Novels Chapter 4: Digital Graphic Novels | 112 Chapter 4: Digital Graphic Novels | 114 Chapter 4: Digital Graphic Novels | 116 Chapter 4: Digital Graphic Novels | 118 Chapter 5: Human-Computer Interaction | 122 123 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 124 125 | Chapter 5: Human-Computer Interaction 127 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 128 Chapter 5: Human-Computer Interaction | 130 131 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 132 133 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 134 137 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 138 Chapter 5: Human-Computer Interaction | 140 141 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 142 143 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 144 145 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 146 Chapter 5: Human-Computer Interaction | 148 149 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 150 151 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 152 153 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 154 155 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 156 157 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 158 159 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 160 161 | Chapter 5: Human-Computer Interaction Chapter 5: Human-Computer Interaction | 162 Chapter 6: Emotion | 166 Chapter 6: Emotion | 168 Chapter 6: Emotion | 170 Chapter 6: Emotion | 172 173 | Chapter 6: Emotion Chapter 6: Emotion | 174 175 | Chapter 6: Emotion Chapter 6: Emotion | 176 177 | Chapter 6: Emotion Chapter 6: Emotion | 178 179 | Chapter 6: Emotion 185 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 186 187 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 188 189 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 190 191 | Chapter 7: Diagnosis 193 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 194 Chapter 7: Diagnosis | 196 197 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 198 199 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 200 201 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 202 203 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 204 205 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 206 Chapter 7: Diagnosis | 208 209 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 210 211 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 212 213 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 214 215 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 216 217 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 218 219 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 220 221 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 222 223 | Chapter 7: Diagnosis Chapter 7: Diagnosis | 224 227 | Chapter 8: Action Planning and Action Taking Chapter 8: Action Planning and Action Taking | 228 Chapter 8: Action Planning and Action Taking | 230 Chapter 8: Action Planning and Action Taking | 232 Chapter 8: Action Planning and Action Taking | 234 235 | Chapter 8: Action Planning and Action Taking Chapter 8: Action Planning and Action Taking | 236 Chapter 8: Action Planning and Action Taking | 238 239 | Chapter 8: Action Planning and Action Taking Chapter 9: Demonstration and Evaluation | 242 245 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 246 247 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 250 251 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 252 253 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 254 255 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 256 257 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 258 259 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 260 Chapter 9: Demonstration and Evaluation | 264 267 | Chapter 9: Demonstration and Evaluation 269 | Chapter 9: Demonstration and Evaluation 271 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 272 273 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 274 275 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 276 279 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 280 281 | Chapter 9: Demonstration and Evaluation 283 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 284 Chapter 9: Demonstration and Evaluation | 286 287 | Chapter 9: Demonstration and Evaluation 289 | Chapter 9: Demonstration and Evaluation Chapter 9: Demonstration and Evaluation | 290 Chapter 9: Demonstration and Evaluation | 292 Chapter 9: Demonstration and Evaluation | 294 Chapter 10: Specifying Learning | 298 Chapter 10: Specifying Learning | 300 Chapter 10: Specifying Learning | 302 303 | Chapter 10: Specifying Learning Chapter 10: Specifying Learning | 304 305 | Chapter 10: Specifying Learning Chapter 10: Specifying Learning | 306 307 | Chapter 10: Specifying Learning Chapter 10: Specifying Learning | 308 309 | Chapter 10: Specifying Learning Chapter 10: Specifying Learning | 310 311 | Chapter 10: Specifying Learning 317 | Bibliography Bibliography | 318 319 | Bibliography Bibliography | 320 321 | Bibliography Bibliography | 322 323 | Bibliography