TOWARDS A DIGITAL TOOL FOR MONITORING AND REPORTING MOBILE VICTIMISATION AMONG SOUTH AFRICAN HIGH SCHOOL STUDENTS

By

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DECLARATION

I, Shallen Lusinga, hereby declare that the work presented in this thesis is my own unaided work, and is, to the best of my knowledge and belief, original, except as acknowledged in the text. I hereby declare that I have not submitted this material, either in whole or in part, for a degree at this or any other institution.

Signed by candidate

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(Signature)

26 August 2019

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(Date)

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This journey has had many ups and downs. I have been fortunate, however, that God was by my side. I was also fortunate to have had the following people and their support.

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For Edward and Gertrude Lusinga

PREFACE

Parts of this thesis have appeared in a publication and been accepted for presentation and publication. Details are as follows:

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2. Lusinga, S. (2015). Towards A Typology for Understanding Mobile Phone Victimisation in South African High Schools. (Masters Dissertation).
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ABSTRACT

Mobile victimisation is one form of cyber aggression that is increasing and affecting many young people in the developing world today. However, the focus on mobile victimisation in developing nations is limited. There is also limited theoretical work to enhance the conceptualisation of mobile victimisation. Understanding this phenomenon in developing countries is particularly critical as mobile phone usage and crime in these countries are among the highest in the world. Literature shows that in addition to these challenges, schools that have adopted paper or program-based interventions have not been very successful in combating victimisation. Research from other disciplines, however, suggests that digital interventions effectively address health and psychological challenges by offering digital self-intervention.

Research shows that reporting bullying incidents is a form of intervention whose challenges in developing and maintaining mechanisms persist. Schools particularly lack systems for reporting and students do not trust some of the reporting mechanisms. Similar problems have been identified in cyberbullying literature. Reporting violence in schools is particularly important in a country like South Africa, where the rate of crime remains the highest in the world. Understanding the circumstances under which victims decide to report (or not report) is important for effective development and implementation of appropriate interventions.

Studies on crime reporting provide mechanisms for predicting reporting behaviour that are mainly based on sociological, economic or psychological models. Given that this study investigated reporting behaviour from a technological perspective, technological models were also considered. However, focusing on one theoretical model may fail to capture the complexity of the factors influencing a victim's decision whether or not to report aggression. A broader theoretical perspective would allow for the identification of the various motivating factors which generally do not operate exclusively. In addition, most existing studies have focused on traditional forms of violence. Victimisation in schools is increasingly committed using mobile technology, making it imperative to examine the problem of reporting in a mobile environment. Reporting practices in a digital context may, however, differ in some aspects from reporting in a non-technological environment and these may vary across cultural groupings.

Applying a design science research (DSR) process within a pragmatic paradigm and being informed by literature, this study developed an integrative framework for understanding the

under-reporting of mobile victimisation by students so as to inform the development of a mobile-based intervention. Findings from the study confirmed that students do not report their victimisation because of economic, psychological, cultural-sociological and technological factors as predicted by the integrative theoretical framework. This confirmed the complexity of the factors influencing students decision whether or not to report aggression. This, therefore, implied that the proposed framework is not only valuable in explaining the broad social-cultural context of victimisation reporting, but also in reporting behaviours at the individual level. The proposed framework, therefore, informed the design, development and evaluation of a mobile application for reporting mobile victimisation faced by high school students in South Africa. An application named the Mobile Victimisation Monitoring and Reporting (MVMR) application was then developed and evaluated among high school students.

The MVMR application (app) provides useful features that enable: reflection by students; empathy from adult figures; empowerment for the students; consequence for the bullies. It also mitigates students' fear and provides them with the ability to control their reporting. Of the features engrained in the MVMR app to capture these themes, students found the option to report anonymously, the option to identify the bully and the display of their frequency of mobile phone use to be the most relevant and useful.

The study makes significant contribution to knowledge by providing insights into the reporting behaviours of high school students, which is an understudied research area. One essential theoretical contribution was the development of an integrative theoretical framework that provides the theoretical and social-ecological underpinnings to reporting behaviour which have previously been broad-brush approaches given to a whole class or whole school.

Concerning the contribution to practice, the study produced an IT artefact that is based on the proposed integrative theoretical framework. With this tool, high school students will have a means by which to report their victimisation and have the report addressed by an administrator who has a social-ecological understanding of that student. This creates a shift from generalised interventions and creates a more personalised approach to intervening mobile victimisation. Further discussions on the theoretical, practical and methodological contributions are made in this thesis, along with the limitations of the study and recommendations for future research.

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LIST OF ABBREVIATIONS

MVMR	Mobile Victimisation Monitoring and Reporting
MVT	Mobile Victimisation Typology
SRGBV	School-Related Gender-Based Violence
GQM	Goal-Question-Measurement Model
DSR	Design Science Research
DSRPM	Design Science Research Process Model
SMS	Short Text Messages
DBE	Department of Basic Education
DIs	Digital Interventions
MBP	Mobile Bullying Project
NRF	South African National Research Fund
MMS	Multimedia Messaging Services
wCBT	web-based Cognitive Behavioural Therapy
ACG	Attention Control Group
MAV	Mobile Added Value
LRAT	Lifestyle Theory and Routine Activities Theory
GPS	Global Positioning System
SNTs	Social Networking Technologies
VAW	Victimisation Against Women
AR	Action Research
IS	Information Systems
DBESA	Department of Basic Education of South Africa
CAT	Computer Applications Technology
IT	Information Technology
API	Application Programming Interface's
SaaS	Software as a Service
IDE	Integrated Development Environment
SDK	Software Development Kit

CHAPTER 1 INTRODUCTION

"*I keep six honest serving-men*
(They taught me all I knew);
Their names are What and Why and When
And How and Where and Who"
(Kipling, 1988: 3)

1.1 Background to the Study and Problem Statement

Victimisation is a complex phenomenon which results from a multitude of influences (Wilcox, 2010). Efforts to conceptualise and understand the behaviours of those who experience victimisation have, therefore, led to the development of victimisation theories and "typologies". While the theories help in understanding victimisation and its causes (Wilcox, 2010), the typologies serve as a basis for identifying, describing, comparing, explaining and predicting the phenomenon (Davis & Theron, 2000). Currently, even though victimisation typologies exist, none exists particularly to aid in the understanding of mobile victimisation. This is of concern as adolescent use of mobile phones has increased drastically (Downie & Glazebrook, 2007). Around the world, smartphones were used by 1.85 billion people in 2014 and was expected to reach 2.32 billion in 2017 and 2.87 billion by 2020 (Statista, 2017; Cha & Seo, 2018). A study by Global Kids Online (2016) indicated that 84.2% of South African children accessed the Internet via their mobile phones. This, and the rise in bullying using mobile technology, have led to mobile bullying becoming the obvious problem in the Western world (Holt et al., 2016) and also in South Africa (Kyobe, Mimbi, Nembbandona & Mtshazi, 2017). Kraft (2006) claims that mobile bullying has become the principal method of bullying and this trend has gone unnoticed and unidentified, leading to many students falling victim to this aggression. As a result, they are left facing loneliness, peer rejection, lower self-esteem and self-efficacy, higher stress, anxiety, depressive symptoms and sometimes even suicide (Hinduja & Patchin, 2010; Collins, 2012; North Shore-Long Island Jewish (LIJ) Health System, 2015; Holt et al., 2016).

Many different forms of technology may be used to carry out cyberbullying. However, when cyberbullying is carried out through the use of mobile phones, it is known as mobile bullying. Kowalski et al. (2008) have defined mobile bullying as a form of cyberbullying through e-mail,

chatrooms, instant messaging and short text messages (SMS) using mobile phones. In the past, there had been limited examination of the nature of mobile bullying, and, subsequently, mobile victimisation in cyberbullying studies (Smith, Mahdavi, Carvalho & Tippett, 2006; Deakin, 2006; Li, 2007; Wolak et al., 2007; Smith, Mahdavi, Carvalho, Fisher, Russell, & Tippett, 2008; Ngo & Paternoster, 2011; Slonje, Smith & Frisén, 2013; Lipton, 2011; Holt et al., 2016). Fortunately, the previous decade has seen an increase in the number of cyberbullying studies, especially in the North America and Europe. South America and Africa, however, are still lagging behind in this development (Smith, 2019). Ngo and Paternoster (2011) have suggested that there is a definite need for empirical research on victims (particularly child victims) to investigate a variety of factors contributing to victimisation. Badenhorst (2011) emphasises this, suggesting that in the South African context, mobile bullying and the resulting mobile victimisation have not been extensively examined. Holt et al. (2016) add to this argument by stating that findings from cyber- and mobile bullying and victimisation research tend to be generally consistent among studies examining the risk factors of online harassment and cyberbullying victimisation within college samples. Consequently, besides research focusing on the risk factors of victimisation and focusing on college samples, few scholars have in fact considered the value of studying these phenomena among age groups most likely to be victimised in this fashion, that is, adolescents (Bossler et al., 2012; Holt et al., 2016). In their study of mobile female bully-victims in South African high schools, Kabiawu and Kyobe (2015) found that while this category of bullies is increasing in size and becoming more aggressive, very few reports have been made of their behaviour. This is problematic as, for instance, international evidence shows that there exists an association between suicide and bully-victim behaviour. This raises concerns as suicide is fast becoming the second leading cause of death among South African youth. Some of the youth (9%) consider suicide to be the first option to solving most of the problems they experience (Ntseku, 2019).

In addition to the above challenges, few of the interventions made by schools and the Department of Basic Education in South Africa have been effective in minimising victimisation in some schools (Creecy, 2012). Kabiawu and Kyobe (2015) reinforce this, stating that very little has been done by researchers to develop appropriate interventions that would best counter bullying among high school students in South Africa. The lack of intervention has led to schools becoming unsafe and violent environments for students in which school drop-out rates have increased and access to education has reduced (Department of Basic Education Annual Report, 2013/14).

Most bullying literature references the social-ecological model, which often places students at the centre of various contexts or systems in which the individual develops. Since the origins of research on bullying, there have been attempts to intervene, noticeably in school settings (Smith, Bauman & Wong, 2019). However, there remains the need to examine how those larger, more distant systems of the social-ecological model impact the work done in schools. An important phase in current research is to document successes and failures in anti-bullying interventions, and relate these to our rapidly growing knowledge base (Smith, Bauman &Wong, 2019). However, while evidence exists that suggests that many of the interventions have some success, as evidenced by meta-analyses and by collected contributions from across the globe, many of them are practitioner-delivered, program-based, paper-based, or technological, these have not worked effectively and none that exist meet all the requirements needed to counter cyber victimisation (Smith, Bauman & Wong, 2019; Notar et al., 2013).

Other issues highlighted in research include other important aspects in interventions such as whether bystanders (who often form a 'silent majority') feel empowered to act in a more pro-social way and defend a victim (Myers & Cowie, 2019). Victims, too, may or may not feel able to cope with bullying in effective ways, and coping strategies for students can be enhanced as indicated in several studies. Many interventions are broad-brush approaches given to a whole class or whole school. These can be valuable, but as shown in the study by Nocentini, Palladino and Menesini (2019), they may be differentially effective for different pupils. Some pupils may need more targeted interventions, and it would be important to identify who they are as well as what kind of intervention is needed.

It is not going to be possible to 'eliminate' bullying. However, we can take actions to reduce its prevalence, to provide more effective help for victims, to assist bystanders to act positively, to encourage perpetrators to change their ways, and generally to improve safety and climate in schools and other settings (Villarejo-Carballido, Pulido, de Botton & Serradell, 2019; Astor & Benbenishty, 2018). Research from other disciplines and studies, however, suggests that digital interventions (DIs) can effectively address health and psychological challenges. Digital interventions are "programs that provide information and support (emotional, decisional, and/or behavioral) for physical and/or mental health problems via a digital platform specifically a website or a computer" (Alkhaldi, Hamilton, Lau, Webster, Michie & Murray, 2015: 2). For instance, in the health industry, a lot of evidence has shown that *self-intervention in digital*

form can offer patients self-care information and education and can help them manage and support their behaviours towards better health (Bucci, Lewis, Ainsworth, Haddock, Machin et al., 2018). In addition, this method of intervention may be done remotely using technological mediums such as the Internet, mobile applications, and text messaging services (Bucci et al., 2018; Clarke, Proudfoot, Vatiliotis, Verge, Holmes-Walker et al., 2018; Berry, Lobban, & Bucci, 2019; Michie, Yardley, West, Patrick & Greaves, 2017). An example of this is that of Bradbury, Watts, Arden-Close, Yardley and Lewith (2014), in which they recommend DIs as a sure way to answer the call for patients to self-manage and self-care over their health. Bradbury et al. (2014) highlight DIs as being more beneficial than (i) paper-based interventions, which require the production, printing and distribution of costly hard copy material and (ii) practice-based interventions which limit access or availability of practitioners and are sometimes costly. They argue that besides DIs being extremely cost-effective, DIs complement practitioner-delivered interventions, increase access to healthcare interventions and are able to reach large numbers of people (Bradbury et al., 2014).

Not many digital or mobile tools have been developed, however, to address the mobile victimisation problem. It is suggested that to combat cyber victimisation, explicit interventions in the form of new technical developments can be taken advantage of (Slonje, Smith & Frisén, 2013; Ranney, Pittman, Riese, Ybarra, Huang et al., 2018). Even with mobile health interventions becoming increasingly popular, challenges in developing effective, user-friendly, evidence-based technology-augmented interventions persist (Ranney et al., 2018). Additionally, applying design principles to develop these interventions in practice is difficult and rarely completed effectively (Ranney et al., 2018). This difficulty is due to the need for expertise in not only healthcare-specific topics, intervention development theory, and population-specific characteristics, but also design and development of technology for effective intervention delivery (Ranney et al., 2018). Therefore, with the mobile phone currently becoming a convenient means of carrying out bullying (due to factors associated with cyberbullying such as anonymity (Smit, 2015)) (Venkataraghavan, 2015), this study attempts to develop a digitally based tool that may be used as an intervention method. The tool will be useful in the monitoring and reporting mobile victimisation of high school students in South Africa. While doing so, this study will also fill the gap in the understanding of the mobile victimisation of students in South African high schools as well as understanding of their reporting behaviours when they experience mobile victimisation.

1.2 Research Questions and Research Objectives

1.2.1 Research Questions

- How can a digital tool monitor and report mobile victimisation of South African high school students?

1.2.1.1 Sub-Questions

- What is the influence of different types of digital tools on monitoring and reporting mobile victimisation?
- What factors influence the effectiveness of a digital tool that monitors or reports mobile victimisation?

1.2.2 Research Objectives

- To develop a digital tool, based on a victimisation typology, that will monitor and report mobile victimisation among South African high school students.
- To evaluate the proposed tool and its usefulness among students and through the process, to enhance the proposed mobile victimisation typology.

1.2.2.1 Secondary Objectives

- To further investigate mobile victimisation in order to understand how and why some students are more likely than others to become victims of mobile bullying.
- To understand the process of developing a digital tool for interventional purposes.

1.3 Research Strategy

To answer the research questions and meet the research objectives, the researcher adopted pragmatism as the research philosophy underpinning this study. As it follows the philosophy, Design Science Research (DSR) methodology was adopted, relying on Vaishnavi and Kuechler's (2004) DSR process model to achieve the goals of this study. This DSR process model includes five stages, and the adaptation of these stages in this study are captured in Figure 1 below. This Design Science Research (DSR) methodology is discussed in more detail in the Methodology chapter and the implementing design science chapters.

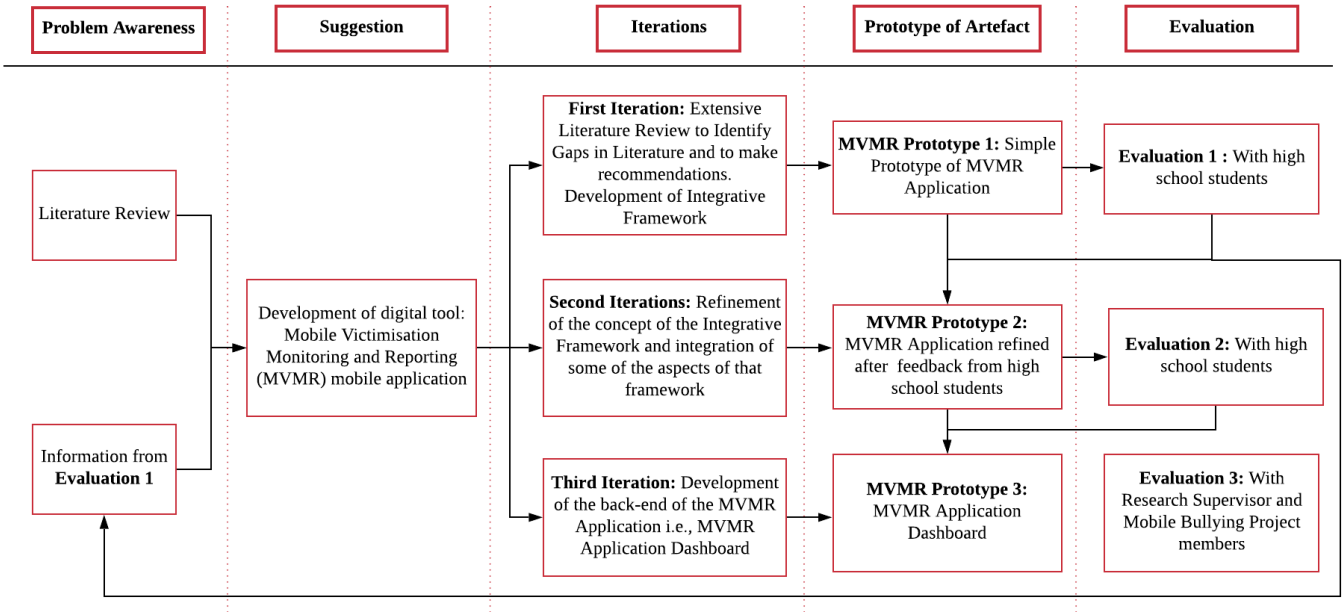


Figure 1: Research Strategy

The literature and information from high school students informed the problem awareness. This led to the suggestion of the development of a mobile application that could be used by high school students in South Africa. The framework developed in the suggestion phase was demonstrated by designing and developing three prototypes of the mobile application in three iterations. The first two prototypes were evaluated by high school students as they had to have input in the development of the application. The third and last iteration was evaluated by this study's supervisor and the researcher's colleagues in the Mobile Bullying Project (MBP) funded by the South African National Research Fund (NRF).

1.4 Research Contributions

This study has theoretical, practical and methodological contributions.

1.4.1 Theoretical Contributions

Through adapting Bronfenbrenner's ecological model as a guide in developing an integrative theoretical framework for studying factors influencing under-reporting, this study extended and tailored the model to understand the behaviour of reporting mobile victimisation. In adapting this model and tailoring the reporting models that exist in the different systems of young people, instead of taking an individualistic approach, the integrative theoretical model considers the larger, more distant systems of the social-ecological model that could impact the

work done in schools to avail students with access to reporting and intervention mechanisms for mobile victimisation.

1.4.2 Methodological Contributions

The major methodological contribution of this study was the use of Design Science Research (DSR) to study mobile victimisation and its reporting and in the development of digital interventions for addressing this aggression. Due to the iterative nature of designing artefacts using this methodology, this study demonstrated the robustness and the applicability of DSR methodology. This study also established the usefulness and strength of mixed methods to enrich understanding of mobile victimisation. Not many studies on bullying behaviour are conducted using interviews. However, through ethical consideration, measures were put in place to protect the students and to offer them support should there be a need. The use of mixed methods allowed for richer accounts and insight into the phenomenon being investigated.

1.4.3 Practical Contributions

This thesis and the results it will produce may also be very informative in the development of laws and policies as well as prevention and intervention programmes against mobile bullying. According to Popovac and Leoschut (2012), there is insufficient information on which to base bullying policy decisions in South Africa. This thesis has given some essential information that may be relevant to policy decisions. For instance, this thesis may be used in targeting prevention and intervention programmes towards the most efficient and relevant direction in terms of resource and impact management. Since the reporting behaviours of mobile victimised students could be revealed, these may be beneficial in detecting and preventing mobile victimisation from potentially occurring in students' lives.

1.5 Structure of the Thesis

This thesis comprises nine chapters. The nine chapters are structured as follow:

Chapter 1 presents the introduction to the study and poses the research questions and objectives.

Chapter 2 provides a literature review on mobile bullying and victimisation. It also discusses the interventions that exists and their inadequacies.

Chapter 3 explains the development of the integrative model designed for the purpose of this study.

Chapter 4 describes the research methodology and approaches adopted in this study and outlines the data collection and data analysis techniques used.

Chapter 5 briefly gives an overview of the adaptation of a Design Science Research model process in this study.

Chapter 6, Chapter 7 and Chapter 8 then present three iterations in which the Design Science Research process model is applied to the context of this study.

Chapter 9 concludes the study and highlights recommendations for future mobile victimisation interventions.

(Please refer to Figure 2 below for the overview of this thesis).

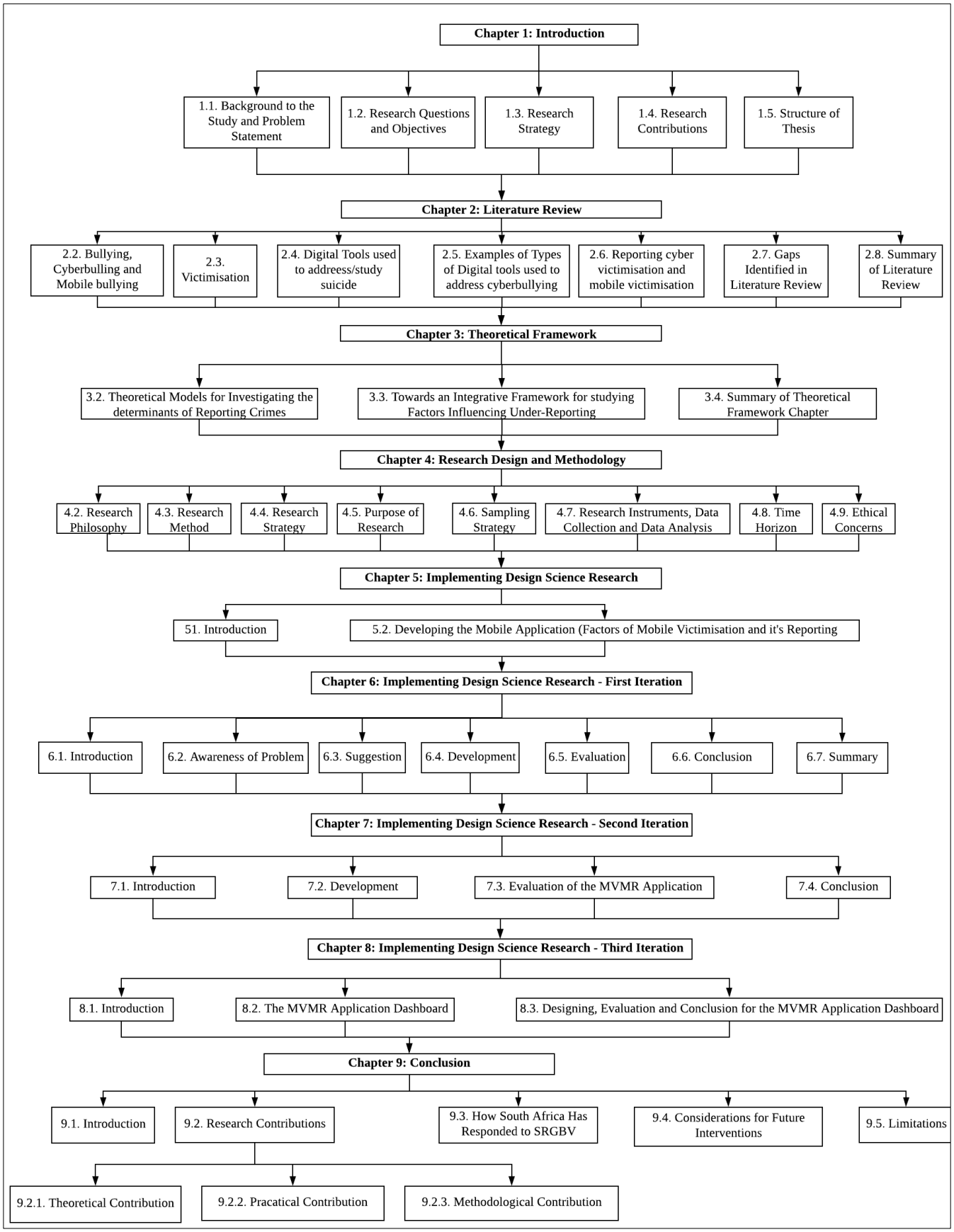


Figure 2: Overview of Thesis

CHAPTER 2 LITERATURE REVIEW

"If you believe everything you read, better not read."
(Japanese proverb)

This chapter presents the literature review (please refer to Figure 3 below for the literature review overview).

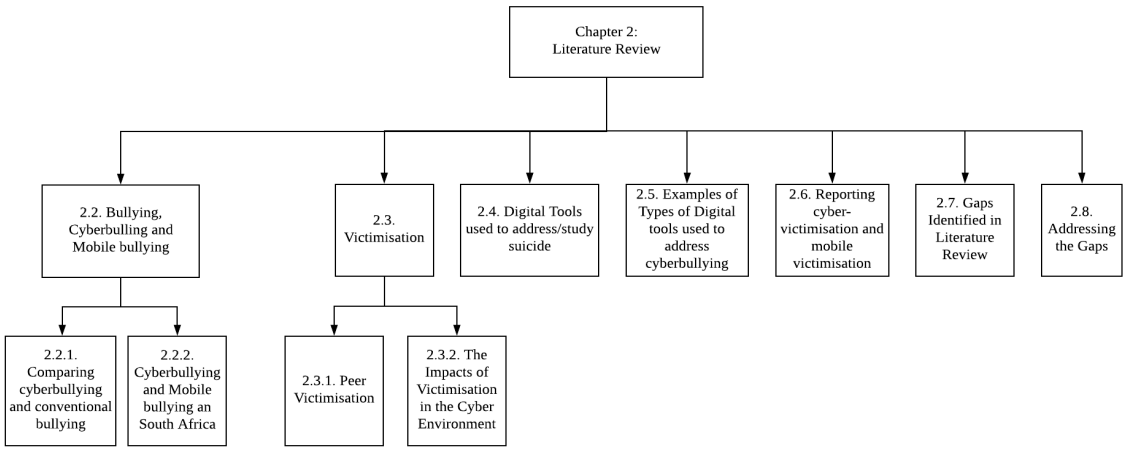


Figure 3: Overview of Literature Review Chapter

This literature review gives insight into bullying, cyberbullying and mobile bullying, victimisation, the digital tools used to address and/or study suicide, the means by which students have dealt with their cyber and mobile victimisation and, focuses on reporting as a primary means by which mobile victimisation may be tackled. The literature review then concludes by identifying gaps in the literature and how these gaps may be addressed.

2.1 Introduction

In a legal sense, victimisation is the process of a person becoming a victim of a crime (a serious offence committed by breaking the law) (Canadian Resource Centre for Victims of Crime, 2005), which usually affects a person directly, making that person a "crime victim". Many studies have examined victimisation in different areas such as peer victimisation, secondary victimisation and self-victimisation. For this study, peer victimisation is of concern since it's definition is similar to that of bullying. Peer victimisation is defined as the repeated reception of aggressive acts from one's peer or peers (Olweus, 2001). It is essential to start by examining

the concepts of bullying to fully understand mobile victimisation as a result of mobile bullying (Lipton, 2014). This consideration offers a useful background to understanding mobile victimisation as a whole (Lipton, 2014). Evidence has shown that cyberbullies often become cyber victims themselves. In turn, cyber victimisation may also increase the likelihood of one becoming a cyberbully (Ybarra & Mitchell, 2004; Li, 2007a; Walrave & Heirman, 2011). It is, therefore, essential to understand cyberbullying in order to understand cyber victimisation as the former contributes to the latter.

2.2 Bullying, Cyberbullying and Mobile Bullying

According to Olweus (1997: 497), bullying is defined as "the exposure to negative actions (aggressive behaviour or intentional harm doing) which are done repeatedly and over time in a relationship where there is an imbalance of strength". Bullying can be conventional or cyber-based. According to Orpinas and Horne (2006), conventional bullying has been defined as the misuse of power by an aggressor acted on a target. The ubiquity of computer technology, the Internet, and mobile phones enable youth to engage in intentional, aggressive behaviours against others in cyberspace (Holt et al., 2016). Many terms and definitions have been used in literature to capture cyberbullying (please refer to Table 1 below). What is certain, however, is that once given another method, in the form of computers, cell phones and other electronic devices, bullying becomes cyberbullying (O'Moore, 2012). The term cyberbullying specifically refers to attempts to cause emotional harm and social embarrassment through the use of instant messaging, e-mail, social media, and text messages via cell phones (Holt et al., 2016).

Table 1: Conceptual Definitions of Cyberbullying (Tokunaga, 2010)

Study	**Conceptual Definitions of cyberbullying**
Finkelhor et al. (2000)	*Online harassment: Threats or other offensive behaviour (not sexual solicitation) sent online to the youth or posted online about the youth for others to see*
Ybarra and Mitchell (2004)	*Internet harassment: An overt, intentional act of aggression toward another person online*
Patchin and Hinduja (2006)	*Wilful and repeated harm inflicted through the medium of electronic text (p. 152)*
Willard (2007)	*Sending or posting harmful or cruel texts or images using the internet or other digital communication devices (p. 1)*
Li (2007)	*Bullying via electronic communication tools such as e-mail, cell phone, personal digital assistant (PDA), instant messaging, at the World Wide Web (p. 224)*
Slonje and Smith (2007)	*Aggression that occurs through modern technological devices and specifically mobile phones or the Internet*

Belsey (2007) (as cited by Tokunaga, 2010)	*The use of information and communication technologies to support deliberate, repeated, and hostile behaviour by an individual or group, that is intended to harm others*
Smith (2008)	*An aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly or overtime against a victim who cannot easily defend him or herself (p. 376)*

Many different forms of technology may be used to carry out cyberbullying. It has been said that mobile bullying is using a mobile phone to perform the act of bullying. According to Kowalski, Limber and Agatston (2008) and Holt et al., (2016), ways in which a mobile phone may be used for bullying include the use of hurtful and threatening SMSs (Short Message Services) being sent to someone. It also includes the distribution of embarrassing recorded images or videos of people to the public through Multimedia Messaging Services (MMS), and harassing voice messages. Researchers such as Kowalski et al. (2008) have defined mobile bullying as a form of cyberbullying through e-mail, chatrooms, instant messaging and short text messages using mobile phones. This definition of mobile bullying is the definition that will be used for the purpose of this study.

2.2.1 Comparing Cyberbullying and Conventional Bullying

It has been argued that cyberbullying is the same as conventional bullying, only through a different medium. However, literature also argues this not to be true (Law, Shapka, Hymel, & Waterhouse, 2012; Lipton, 2014). For example, some researchers question the seriousness of cyberbullying or the extent to which cyberbullying could affect its victims. Kennedy and Taylor (2010) suggest that the cyber environment is less threatening than the media has reported and that the most severe dangers to internet users continue to exist offline. They found that the rates of victimisation initiated through online contact suggest that, although cyber activity may provide opportunities for certain types of victimisation, students are still at a higher risk from people they meet offline (Kennedy & Taylor, 2010). Mitchell et al. (2011) reported, however, that youth are more at risk of being victimised by many different forms of victimisation and it is unclear where precisely cyber victimisation is situated in the larger scale of victimisation in terms of frequency and effect. Additionally, they suggest that cyber victimisation affects a small portion of the population in comparison to conventional victimisation. Furthermore, it has been found that victimisation does not occur in isolation. Instead, most students report having been victimised online as well as offline concurrently (Wells & Mitchell, 2008).

Due to the controversies that exist between conventional bullying and cyberbullying, it is, therefore, essential to distinguish between them. Acknowledging the differences that do exist between offline and online crimes would create better understanding of cyberbullying, improve the development of laws and policies and prevention and intervention programmes against cyberbullying (Lipton, 2014). In addition to this, it would assist in targeting these prevention and intervention programmes towards the most efficient and relevant direction in terms of resource and impact management (Mitchell et al., 2011).

In defining bullying, Olweus (1997) mentions that traditional bullying has three key features: (i) aggressive behaviour or intentional "harm-doing" that is carried out (ii) "repeatedly and over time" and in an (iii) "interpersonal relationship characterised by an imbalance of power". When considering Olweus' (1997) definition of bullying and its characteristics, it is not clear if these features are present in cyberbullying. If they are, they often function differently from those in traditional bullying (Law et al., 2012). In cyberbullying, the cyberbully may be physically removed from the victim (Lipton, 2014). Therefore, the power struggle is often not related to the physical stature of the individual as even the smallest or least physically powerful individual may victimise others online. More often than not, those that are “tech-savvy” and competent are the ones who hold the power in a cyber-environment (Law et al., 2012; Kyobe, Oosterwyk & Kabiawu, 2016). For example, Ybarra and Mitchell (2004) found that people that claim to be more competent in Internet knowledge environments were found to be more aggressive than those that said they were not. Zhang, Land and Dick (2010) also found that people who spent much of their time on the Internet showed mobile-bullying behaviours.

Repetition of aggressive behaviour is also often different online than it is traditionally. When online, victims and bullies have the opportunity to read, look at and watch offensive materials that have been sent to them repeatedly. Lipton (2014) refers to a “constant effect”, whereby online attacks are permanent. For example, even if postings about an individual are removed from one site, they may exist on another. In addition, online attacks may be done anytime and anywhere whereas traditional bullying often occurs in real time (Law et al., 2012; Kyobe Oosterwyk & Kabiawu, 2016). Search engines can also make searching for information more straightforward, making damaging information more accessible to those looking for it (Lipton, 2014). Furthermore, cyberbullies can attack on a larger scale than conventional bullies because of the immediate effect of their conduct and the speed and ease of the global distribution of online information (Lipton, 2014; Kyobe, Oosterwyk & Kabiawu, 2016).

With regards to aggressive behaviour, researchers often discuss three forms of bullying: physical (for example, hitting); verbal (for example, shouting) and social (for example, spreading rumours) (Law et al., 2012). Social bullying, between conventional and cyberbullying, is different in that a cyber-environment provides a sense of privacy and protection for bullies, which gives them comfort and power to say things they would not say on a regular basis (Law et al., 2012; Kyobe, Oosterwyk & Kabiawu, 2016). This is one of the characteristics of cyberbullying that suggests that it is more casual than conventional bullying. It is also believed that the social context of a cyber-environment within which most social interactions occur make the risk of being victimised higher than that of traditional bullying (Brighi, Guarini, Melotti, Galli & Genta, 2012). Furthermore, the option of a victim to turn off their device in cyberbullying as opposed to walking away in a conventional sense has been argued to be more achievable (Lipton, 2014). However, as today's people are interconnected through technology, this action would mean that in some instances, personal and professional opportunities are relinquished (Lipton, 2014). Shying away from one's devices also does not stop cyber-attacks from occurring.

Another significant difference between conventional and cyberbullying is that of anonymity (Serra & Venter, 2011; Lipton, 2014). The cyber-environment provides anonymity, unlike the physical environment (Kyobe, Oosterwyk & Kabiawu, 2016). Therefore, anonymity potentially leads to an increase in the volume of abusive attacks on victims because those who fear being caught in a physical manner would not engage in bullying. Also, when one avoids being caught as a result of anonymity, engaging in bullying behaviour becomes more likely (Lipton, 2014). Anonymity gives offenders the opportunity to view or spy on their victims for extended periods of time without being detected (Lipton, 2014).

2.2.2 Cyberbullying and Mobile Bullying in South Africa

There is great concern in South Africa with regards to violence in schools as it has claimed many lives of both students and educators (Burton & Mutongwizo, 2009; Padmanabhanunni & Martin Gerhardt, 2019). Bullying has also affected students and educators, and although it has recently gained media attention, it has not been studied extensively (Smit, 2015). According to Popovac and Leoschut (2012) and Popovac and Hadlington (2019), existing research in South Africa highlights online risk-taking behaviour as being a growing problem among young

people. Of the research that exists, however, there is still a substantial gap in the research literature examining online risk-taking behaviours in this context. Bullying is worsened by the anonymity associated with cyberbullying which increases the anti-social behaviour of South African students (Smit, 2015). As a result of cyberbullying, South African students are often affected negatively and go through effects such as school failure, dropout, depression, attachment to technological behaviours and extreme technology usage (Smit, 2015; Reyneke & Jacobs, 2018; Farhangpour, Maluleke & Mutshaeni, 2019). It is, therefore, essential to acknowledge cyberbullying as a problem in South Africa and realise the impacts it has on the youth (Popovac & Leoschut, 2012; Popovac & Hadlington, 2019).

In their study, Burton and Mutongwizo (2009) found that there is a diverse range of technologies that may be used to commit cyberbullying in South Africa. Many of these technologies are available on a mobile phone; the most common of these through which students are victimised were found to be voice calls and SMSs (Figure 4 below). This was no surprise as many young people carry their mobile phones with them, making this the most challenging form of aggression to escape (Popovac & Leoschut, 2012).

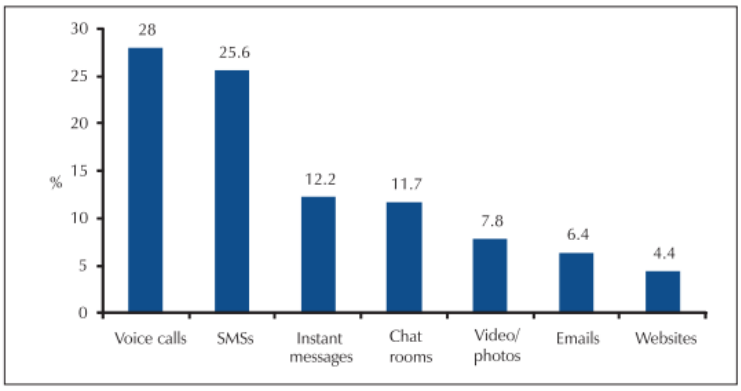


Figure 4: Experiences of Cyber Aggression among Young South Africans (Burton & Mutongwiza, 2009)

Current findings from Farhangpour et al. (2019) show that most of the participants (84%) in their study owned a cell phone and up to 100% could access the Internet. This figure is comparable to the figures reported by Popovac and Leoschut (2012) that 9 out of 10 (92.9%) of 12- to 24-year-old youths in Cape Town, Durban and Johannesburg either owned or had access to a mobile phone. This finding is important as it shows that, despite the financial

constraints dominating this rural communities, almost all participants managed to access the Internet like their affluent counterparts around the world.

Given that the number of active mobile users is rising, many users of mobile phones are often unaware of this form of bullying and the consequences it presents. Even though some online articles exist, only limited research has been conducted to uncover the nature of mobile bullying and its consequences in South Africa (Badenhorst, 2011; Kyobe, Oosterwyk & Kabiawu 2016; Kyobe et al., 2018). The remaining sections of this chapter present discussions on victimisation, interventions used in cyber and mobile bullying and reporting mobile bullying as a crucial form of intervening.

2.3 Victimisation

As stated earlier, the definition for peer victimisation is similar to that of bullying. Peer victimisation is defined as the repeated reception of aggressive acts from one's peer or peers (Olweus, 2001). Olweus (1997: 497) gives the same definition for victimisation as that of bullying and this has made the study of victimisation as an act that stems from bullying. In essence, this means that those people who are bullied are victims of bullying as they would have been victimised through the process of bullying. As a result, victimisation can be said to be a result of the activity of bullying. To understand cyber victimisation, however, it is important to discuss peer victimisation in the physical sense (conventional bullying).

2.3.1 Peer Victimisation

Peer victimisation can take various forms including direct bullying behaviours (such as teasing or physical aggression) as well as more indirect behaviours such as group exclusion or malicious gossip (Crick, Kasas & Ku, 1999). There are two forms of peer aggression by which one may be victimised: overt and relational aggression (Sullivan, Farrell & Kliewer, 2006). Overt aggression involves physical behaviour such as touching, flicking, pushing and hitting, and verbal behaviour such as taunting and threatening others. Relational aggression involves the behaviour of harming someone by damaging or manipulating their relationships with others, for example by social exclusion, spreading rumours and instigating interpersonal peer conflicts (Crick et al., 1999; Sullivan et al., 2006). Peer victimisation in the cyber environment is a special case that occurs through the use of electronic devices, that is, cyber victimisation

(Dempsey et al., 2009). Mobile victimisation may, therefore, be considered a special case of peer victimisation as mobile phones may be one of the electronic devices used in peer victimisation to exercise bullying behaviours.

2.3.2 The Impacts of Victimisation in the Cyber Environment

While there may be differences in the types of victimisation, depending on its nature, there are some common aspects. Victims of any crime are often affected physically, emotionally, psychologically and financially (Canadian Resource Centre for Victims of Crime, 2005). Cyber victimisation is also harmful to victims for several reasons including the aforementioned impacts. Sourander et al. (2010) reported that cyber victims (those who are victimised with the use of technology) were associated with perceived difficulties, lived in a family with other than two biological parents, had emotional and peer problems, had psychosomatic symptoms and did not feel safe at school. Hinduja and Patchin (2010) and Holt et al. (2016) also found that the experience of school and electronic victimisation was associated with loneliness, peer rejection, lower self-esteem and self-efficacy, higher stress, anxiety, and depressive symptoms among youthful populations. These depressive symptoms are at times found to be at high levels (Perren, Dooley, Shaw & Cross, 2010; Farhangpour et al., 2019; Arnarsson et al., 2019). Victimisation is often unpredictable, unpreventable and unexpected. It frightens and unsettles victims, leaving them confused, frustrated, fearful and angry. In some case, especially among adolescents, cyberbullying has left victims feeling helpless, vulnerable and subsequently suicidal. According to Hinduja and Patchin (2010), a relationship between bullying and suicide and they found that cyberbullying is related to high suicidal ideation among youth. As a result, victims of cyberbullying are more likely to consider suicide due to the negative impacts of bullying (Collins, 2012; North Shore-Long Island Jewish (LIJ) Health System, 2015; DeSmet, Rodelli, Walrave, Soenens, et al., 2018; Farhangpour et al., 2019; Arnarsson et al., 2019).

Notar, Padgett, and Roden (2013) and Smith, Bauman and Wong (2019) acknowledge that it is clear that students are not equipped to handle cyberbullying. Myers and Cowie (2019) add that victims may or may not feel able to cope with bullying in effective ways and may not have access to adequate coping strategies. They generally do not seek help because of fear of reprisal, embarrassment, or because they assume adults will not act. Some try to avoid the situation which may stop a particular incident but does little to protect them long-term or discourage the cyberbully. Technologically oriented researchers and many book authors,

therefore, tend to emphasise the importance of teaching students, parents, and educators various aspects of "netiquette" concerning such things as Internet safety, how the different technologies function, and how to behave appropriately on the Internet (Olweus, 2013). It is probably useful for most students, parents, and educators today to achieve a certain level of such basic knowledge about the new technologies. Many schools could undoubtedly benefit from introducing and strictly enforcing clear rules about the use of cell phones and computers or the Internet in their schools. At the same time, there seem to be fundamental limitations to what can be achieved with such a technological approach, according to a recent small-scale meta-analysis (Mishna et al. 2011). One such limitation is that technological solutions work more on an individual level while the implementation of prevention and intervention strategies is often more practical and effective when implemented in school settings (Tanrikulu, 2018). Thus, non-technical interventions are preferred (Tanrikulu, 2018). Altogether, some of the other areas that have been explored in the combating of cyberbullying, as mentioned by Notar et al. (2013), Gaffney, Farrington and Ttofi (2019a), Hutson, Kelly and Militello (2018) and Gaffney, Farrington, Espelage and Ttofi (2019b), are discussed below.

Public school-sponsored programmes: These form the basis of a curriculum to prevent cyberbullying in junior high and middle schools. An example of such a programme is the Seattle curriculum which attacked the entire problem by using the four most promising prevention practices: (i) debunking misperceptions about digital behaviour, (ii) building empathy and understanding, (iii) teaching online safety skills, and (iv) equipping young people with strategies to reject digital abuse in their lives.

Curriculum-based programs: Several curriculum-based programs that address cyberbullying in schools have been developed. Examples include the iSAFE Internet Safety Program. Typically, these programs involve video or webisodes related to cyberbullying and a series of scripted lessons to help students discuss issues related to cyberbullying and efforts to prevent and to address cyberbullying when it occurs.

Parent programs: A free filtering program will let parents track both questionable e-mails and cell phone text messages. Parents (or students themselves) can use one or more of the popular search engines such as Google to check and see if any personal information has found its way onto the Web. Teaching parents about Internet safety and helping them establish rules for Internet use is another way to play an active role in the prevention of cyberbullying.

Monitoring programs: In the US, services such as AT&T FamilyMap, Verizon Family Locator, and Sprint Family Locator let parents keep track of the physical whereabouts of their

children by tracking the location of the children's mobile phone. The services do provide some peace of mind, but they also have some limitations. Most of these commercial software programs provide a third party (for example, parent or school administrator) the ability to monitor a summary of violations (for example, messages delivered with targeted keywords) allowing the identification of potential cyberbullying without the need to review each and every electronic communication. Although most online bullying originates from the home computer (Twyman, 2010) youth can access the Internet from many other locations (Ybarra & Mitchell, 2004); thus, these software programs provide only limited victim protection (Frey et al., 2009).

Online programs: Websites such as www.stopcyberbullying.org by the group WiredSafety includes information on identifying cyberbullying, preventing it, and how to handle it if it happens to one.

Applications: Examples of this may be the iPhone and iPad app "Over the Line," which acts like a "digital morality meter" to help teens understand the difference between digital use and abuse by asking them to rate real-life stories about sexting, sextortion, textual harassment, digital dating abuse, and other forms of online hostility.

While evidence exists that suggests that many of these interventions are practitioner-delivered, programme-based, paper-based, or technological, these have persistently not worked effectively and none that exist meet all the requirements needed to counter cyber victimisation (Smith, Bauman & Wong, 2019; Notar, 2013). Notar et al. (2013) suggest that these interventions, individually, only cure "a symptom" of the problem and not the problem itself. In addition, while students may be experiencing victimisation, the suitability of these solutions to reduce cyberbullying may not fit the schools, their policies and structures (Smith, Bauman & Wong, 2019; Notar, 2013). One of the key reasons for these issues - recently noted in literature - is that while bullying research often references the social-ecological model, which places students at the centre of various contexts or systems in which they develop, research on intervening bullying has only made attempts to intervene noticeably in school settings (Smith, Bauman & Wong, 2019). Thus, many interventions have neglected the social-ecological factors that may influence intervening bullying and victimisation behaviour. Many of these school interventions are broad-brush approaches given to a whole class or whole school. This means that interventions tend to be generalised. These interventions can be valuable, but as shown by Nocentini, Palladino and Menesini (2019), they may be differentially effective for different pupils. Some pupils may need more targeted interventions, and it is important to identify who they are as well as what kind of intervention is needed. Subsequently, there remains the need

to examine how those larger, more distant systems of the social-ecological model impact the work done in schools (Smith, Bauman & Wong, 2019).

Notar et al. (2013) highlight only those interventions that have been used in the United States of America and thus could be unsuitable or non-existent in other countries. Popovac and Hadlington (2019) add that much of the research focus on online risks to date has been on the experiences of children and adolescents in Europe, Australia and the United States, and relatively little is known about the experiences of young people in more developing contexts, including South Africa. Creecy (2012) claimed that in South Africa, the interventions made by schools and the Department of Education in South Africa are also lacking. This had been due to South Africa's incapacity (for instance, limited institutional capacity, financial resources and other concerns the nation may be facing) to address these problems as is the case in many developing countries (Gasser et al., 2010). The problems still persist as evidenced by Juan, Zuze, Hannan, Govender and Reddy (2018). They state that due to the varying socio-economic contexts in which schools operate in the country, there is a need to understand the extent and nature of bullying in South Africa (Juan et al., 2018). Kyobe et al. (2018) also found that the interventions that exist for the South African youth tend to be focused on the early age groups rather than older students. These findings suggest that understanding the extent and nature of bullying in South African schools would help achieve legislation and policy goals and encourage policy makers and implementers to appropriately direct the limited available resources to formulating interventions that help to reduce incidences of bullying (Juan et al., 2018; Kyobe et al., 2018).

In addition to the problems listed above, victimisation (by electronic means or otherwise), is under-reported, particularly in schools. Reporting violence and abuse in schools is particularly important in a country like South Africa, where the rate of crime is among the highest (Cameron, 2016). This hampers efforts to combat anti-social behaviour (Pettalia et al., 2013; Styron et al., 2016). Notar et al. (2013) highlighted the importance of reporting within these areas of intervening and preventing cyberbullying. They suggest that within these areas, students should be encouraged to report their victimisation and that a safe and accommodating environment should be created for them to report. Since this type of bullying occurs digitally, it warrants digital means of combating it; as an example, Notar et al. (2013) refer to online programs such as many of the social networking sites that allow the user to report abuse by merely accessing a link at the bottom of each profile. It has been reported, however, that social

media sites such as Twitter, for example, have admitted to handling reports of bullying behaviour poorly (Barron, 2015; Katsch & Rabinovich-Einy, 2017). Twitter has since updated their harassment policies and rolled out a tool for reporting abuse on their site. The effectiveness of this tool is unknown (Barron, 2015) but the CEO of Twitter has admitted that they have failed to deal with harassment effectively (Katsch & Rabinovich-Einy, 2017). As Facebook has been accused of being a big part of the bullying problem (Siner, 2013), it has formulated its own policies for reporting and blocking users, their profiles, specific posts, ads and comments (Barron, 2015). The company rolled out its social reporting facilities in 2011 (Siner, 2013), and goes so far as to work with law enforcement officials in cases where safety is a concern. The effectiveness of these policies and guidelines is also not known (Barron, 2015); however, Siner (2013) and Katsch and Rabinovich-Einy (2017) reported that the constant changing of Facebook's policies confuses users rather than keeping them safer. These are examples of a digital way of reporting and thus a step in digitally intervening cyber and mobile victimisation. As Styron et al. (2016) stress, reporting is a critical factor that should be included in cyberbullying prevention and intervention school. The benefit to students is obviously that their cries for help are heard so that their victimisation may be understood and resolved. For these social media sites such as Facebook, tightening the rules and regulations with regards to bullying helps the organisations themselves maintain users as reports have shown significant falls in the number of users among teenagers (Siner, 2013).

Research from other disciplines and studies also suggests that digital interventions (DIs) can effectively address health and psychological challenges. The next section of this literature review will evaluate how "digital interventions" have played vital roles in other fields in intervening adverse health and psychological challenges such as suicide, stress and depression. Hinduja and Patchin (2010) found that the experience of school and electronic victimisation was associated with loneliness, peer rejection, lower self-esteem and self-efficacy, higher stress, anxiety, and depressive symptoms among youthful populations. These depressive symptoms are at times found to be at high levels (Perren, Dooley, Shaw & Cross, 2010; Collins, 2012; North Shore-Long Island Jewish (LIJ) Health System, 2015; DeSmet, Rodelli, Walrave, Soenens, Cardon et al., 2018; Farhangpour et al., 2019; Arnarsson et al., 2019). Victimisation is often unpredictable, unpreventable and unexpected. It frightens and unsettles victims, leaving them confused, frustrated, fearful and angry. In some case, especially among adolescents, cyberbullying has left victims feeling helpless, vulnerable and subsequently suicidal. As pointed out earlier by Hinduja and Patchin (2010) and Bauman, Toomey and

Walker (2013), there exists a relationship between bullying and suicide and, in addition, they found that cyberbullying is related to high suicidal ideation among youth. For instance, Bauman et al. (2013) found that, although differing by gender, the association between bullying/victimisation and suicide was mediated by depression. Also, although just for females, depression mediated the link between cyber victimisation and suicide attempts. As a result, victims of cyberbullying are more likely to consider suicide due to the negative impacts of being bullied (Collins, 2012; North Shore-Long Island Jewish (LIJ) Health System, 2015; Holt et al., 2016).

2.4 Digital Tools used to address/study Suicide

Suicide is one of the major causes of death in the world, with one person dying every forty seconds in 2019 (WHO, 2019). Among teenagers aged 15-19 years, suicide was the second leading cause of death among girls and the third leading cause of death in boys (WHO, 2019). Suicide in itself is an issue that has been stigmatised and considered to be taboo, and its severity and significance underrated (Titelman & Wasserman, 2009; Anderson & Jenkins, 2009). With the massive communication possibilities that the Internet has brought, problematic subjects like suicide have become more accessible to individuals than ever before. Computer-mediated communication through the Internet (i.e., websites and discussion forums) has given communicators the ability to remain anonymous while being able to publicly communicate their personal experiences, thoughts and feelings about suicide.

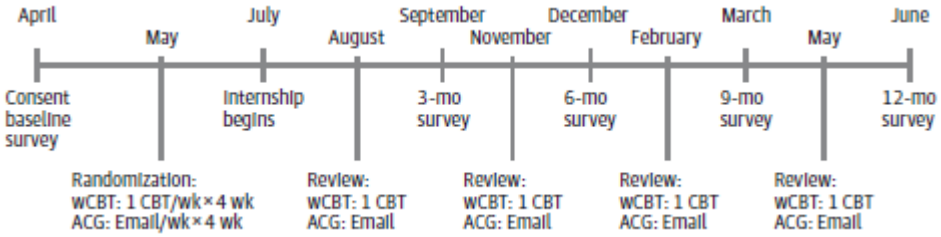
People who are suicide risks who frequent the Internet in search for materials to assist them to cope with their suicide, tend towards suicide risk variables such as lower education, unemployment, suicidal ideation, suicidal plans, living alone and a history of psychiatric diagnosis (Harris et al., 2009; Westerlund et al., 2015). They also report less perceived social support from family and friends, compared with other online users (Westerlund et al., 2015). These people find that speaking to healthcare professionals, family and friends about their problems is less satisfying than posting on internet forums where they are open, anonymous and unmoderated (Westerlund et al., 2015). In the previous studies by Westerlund et al. (2015), it was found that attitudes strongly influence suicidal behaviour and that training programmes designed to modify these attitudes tend to be promising in increasing help-seeking and offering behaviours and even reducing suicide attempts. Therefore, it is necessary to both inform people

about the suicidal process and to develop new digital tools that identify suicidal individuals by the way they communicate (Westerlund et al., 2015).

Research that has been conducted, for instance by Guille et al. (2015), has shown that help for suicide and even suicidal thoughts may come from smartphones. As an example, the lives of new doctors can be stressful and can often lead them to thoughts of self-doubt, and eventually thoughts of suicide due to their demanding schedules. Guille et al. (2015) tested a web-based tool that was designed to assist with these doctors' mental health in reducing these thoughts by half. This tool uses cognitive behavioural therapy in the form of "talk therapy" (often provided by professionals in office visits). This is referred to as web-based cognitive behavioural therapy (wCBT) (Guille et al., 2015). By so doing, the program allows for "an understanding of the interplay between thoughts, emotions and behaviours and teaches cognitive restructuring techniques that promote the ability to identify and challenge inaccurate, unrealistic, or overly negative thoughts" (Guille et al., 2015: 1195). It also includes problem-solving strategies.

The criteria to be met by participants in their study was that they had to be commencing medical internships in July 2009 and July 2011 at any of the two participating hospitals. All participants were given information about depression and its symptoms. The participants were given $60 at the beginning of their intern and $40 during the year. The participating universities gave the study approval and waivers of written or oral consent. Patient consent was also waived. Three months before the internship, interns answered a survey to assess their suicidal ideation.

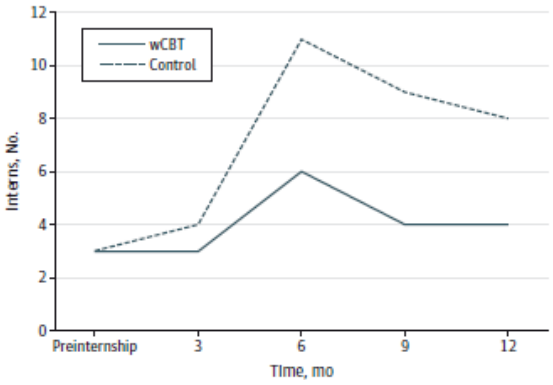
A total of 199 interns participated and were randomly assigned into two groups, i.e., the wCBT group and the attention control group (ACG). All participants received e-mails each week for four weeks before the start of the internship. The wCBT group were e-mailed to be directed to the intervention website while the control group were e-mailed material about depression and its symptoms. Assessments (surveys) of all participants were then taken quarterly throughout the first internship year. The wCBT group was then requested to go to the wCBT website periodically throughout the year, in between surveys, while the ACG were sent e-mails with material about depression and its symptoms (Please refer to the timetable below in Figure 5).



ACG: attention control Group; wCBT: web-based Cognitive Behavioural Therapy

Figure 5: Study Timeline

The results below (Figure 6) map the number of interns endorsing suicidal ideation over a period of time (twelve months). The results showed that this type of tool (a free easily accessible and brief wCBT program) could assist in reducing stress, pressure and likelihood of suicidal ideation from those individuals in stressful positions. The graph shows that more students in the ACG (60%) were more likely to endorse suicidal ideation than those in the wCBT group during the year.



ACG: attention control Group; wCBT: web-based Cognitive Behavioural Therapy

Figure 6: Number of students endorsing suicidal ideation with time

This study is in line with previous studies using wCBT in that wCBT shows a significant reduction in suicidal ideation. However, this study differs in that the participants used in this study were selected prior to having suicidal ideation as opposed to after, therefore extending current literature (Guille et al., 2015).

The challenges faced in this study that were related to suicidal ideation were assessed through a self-report inventory rather than through an actual mental diagnostic interview. This was so because previous data had shown that anonymity was vital in accurately assessing mental

health issues. This study was limited to suicidal ideation and not suicide itself. This, therefore, makes it unknown whether this intervention has any effect on physician suicide. For that to happen, a much larger sample size and more extended follow-up period would be appropriate.

Shand, Ridani, Tighe and Christensen (2013) also used digital intervention in order to intervene with the suicidal intentions of indigenous youths in Australia. Indigenous Australian youths are four times more likely to suffer from depression than non-indigenous Australian youths. They avoid seeking help often because they fear shame and loss of autonomy, and they have negative attitudes towards healthcare professionals. Cost, service availability and suitability, stigma and the need to maintain esteem within the community are other barriers to them seeking help (Farrelly, 2008). Shand et al. (2013) found that as the use of mobile phones and the apps available on them increases, there is ample opportunity to use them as aids in overcoming "help-seeking barriers" such as the aforementioned ones. Mobile apps have been able to assist people in several health-related issues (Shand et al., 2013). In Australia, a survey showed that 76% of the general public would be interested in using mobile phones for mental health monitoring and self-management suggesting that mobile health (mHealth) is very acceptable and may be useful in the advancement of access to evidence-based monitoring and self-help for individuals with mild-moderate common mental health conditions (Proudfoot et al., 2010). Although the internet may provide a sense of anonymity to these people and hence address help-seeking barriers, portable devices and apps may provide a more accessible method of support.

Around the world, smartphones were used by 1.85 billion people in 2014, and were expected to reach 2.32 billion in 2017 and 2.87 billion by 2020 (Statista, 2017; Cha & Seo, 2018). Subsequently, this has meant that apps that cater to the mental health and well-being of others have also increased in availability on the market. Most of these apps, however, have not been evaluated to test the extent of their effectiveness (Shand et al., 2013). In addition, it has been found that cognitive behavioural therapy, dialectical behaviour therapy and other cognitive interventions (that is, schema-focused and problem-solving therapies) are effective in reducing self-harm and suicidal behaviours (Weinberg et al., 2010; Berry, Lobban, & Bucci, 2019).

In their study, Shand et al. (2013) used acceptance and commitment therapy (ACT), a rigorous behavioural therapy that is based on the scientific validity of human cognition. ACT also addresses issues of self, values and spirituality. These components have been found to be

important in the success of suicide prevention among indigenous individuals. Its goal is to help in reducing the struggles individuals face as a result of their internal experiences, i.e., thoughts, feelings, memories and sensations and help them move in valued directions by implementing effective behavioural changes. It is effective in a number of mental health domains, including depression, anxiety and stress (Bohlmeijer et al., 2011; Arch et al., 2012; Brinkborg et al., 2011; Powers et al., 2009). It has the same effect as traditional cognitive behavioural therapy. Shand et al. (2013) applied ACT in developing an app that would reduce the suicidal thoughts among indigenous youth, focusing their intervention on those with suicidal ideation. Their study aimed to: evaluate whether the app could reduce suicidal thinking, psychological distress or impulsivity; assess the acceptability of the app among the indigenous youth; assess the feasibility of the recruitment, screening and randomisation methods; examine uptake and adherence of the app, and evaluate the safety, security and clinical support protocols.

In their study, Shand et al. (2013) highlight a procedure for a randomised controlled trial comparing the impact of a self-help app intervention with a wait-list control condition. They had 150 participants, but 98 would have been adequate for a medium-effect size. In the beginning, at the end and six weeks after intervention completion of the study, these participants were given an assessment to monitor any psychological and emotional changes throughout the process. Shand et al. (2013) received approval from the University of New South Wales Human Research Ethics Committee, the Western Australian Aboriginal Health Ethics committee and the Kimberley Aboriginal Health Planning Forum. The criteria for the participants in this study were that they had to be between the ages of 18 and 30, able to attend two or three face-to-face sessions; able to answer personal questions; had not been diagnosed with a psychological disorder; had had suicidal thoughts in the last two weeks; not be severely suicidal, and willing to make contact with the Suicide Call-Back Service. Participants in the intervention group were given tablets and instructed on how to use them and the app. Those in the wait-list group were asked to return after seven weeks. After screening, participants were randomly assigned to each group using block randomisation.

The programme was a self-paced app that helps participants decrease the frequency and intensity of their suicidal thoughts via a sequential completion of three modules aimed at addressing thoughts, emotions and values. These modules are briefly highlighted below.

Module 1: In this module, the participants group specific thoughts according to the frequency at which they experience them by 'swiping' the thought down the screen into a basket. The thought that bothers them the most with the highest occurrence is then selected and its accompanying feelings and behaviours are identified. With this comes psychoeducation, which shows the connections between thoughts, feelings and behaviours. After this, strategies are presented to help diffuse their negative thoughts.

Module 2: This module helps participants regulate their emotions through strategies such as *mindfulness* (a practice that encourages non-judgmental interactions with psychological and environmental experiences as they occur); *acceptance* (instead of avoiding, participants are helped to be aware and to acknowledge their internal experiences without the desire to control them); and *self-soothing activities* that participants can take part in, including those that fall within social (for example, calling a friend), active (for example, going for a walk), and cultural (for example, spending time in nature) categories.

Module 3: Participants identify values they wish to stand for (for example, compassion, kindness and courage) and are asked to set achievable goals that assist them to stand by these values. After this module, an action plan is developed and given to the participants, based on their answers to the different activities throughout the app.

The app was able to track and monitor log-in and log-out times, activities completed, time spent in each section and answers to assessments within the device. The app required a security pin for access and any data stored on the device were encrypted and hidden within the app coding. Answers to the questions were also coded and not available to anyone not part of the project. Participants were also able to track their progress through a personalised dashboard. The text was accompanied by voice recordings and although not intended to be a crisis intervention tool, the app also displayed emergency contact information for several 24-hour helplines.

Their protocol was not without limitations. Firstly, online interventions often have high drop-out rates. This would, therefore, present a bias in the data and threaten validity. To avoid this, additional contact details were asked of the participants. Participants were also contacted periodically, as a reminder, during the trial. Secondly, the measures used did not give a psychiatric diagnosis. This is because Shand et al. (2013) did not want to overwhelm the participants with too many measures in order to increase retention. Lastly, research in suicide, especially of indigenous people, is difficult as it is still at its early stages. The findings from

this research were not discussed as Shand et al.'s (2013) research was a longitudinal study and the trial was still in progress. Later findings showed, however, that there was a reduction in distress and depression but no significant reductions on suicide ideation or impulsivity (Tighe, Shand, Ridani, Mackinnon, De La Mata & Christensen, 2017). Tighe et al. (2017) also concluded that an eHealth application may cut through the significant barriers mental health professionals and researchers face when attempting to improve health outcomes for young indigenous people and other disadvantaged groups (Tighe et al., 2017).

Cyberbullying is a form of psychological cruelty (Notar et al., 2013). One of the significant concerns of cyberbullying and what has made it a controversial issue in media is that of suicide and the increase in the number of high-profile and tragic cases of this nature (Dooley, Pyżalski & Cross, 2009). Below is an example of the digital interventions that have been developed in order to curb the impacts of cyberbullying.

2.5 Example of the types of Digital Tools used to address/study Cyberbullying

With regards to technology, the MIT Media Lab's Time Out project is one initiative that is investigating innovations in the social networking software to help prevent and mitigate the consequences of cyberbullying. These innovations fall into two groups, i.e., *detecting* and *intervening* cyberbullying. Detecting cyberbullying involves the use of machine learning to better understand and therefore detect cyberbullying behaviours. This is personalised and contextual in that topics such as race and ethnicity, sexuality and sexual identity, physical appearance, rejection, social acceptance and intelligence are often topics with which to victimise others (Lieberman et al., 2011). Therefore, if the language used in these instances is related to these topics, potential cyberbullying messages may be identified. Intervention technologies for the individual as well as network providers urge victims to seek emotional support, discover how others have dealt with similar situations, give suggestions for appropriate responses and discourage them from retaliating (Lieberman et al., 2011). The key in intervening is to offer advice that is personalised, specific and actionable through material which may come in many forms such as stories, videos or interactive narratives (Lieberman et al., 2011). As intervention technologies focus on these activities, it is evident that for these to occur, one would have had to report what would have happened. Hence, this further proves how critical reporting is in intervening cyber victimisation and mobile victimisation as stated by Styron et al. (2016) even in a digital manner.

2.6 Reporting Cyber victimisation and Mobile Victimisation

This study defines reporting cyber victimisation and mobile victimisation as notifying someone of cyberbullying or mobile bullying that took place. This definition is taken from Goudriaan (2006: 14), who defines reporting crime to the police as "notifying the police of a crime that took place". With regards to the reporting of cyber- or mobile bullying, students tend to report to their peers, parents, guardians, or other adult figures (Patchin & Hinduja, 2006; Bauman, 2010). When using technology, students report their victimisation to the companies themselves. For social media apps (for example, Twitter, Facebook and YouTube), they use the reporting tools or links on the sites or apps (Barro, 2015; Siner, 2013; BullyingUK, nd). For the messaging apps: Instagram, Snapchat and Whatsapp, students can use the in-app reporting facilities, fill in a report form or block or delete the contact bullying them respectively (BullyingUK, nd). Reports are received by these companies and action is taken. For instance, Facebook claims to examine these reports to see whether the content being reported broke any rules and if it did, they take it down (Green, 2015).

The question of reporting and why students do not report has been raised in other studies. Li (2010) found that less than 18% of students were likely to report their victimisation, while over 80% were not likely to. The reasoning for this was that students found that school staff would not understand or believe what they are reporting; school staff would not or could not do anything to stop the bullying; they could get themselves into trouble either because they might also be at fault, or for no reason; they worried that reporting could worsen the problem; students were concerned that other students would mock them; students were worried that their parents might limit their use of technology; students thought ignoring cyberbullying was a solution (Li, 2010; Bauman, 2010; Agatston et al., 2007; Willard, 2006). Students have also reported that since it is against school policy to have mobile phones during school hours, they were less likely to report cyberbullying to the adults at school since it frequently occurs when they are using their mobile phones (Agatston et al., 2007).

When reporting using digital means, there have been issues that users of, for instance, social networks have experienced with reporting. When a user reports to Facebook, for example, it is graded for its severity and guided to the right team with more severe reports taking precedence (Green, 2015). However, the Facebook community standards state that "Because of the diversity of our community, it is possible that something could be disagreeable or disturbing to

you without meeting the criteria for being removed or blocked" (Scaife, 2014: 160). This means that with the Facebook community being widely diverse, what one finds offensive may not be offensive to another. Facebook does claim, however, that they hire people from different backgrounds and cultures to address reports so as to ascertain whether the reports are severe or not. The same can be said of Twitter, as Twitter decides what counts as threats and what does not (Warzel, 2017). Twitter considers some reports to not be a violation of its terms of service even if the terms have been breached (Warzel, 2017). This has led to the dismissal of reports of harassment that are not subtle (Warzel, 2017). A survey of over 2700 people conducted by BuzzFeed News showed that 90% of the people said that Twitter did not do anything about their reports (Warzel, 2017). This shows that when one reports, there is no certainty that the reports will be taken seriously or considered to be threats. This often leads to nothing being done in those cases that are not considered to be serious.

There have also been claims that, for example, the many Facebook measures that are in place to protect its users run on autopilot, and Facebook has little control over these measures (Tice, 2013). Facebook has been condemned for lacking human-like interactions with its constantly increasing number of users (Green, 2015). The responses to the reports by Twitter also seem to be automated (Warzel, 2017). This also contributes to the users' indignation when reporting abuse online. The lack of human-like interactions makes it seem the reports are not taken seriously and may be overlooked. Users believe that Facebook's fast growth has out-run their ability to protects its users' privacy and safety (Cluley, 2012). The same could be said of Twitter, as the process of reporting has been found to be frustrating for victims of harassment as Twitter has been reported as being slow or unresponsive unless there is media attention (Warzel, 2017). Another concern for users is that, although the sites and applications are rolling out tools on their site for protecting its users, abuse continues (Warzel, 2017). Besides their inability to accurately detect reports efficiently, another reason for this is that even if social networking sites such as Twitter suspend or remove an account, the user can create a new account and continue with the abusive behaviour (Knibbs, 2015).

These statistics and reasons run true in literature, as Kowalski et al. (2008) reported that between 4% to 53% of students reported their victimisation. In their study, Zsila, Urbán and Demetrovics (2019) also found that almost half of the reported victims never sought help when they were victimised online, while 57% have approached others for help after an incident. Mishna (2008) found that only 8% of students would report to a parent, while only 3% would

report to someone at school. This is in line with claims by Agatston et al. (2007) that students were more likely to turn to their parents when being bullied than to adults at school, especially if the bullying was threatening in nature. However, Bauman (2010) also found that 12% of the students they surveyed would not report their cyber victimisation to their schools and only 9% would report to their parents. Consistent with these previous findings the most frequently reported sources of help for victims are friends, parents, and the victim's partner (Zsila, Urbán & Demetrovics, 2019). This indicates some inconsistencies in the rates of whom the students report to more frequently. Of all forms of cyberbullying, a nationwide study by the National Education Association (NEA) (in the United States) in 2011, found that many teachers and support staff noted cyberbullying as the least likely form of bullying to be reported (as cited in Styron et al., 2016). Digitally, as stated earlier, students report the applications themselves. However, of those students that do report, the numbers seem low. For instance, it has been reported that only 37% of teenagers that have been bullied on Facebook have reported the incidents to Facebook (Gaille, 2017).

What can be gathered from literature is that researchers have persistently agreed that cyberbullying is under-reported (Agatston et al., 2007; Pettalia et al., 2013; Reyneke & Jacobs, 2018). Under-reporting shows that cyberbullying behaviours may go unidentified by adults and makes it a challenge to hold cyberbullies accountable for their actions (Pettalia et al., 2013). The lack of reporting of cyberbullying has added in it being problematic to identify, mediate and intervene (Styron et al., 2016). Cyberbullying has thus become one of the many issues of digital safety in the developing world as much as it has been in the developed world. In addition, while technology offers many opportunities to young people in the developing world, it also exposes them to many threats. These threats are exacerbated by, for instance, limited institutional capacity, financial resources and other means of mitigating and addressing these threats and problems (Gasser et al., 2010; Notar et al., 2013; Kyobe et al., 2018). Also, due to poor or limited information on which to base decisions on and the need of urgency in addressing these problems, leaders in developing nations have been obligated to enforce suboptimal policy and legal action or no action at all (Gasser et al., 2010).

Gasser et al. (2010) conducted an extensive exploratory review of literature in which they found that while there have been significant individual contributions, this field (digital child safety) is relatively only emerging in the developing world in terms breadth, depth and methodologies.

The reviewed proposals identified these, in one way or another, as the "three pillars" that may increase digital safety for children:

- ***Law and Law enforcement****:* There is generally a call for law reform.
- ***Technology****:* Technology has been referred to as a means to promote or improve digital safety. For example, filtering technologies on both the individuals' level as well as the network level.
- ***Awareness and Education****:* Awareness campaigns and education initiatives and programs with regards to digital safety targeted at teachers, parents and children are also encouraged.

These seem very similar to those tools used in the developed world. However, there are important contextual differences with regards to the design and use of these instruments that call for careful analysis of the particular ecosystem before any recommendations are made primarily in nations whose legal and institutional frameworks are lacking (Gasser et al., 2010). With regards to research, Gasser et al. (2010) and McGuckin and Corcoran (2016) also suggest that there is need for more research in which a more pragmatic approach is taken so that we can measure the success of instruments used to aid in digital safety, rather than critiquing the genetic background of these approaches in terms of their theoretical and methodological rigour.

2.7 Gaps Identified

The introduction and the literature review have shown that there are some significant gaps within literature with regards to mobile victimisation and the interventions that exist to counteract its impacts on youth. Firstly, it should be noted that many studies conducted on cyberbullying, have a tendency to generalise it, its definition and impacts (Li, 2007; Smith, Mahdavi, Carvalho, Fisher, Russell, & Tippett, 2008; Slonje, Smith & Frisén, 2013). These studies also generalise the populations that are affected by this aggression. Consequently, these studies have neglected the different characteristics of these technologies and have subsequently ignored the different effects each technology may have on different populations (Rice & Katz, 2003; Smith et al., 2006; Wolak et al., 2007; Pyżalski, 2011). These generalisations have, therefore, led to the limited examination of the nature of mobile bullying, and, subsequently, mobile victimisation (Lipton, 2014; Smith et al., 2006; Wolak et al., 2007). Also, as noted by

Notar et al. (2013), of those interventions that exist, none meet all the requirements needed to counteract cyber victimisation and subsequently mobile victimisation.

The literature review has also highlighted why there is a need for a digital tool for intervening mobile victimisation. As stated by Farrelly (2008), Shand et al. (2013) and Westerlund et al. (2015), people who suffer from suicide avoid seeking help for their thoughts and feelings because they find that communicating with healthcare professionals, family and friends about their problems is less satisfying than posting on Internet forums where they are open, anonymous and unmoderated. They also avoid seeking help because they fear shame, loss of autonomy, the costs of professional help, poor service availability and suitability, stigma and the need to maintain esteem within their communities. Hence the need for a digital tool or intervention in order to identify those who are suicidal by their behaviours and the way they communicate (Guille et al., 2015). The same could be said of victims of mobile bullying because, according to Li (2010) and Mishna, Saini and Solomon (2009), students are often reluctant to report cyberbullying because they prefer to sort out these situations on their own and find reporting to be pointless as the bully is never apprehended. Also, Notar et al. (2013) find that victims of cyberbullying are not equipped to handle cyberbullying. Therefore, in a similar sense, as students tend to avoid confronting the problem of cyberbullying and the thoughts and feeling associated with it, a digital tool may be useful as an intervention. As help for suicide, and even suicidal thoughts, may come from smartphones, so can help for mobile victimisation. Shand et al. (2013) suggest that mobile phones and the use of the apps available on them would allow people the opportunity to use them as aids in overcoming "help-seeking barriers" such as the aforementioned ones. Hence the need for the development on a mobile phone app to overcome help-seeking barriers challenging students from seeking help when being bullied.

Secondly, perhaps there would be merit in evaluating theories as a basis to inform the development of a mobile application to tackle mobile victimisation and the effects that mobile bullying may have on students. Understanding of the interplay between thoughts, emotions and behaviours with regards to mobile victimisation may afford the researcher the opportunity to elicit useful and relevant information about the students. This may then inform the development of youth programmes, laws and policies against mobile victimisation. Lieberman et al. (2011) urge that the key in intervening is to offer advice that is "personalised, specific and actionable".

Therefore, through the use of theory, it is probable that the results of this study would be relevant in informing in all these aspects.

Thirdly, it was noted that many of the interventions presented in this literature review were of suicidal ideation and not the actual act of suicide. This made it difficult to say whether the proposed interventions would be as effective on intervening the act of suicide (Guille et al., 2015). This may be useful in that the digital tool to be proposed for intervention for mobile victimisation may be applied to students, focusing on mobile victimisation as it occurs and the possible psychological and emotional impacts it may have on a student at those times. In this way, the adverse impacts that students may have may be curbed at their onset and prevented from becoming worse.

Finally, with regards to the sampling and methodologies that were reviewed in this literature review, it was noted that the selection criteria for all the reviewed studies was rigid. Only those that fit the criteria were able to participate in these studies. In addition, there seemed to be randomisation in the samples in that in most cases, two groups were under observation, i.e., the intervention group (those that were using the intervention tool) and a control group (those not using the tool). It was also noted that studies were cautious about the attrition rate as participants would vary depending on the measures being evaluated. This indicates a need for other measures (or incentives) to be used during the testing of the proposed digital tool. Also, as Shand et al. (2013) state that most of these apps used to intervene in suicide have not been evaluated to test the extent of their effectiveness, this study intends to go a step further and evaluate the proposed digital tool, thereby ensuring that mobile victimisation is mediated appropriately.

2.8 Addressing These Gaps

The key gaps identified through the literature review are that (i) there has been limited examination and hence understanding of the nature of mobile bullying and mobile victimisation, (ii) although interventions exist to counteract cyberbullying, mobile victimisation is under-reported and most of the interventions are not comprehensive enough, given the complexity of mobile victimisation and the reporting that would lead to interventions, (iii) most of these existing interventions' effectiveness has not been tested in a mobile environment, and (iv) using theoretical work as a basis to inform the development of a

technological intervention to tackle mobile victimisation could be beneficial in the development of such a tool. Therefore, if a tool is to be developed that is more comprehensive and addresses all these issues, there exists a need to start by understanding mobile victimisation itself and using mobile victimisation theories to inform the development of such a tool. There also exists a need to understand theories on crime reporting behaviours. The incorporation of these theories would be informative in developing the appropriate tool for initiating the first step of intervention, i.e., reporting. The proposed tool's effectiveness would also need to be examined among high school students in South Africa, given the prevalence of mobile bullying and the many barriers students face as a result of mobile bullying.

2.9 Summary

This chapter is part of the problem awareness phase of the Design Science Research methodology that is discussed in the methodology chapter (that is, Chapter 4). This chapter enlightened the researcher on the challenges faced by researchers, policy makers and people who design and manage prevention and intervention programmes around mobile bullying. The researcher emphasised the attributes and the challenges of intervening mobile victimisation to illuminate the significance of the problems surrounding the phenomenon in this study. The approach taken in the literature review by the researcher, therefore, was a problem-centric approach due to the researcher's pragmatic philosophical assumptions. The literature review thus ends with ideas on how intervening mobile victimisation may be executed among South African high school students. The following chapter presents and discusses the theoretical frameworks that guide this study.

CHAPTER 3 THEORETICAL FRAMEWORK (UNDERSTANDING VICTIMISATION REPORTING BEHAVIOUR)

"It is the theory which decides what we can observe."
(Albert Einstein)

3.1 Introduction

This chapter presents the theoretical frameworks that guide this study. This chapter is structured into two major sections. As shown in Figure 7 below, section 3.2 discusses the theoretical models for investigating reporting behaviour. These models include the economic, psychological and sociological model. Since this study considers reporting in a digital manner, the study also considers theories that may explain the technological factors that may influence reporting behaviours of students. Section 3.3. then discusses the steps towards the development of an integrative theoretical framework for studying factors influencing under-reporting. The chapter concludes with a summary section that provides an overview of the content of the chapter.

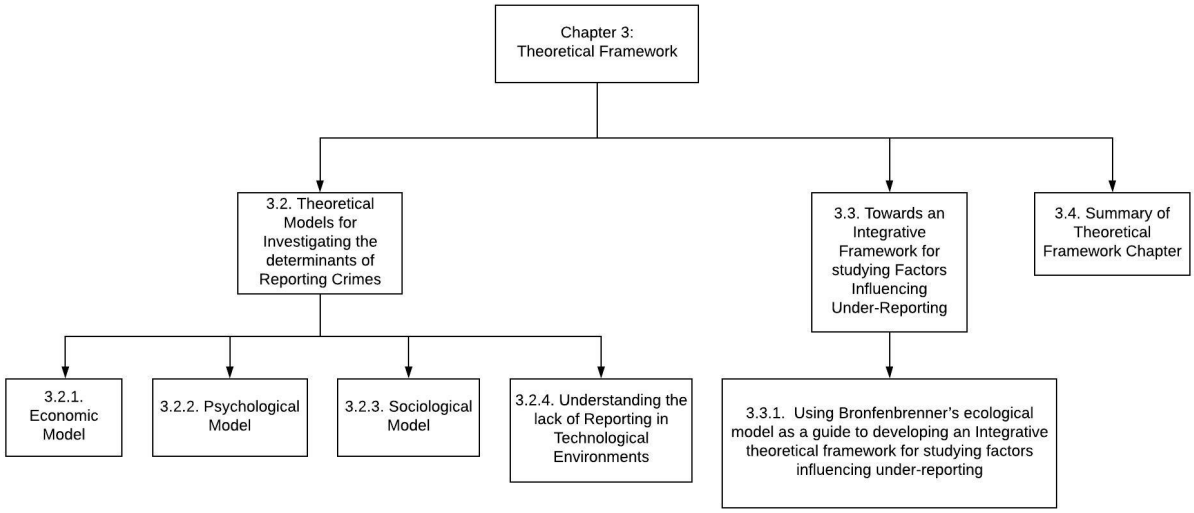


Figure 7: Theoretical Framework Chapter overview

3.2 Theoretical Models for Investigating the determinants of Reporting Crimes – and their limitations

According to Goudriaan (2006), the economic, the psychological, and the sociological model are three theoretical models that have been used in studies that investigate the determinants of

reporting of crimes. These three theoretical models (economic, psychological and sociological) each focus on a different mechanism. This section of this thesis discusses these models and their flaws, and gives examples in which these models may be seen in action. It should also be noted that these models manifest at different levels, i.e., the micro-, meso- and macro-levels. The economic model is a micro-level model that is simply a cost-benefit analysis that assumes that crime seriousness is the most critical factor that influences reporting (Skogan, 1984). The psychological model is a meso-level model that focuses on cognitive decision making and claims that the personal characteristics of a victim and their immediate social network are factors that influence the reporting of a crime. The sociological model is the macro-level model and claims that reporting behaviour is determined by social structures. The aforementioned models are discussed further below.

3.2.1 Economic Model

Of the three often used models of crime reporting behaviour, the economic model is the most commonly used (Goudriaan, 2006; Sidebottom, 2004). The economic model assumes that people report crimes based on a cost-benefit analysis the victim conducts (Greenberg & Beach, 2004; Goudriaan, 2006). Greenberg and Beach (2004) refer to this as a cognitively driven cost-benefit process of reporting. The victim determines whether reporting a crime is worth it or not. In other words, if reporting a crime costs a victim more (for example, the process takes time, the police will not take the report seriously or the police will not do enough to solve the case) than it would benefit them, they will not report their victimisation (Goudriaan, 2006). An example where the economic model may be seen is in the African context where women's dependency on men for financial support has played a role in their reporting behaviour. In the past, traditionally, African women were either discouraged to work or expected not to work at all (Rashe, 2008), therefore making them economically dependent on men. More recently, while these women have been liberated from that school of thought, i.e., economic dependency of women, they still find themselves in relationships and marriages that are abusive and destructive (Rashe, 2008). It has been found that four out of five women in rural South Africa are financially dependent on their partners, have no employment and no income of their own (Rashe, 2008). As a result of this dependency, women in abusive relationships choose not to report their victimisation as the provisions they receive from their partners may be taken away from them.

Another example is that of a study by Mtshazi and Kyobe (2014), where it was reported that since there are no cyberbullying laws, South African law enforcement uses criminal and civil laws to address mobile bullying. In addition, law enforcement is failing in its fight against mobile bullying due to lack of training, resources and clear role description. The absence of these has often led to confusion, delay in cases and subsequently frustration to people who do report cyberbullying activity to law enforcement. These difficulties may seem costlier to victims than reporting the victimisation itself. Therefore, victims opt not to report because they perceive they will receive little action or help from the police or law enforcement (Mtshazi & Kyobe, 2014).

This model could be useful in informing the development and designing of traditional and digital interventions for cyber- and mobile bullying because its focus is more on the characteristics of the crime (mainly the perceived seriousness of the crime). This being the case, this model could be used to determine aspects of interventions that symbolise costs and benefits so that they are addressed. However, since this model's primary focus is on the perceived seriousness of the crime, it neglects the issue that reporting behaviour may be influenced by other psycho-social factors. To this point, Greenberg and Beach (2004: 184) add that the cost-benefit analysis of whether to report a crime "does not tell the whole story" as emotional and social processes play a strong role in the decision-making process of reporting crime. Researchers thus maintain that while crime seriousness may be an important predictor of reporting, other social and psychological factors also influence reporting (Goudriaan, 2006).

3.2.2 Psychological Model

The psychological model assumes that people decide whether to report crimes based on additional factors such as the social network of the victim (Goudriaan, 2006). This model is similar to both the affect-driven and the socially driven process of reporting suggested by Greenberg and Beach (2004). The model explains that in addition to a cost-benefit, victims are too emotional or fearful to make rational decisions after a crime. It has been suggested, "that emotional arousal might influence victims' attention, perceptions, thoughts, judgments, and interpretations, processing capacity, and processing strategies" (Greenberg & Beach, 2004: 178).

According to this model, affective reactions (fear, stress) may influence decision-making. It has also been found that after crime, victims have different ways they behave, and reporting a crime is just one of these (Goudriaan, 2006). This is affected by factors such as a victim's knowledge of the offender, as one may fear retribution by the offender which would decrease the likelihood of a victim reporting. Another important factor that may influence reporting behaviour is the victims' social network in that if a victim is advised to report by those they are close to, they are more inclined to report a crime. This is consistent with research that suggests that when people are anxious or confused, they tend to turn to others (Goudriaan, 2006).

This model could also be useful in designing and development of interventions as it could inform what emotions students go through with regards to reporting and therefore how to address these emotions. For example, to address the fear students have of retribution by the offender, reports could be made anonymously, traditionally or digitally, such that the offender does not know who reported them. In a study by Cassidy et al. (2009), students proposed anonymous reporting as a solution that dealt with cyberbullying. They also suggested longer-term, relationship-based solutions. This can be done by offering counselling online, such as the childline.org.uk website, for example, which offers counselling for cyber victimisation and other issues. Also, understanding how social relationships affect reporting can inform how to deal with reports and to whom reports should be communicated, thereby creating an environment in which students feel comfortable and safe reporting their victimisation. For example, if these social networking apps are lacking human interactivity, reports may be submitted to parents, school authorities or friends digitally through texts or e-mails for example, basically reporting to someone the victim trusts to be able to understand or resolve the situation.

Similarly to the economic model, the psychological model neglects other factors such as the broader social contexts in which crimes and victimisation occur even though other researchers have emphasised that human decision-making and behaviour is influenced by such contextual factors (for example, Granovetter, 1985; Nee & Ingram, 1998). This, again, reinforces that social and cultural contexts are critical in understanding reporting behaviour. The psychological model neglects these by focusing only on the affective reactions of the victims and their social networks to their victimisation.

3.2.3 Sociological Model

The sociological model claims that the likelihood of a crime being reported is a function of the social structures that exist in the society in which the victim and offender live (Black, 1976). This model focuses on the contextual factors that influence reporting. Black (1976) explains that there are five social structural variables that predict variations in the behaviour of law, defined as governmental social control which includes victims filing a complaint with legal officials and the recognition of that victim. Goudriaan (2006) also gives reporting of victimisation as an example of the behaviour of law. The five social structural variables that predict variations in the behaviour of law as identified by Black (1976) are stratification, morphology, culture, organisation and social control. Stratification (the vertical aspect) refers to the uneven distribution of the conditions of existence, such as food, access to land or water and money; morphology (the horizontal aspect) refers to the distribution of people in relation to each other; culture (the symbolic aspect) refers to the religion, decoration and folklore; organisation (the corporate aspect) refers to the capacity for collective action and, social control (the normative aspect) refers to the response to deviant behaviour such as punishment, accusations, compensation and prohibitions. It can, therefore, be concluded that reporting behaviour may be influenced by these five social structural factors.

Of these predictors of variations in the behaviour of law, the researcher will focus more on cultural factors. Ayodele and Aderinto (2016) argue that consideration of cultural factors provides subjective explanations for reporting crime, and this may connect victims to offenders and the contextual situations, taking into account the victim's and the community's shared values, beliefs and norms. In the African context, the individual household condition, communal values, attitudes and practices influence individual and communal safety and subsequently the reporting behaviour (Ayodele & Aderinto, 2016). In their study of the cultural implications of reporting crime in Lagos, Nigeria, Ayodele and Aderinto (2016) found that people who are victimised, who reported that extended family connections frustrate crime reporting, were eight times more likely to discourage reporting crime events. In addition, they found that people who reported cooperation through the extended family connections are two times more likely to discourage reporting of crime. They concluded that socio-cultural factors correlate to reporting and recommend that governments should consider the socio-cultural and community norms if they are to restore hope for justice and build safe communities.

Rennison et al. (2011) concur that understanding culture influences of reporting criminal

behaviour creates trust between victims and law enforcement and also helps in the development of programmes that educate people on resources they have available to them when victimised (Rennison et al., 2011). UNESCO and UN Women (2016) also report that culturally fitting and accessible services such as child protection, health and social services are lacking when it comes to school-related gender-based violence (SRGBV) being reported and responded to (UNESCO & UN Women, 2016). Perpetrators of SRGBV are therefore often not held accountable due to weak institutional response and weak sanctions from the judicial and security services (UNESCO & UN Women, 2016). In addition, schools lack the capacity to identify, prevent and address SRGBV occurrences. Furthermore, factors that influence social and cultural norms – mainly fear of stigma, fear of reprisal from partner and fear of being killed (Rashe, 2008) – discourage the reporting of SRGBV and directly or indirectly offer social sanctions to some forms of SRGBV (UNESCO & UN Women, 2016). The fear of stigma describes instances in which people are made to feel bad about their situations or circumstances, whether they were abused, raped or HIV-positive (Rashe, 2008). Fear of reprisal from a partner refers to the fear of retaliation for reporting abuse, and this keeps, for example, women from reporting abuse from a spouse (Rashe, 2008). Fear of being killed refers to instances in which one is killed for reporting, an occurrence which is referred to as being the most serious outcome of violence (Rashe, 2008). Social and cultural norms themselves also influence the resistance of teachers, school heads and policy makers to engage with students about issues concerning gender violence and sex, as well as the delivery of sensitive material in some contexts (UNESCO & UN Women, 2016).

Documentation of SRGBV cannot keep up with the accumulation of promising techniques and knowledge that may add to the understanding and intervening of SRGBV (UNESCO & UN Women, 2016). There are limited credible data on the extent and impact of SRGBV due to insufficient data and research (UNESCO & UN Women, 2016). This is made worse by some forms of violence not being reported or by marginalised groups not reporting. Subsequently, data are missing pertaining to many contexts, especially in the intersections between gender, gender identity, sexual orientation, race/ethnicity, disability and class, and how these link to vulnerability and to SRGBV (UNESCO & UN Women, 2016).

Other challenges for reporting mechanisms as mentioned in a UNESCO review of SRGBV in the Asia-Pacific region (UNESCO, 2014) are power relations that exist between males and females, as well as between pupil and teacher; deeply ingrained social and cultural norms that

pardon or rationalise violence such as the normalisation of violence as being a part of school life, which in turn could mean that young people may have difficulty recognising physical and sexual abuse. Overall, there is a lack of systems for reporting SRGBV and students do not trust reporting mechanisms because of the fear of reprisals, victimisation, stigma, punishment or ridicule that may result from them reporting (UNESCO & UN Women, 2016).

While the sociological model provides useful insight into the influence of social, structural and cultural factors lacking in the economic and psychological models, it ignores racial differences in criminal behaviours and generalises effects across racial groups (Breetzke, 2010). Breetzke (2010) reports that racial differences in South Africa contribute to the high crime rates. The sociological model also neglects the individual decision-making process of reporting criminal behaviour and the direct and intermediate effects of the unique characteristics of a victim and their situation (Goudriaan, 2006). Walsh and Hemmens (2010) put it clearly that, while macro-level models may be presumed to investigate culture, one of their significant weaknesses is that they tend to generalise groups in their explanations and ignore the individuality of circumstances.

It has been highlighted that the economic, psychological and sociological models of understanding reporting behaviour of crime have fundamental shortcomings, especially with regards to the levels at which they operate individually. The economic model operates on a micro-level and focuses primarily on crime seriousness. The psychological model operates on the meso-level and focuses on the characteristics of the victim and their immediate social network. The sociological model functions on a macro-level and focuses on broad socio-cultural aspects that may affect reporting. These models have generally been applied independently. It has been suggested that to better understand human behaviour, all levels of understanding must be explored (Barker, 1968). In addition to these models, it is critical to consider a technological model to fully understand the reporting of cyber- and mobile bullying as these phenomena occur on technological platforms.

3.2.4 Understanding the lack of reporting in technological environments

Technology may either integrate into or interfere with everyday life (Swingle, 2016). Integration is when technology substitutes other methods due to its superior efficiency or

improves an existing trait (Swingle, 2016). In a study by Boux and Daum (2015), it was found that technology has integrated with the criminal justice system. In their study, they claim that interactions that occur on communicative technologies and social media both challenge and reinforce rape culture across both social and legal environments (Boux & Daum, 2015). They posit, for instance, that one of the key challenges brought on by these technologies is that they provide an opportunity to undermine rape culture and to reinforce the myths of what "real rape" is at all stages of the legal process (Boux & Daum, 2015). These technologies also provide a platform for *victim blaming* and complicate the debates around female and male responsibility and sexuality both in rape cases and in general. However, these technologies do provide, especially at the reporting stage, depictions and evidence to challenge rape tolerance and encourage law enforcement to pursue cases of rape (Boux & Daum, 2015).

In many cases, when a woman has been raped, she fears that her friends, family, the public, people in positions of power and law enforcement will not believe her claims. When women report rape, it is presumed that they are lying unless they provide indisputable evidence or a corroborating witness (Boux & Daum, 2015). Without such evidence, victims are often discouraged from even filing a report (Boux & Daum, 2015). Communicative technologies and social media may be useful in challenging the "female victims are liars" by providing evidence to persuade police and prosecutors to pursue a case (Boux & Daum, 2015). It has been evidenced that communication technologies such as smartphones and social media are frequently used by perpetrators in sexual assault cases as they document or brag about their sexual activities via these technologies (Boux & Daum, 2015). This makes it easier to support the claims of women who have been raped as it acts as evidence of their victimisation. These technologies may also be introduced at trials to defend the "she is lying" myth as well as other stereotypes of the rapist and the victim in the minds of those trying the case (Boux & Daum, 2015). In doing so, these technologies improve the chances of a victim getting justice by providing evidence as well as dismissing any dominant socio-legal narrative that victims of rape are liars.

Interference occurs when technology overrides an existing trait or overshadows a developmental phase (Swingle, 2016). What the researcher is arguing here is that technology has the power to interfere with psychosocial behaviours, thereby transforming them. There are three forms of psychosocial transformation that technology may cause (Swingle, 2016). First, technology facilitates the acceleration of negative or previously neutral behaviour (Swingle,

2016). For example, traditional bullying may become a great attack of cyberbullying. In this case, technology has magnified the behaviour and in turn has become a means of negative transformation (Swingle, 2016). Secondly, technology has been able to change natural social behaviour (Swingle, 2016). For example, instead of real-life face-to-face relationships, activities such as multi-player online gaming has substituted face-to-face socialisation, thereby replacing physical human relationships. Finally, technology has accelerated behaviours to a point at which they become obsessive-compulsive (Swingle, 2016). In doing so, technology has become negative or problematic.

Perhaps one way to explain the transformative power that technology, particularly mobile technology, has over psychosocial behaviour are the attributes that they possess. In their Mobile Added Value (MAV) theory, Pousttchi, Weizmann and Turowski (2003:414) illustrate how mobile technology can facilitate communication and knowledge sharing. They argue that the ubiquity (the ability to receive and transfer data anytime and anywhere, removing any temporal and spatial restrictions to the transfer of knowledge), context-sensitivity (the access to products and services that meet the needs of the user), identifying functions (the ability to authenticate the user as well as their devices), and command and control functions on mobile technology are predictors of added value of mobile communicative technology. These factors enable the knowledge creation process to be easily documented and subsequently gather information and its transfer (Derballa & Pousttchi, 2004). These characteristics help people to share and transfer information and the extent to which this may be done. However, Kyobe and Shongwe (2011) argue that while these features enhance knowledge transfer, students often do not use the affordances of mobile phones to the fullest extent and that students do not recognise the opportunities that mobile phones provide them with regards to knowledge transfer. Since knowledge plays a critical role in individuals achieving their personal goals as well as the management of oneself and others, it is important to encourage and create awareness of the opportunities these technologies may provide (Kyobe & Shongwe, 2011). It is argued that the predictors of MAV may encourage people to communicate openly in their victimisation of others, but still, they may facilitate avenues for students to report their victimisation.

Another way the transformative nature of technology may be explained is by the Lifestyle Theory and Routine Activities Theory (LRAT). According to Pratt et al. (2010), the Lifestyle LRAT predicts that changes in legitimate opportunity structures (societally approved means to reach goals (Williams & McShane, 2010)) - for example, using technology to reach goals - can

increase the convergence of motivated offenders and suitable targets in the absence of capable guardianship (Pratt et al., 2010). Additionally, Marcum et al. (2010) claim that LRAT may explain online victimisation of youth as routine activity such as more time spent online, especially using social network sites, and may increase the likelihood of being exposed to a motivated offender. In addition, the information that youth often provide while using social network sites and their means of communication (i.e., chatrooms, instant messaging, or e-mail) may make them suitable targets for online victimisation (Marcum et al., 2010). Cyberspace also presents guardianship/supervision challenges – it is difficult to monitor phone and e-mail chat usage (Coyne et al., 2009). It, therefore, follows that victims of mobile bullying are most likely to be victims due to the frequency of phone use (a measure of one's behaviour in which one often uses one's mobile phone); one's attachment to one's mobile phone (a measure of one's attitude and perception towards their mobile phone); and the technology and the opportunities it offers (a measure of how advanced one's mobile phone is, i.e., the applicability of one's mobile phone). The researcher, therefore, believes that this typology may be useful as a guide to the development of a digital tool that could be used for measuring and monitoring these predictors and for the reporting of mobile victimisation. This typology can be used to determine which victims are most likely to report or not. A victim is likely to report if he or she uses an advanced mobile phone more frequently and is more attached to it. Victim frequent use of the phone has been identified as a predictor of likelihood to report victimisation (Sidebottom, 2014). Cell phones contain call history, contacts, text messages, web browser history, e-mail, a Global Positioning System (GPS), and other location information that facilitate reporting. The phone can also allow anonymous reporting, shorten the time to report, increase flexibility and lower reporting costs (Tolsma, Blaauw & Te Grotenhuis, 2012).

Attachment to things has been associated with negative emotionality. Pauli-Pott, Haverkock, Pott and Beckmann (2007) found that in infants with high negative emotionality there exists a stronger relationship between attachment disorganisation and behaviour problems. A study by Ishii (2011) found that emotionality is significantly correlated with the frequency of mobile phone use and delinquency score. Emotionality is therefore associated with perceived addiction and the delinquent tendency (Ishii, 2011). An earlier survey also conducted in Japan by Tsushin (as cited by Samkange-Zeeb & Blettner, 2009) involving non-delinquent and delinquent students compared mobile phone ownership and use between these students. The results showed that delinquent students make seven calls per day and send 42.6 e-mails on average, whereas non-delinquent students made 2.7 calls per day and sent 30.5 e-mails (Samkange-Zeeb

& Blettner, 2009). In addition, studies have also found that the chance of reporting is significantly impacted by negative emotionality (Posick, 2014).

Another means by which the transformative power of technology may be seen is through the influence of social networking technologies (SNTs). SNTs, for example, such as Facebook, have become a prominent means by which people share and exchange information and opinions (Neubaum, 2016). Neubaum (2016), however, found that the likelihood of people engaging in these behaviours was strongly influenced by people's "fear of isolation". The fear of isolation draws attention towards user-generated comments which result in their public opinion perceptions being affected. Neubaum (2016) also found that sanctions that people expect from others about expressing their opinions if they are in the minority and the size or the relational ties to the audience affect a user's willingness to convey their opinions. In addition, peoples' hesitation to express their opinions, if their opinions are in the minority, is often caused by the expectation of being personally attacked for those opinions that they have (Neubaum, 2016). So, while mobile technologies and social networking technologies may create atmospheres for open and free engagement, they also create within that same atmosphere, an environment in which people refrain from these engagements and do not express themselves.

What is important is to understand why or how it is these environments create a duplicitous environment of free and open speech and silence. Neubaum (2016) proposes a model to understand mechanisms underlying people's monitoring of opinion climates and expression of personal opinions on social networking sites (SNSs). Assuming a micro-level perspective, the relationships within this model are extensions of mechanisms suggested within the 'spiral of silence' theory that focuses on SNSs and how they intervene these mechanisms (Neubaum, 2016). The spiral of silence theory was introduced by Noelle-Nuemann (1974: 43), who claimed that "to the individual, not isolating himself is more important than his own judgement". Essentially, the theory "observes the phenomenon of diminishing frequency of public opinion due to the fear of nonconformity with the opinion of the majority and the resulting prospects of isolation or sanctions" (Palekar et al., 2015: 4). The spiral of silence was conceived as a macro-social theory but several studies have used it to investigate interpersonal relationships and group dynamics arguing that the decision to voice one's opinion is not entirely dependent on the perceptions of public opinions but rather on the perceptions of opinions of people that one interacts with frequently (Palekar et al., 2015) (please refer Figure 8 to for a diagrammatic representation of the "spiral of silence").

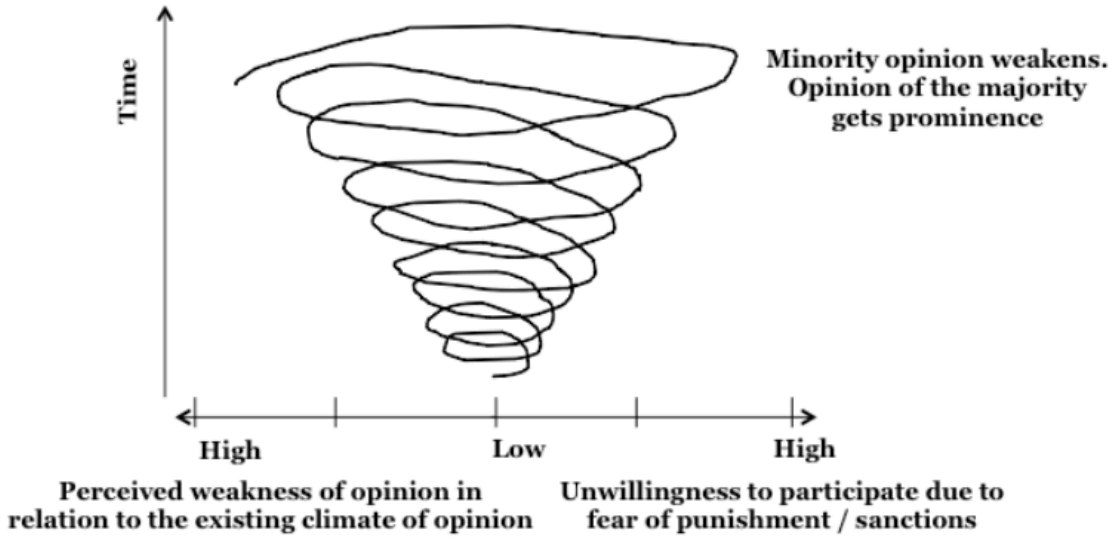


Figure 8: The Spiral of Silence (Scheufele and Moy, 2000)

Neubaum's (2016) model, however, focuses on the use of SNSs by an individual and how its use influences their opinions and behaviour from a social and media psychological perspective (Neubaum, 2016). (Please refer to Figure 9 below). The model has the user and SNS entities. The user entity has an upper and lower layer. The upper layer represents the constant characteristics of a user while the lower layer represents two stages that capture situational processes that influence a user's interaction with a medium (Neubaum, 2016). Stage 1 is the process of monitoring the opinion climate which is initiated by traits such as fear of isolation. The fear of isolation is believed to influence people's attention to possible opinion cues in their environments. Opinion cues on SNSs may be message types. For example, people express their opinions on Twitter through a Tweet. These opinion cues may then shape a person's perception of public opinion (Neubaum, 2016). What this means is that a user will integrate the opinions of other users (which are expressed on SNS) into their perception of the dominant opinion climate. In addition to opinion cues on SNS and pre-existing opinions, interpersonal communication and exposure to mass media are also important aspects of people's public opinion perceptions (Neubaum, 2016).

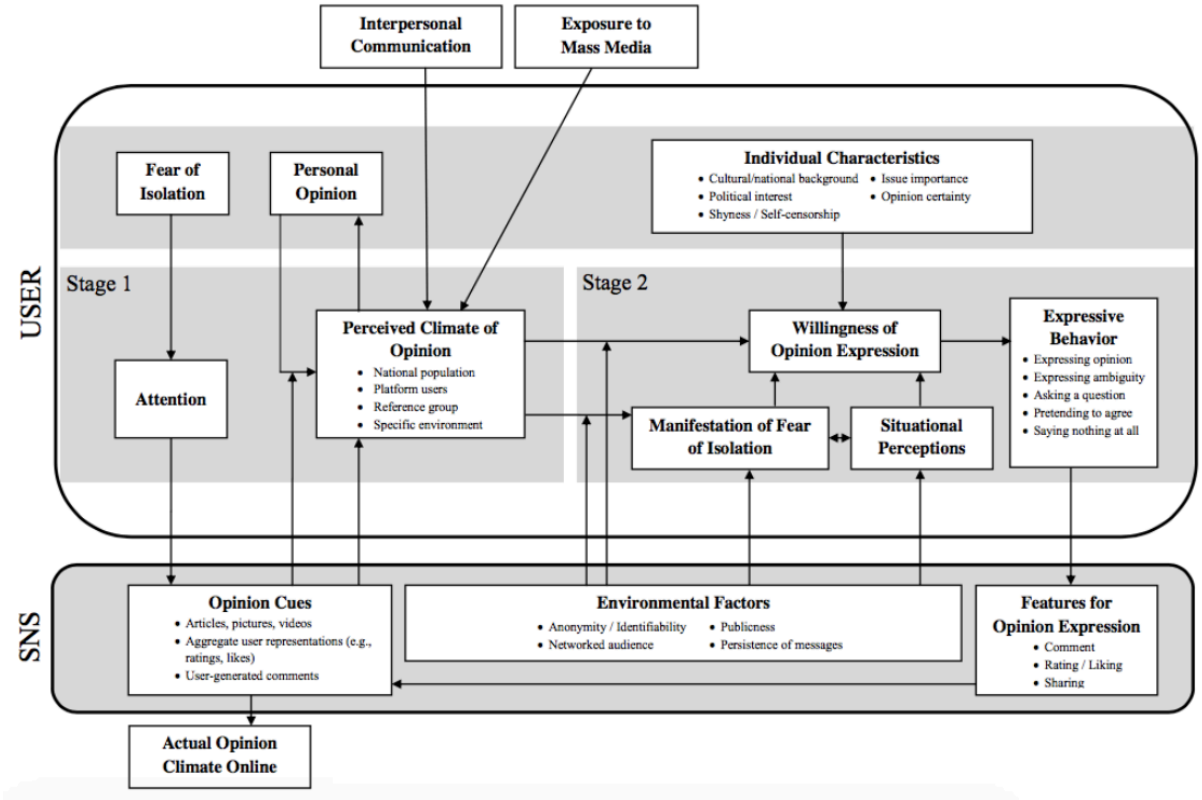


Figure 9: Model focusing on the use of SNSs by an individual and how it's use influences their opinions and behaviour from a social and media psychological perspective (Neubaum, 2016)

Stage 2 is the process by which a person expresses their opinion through a SNS. It is believed that at this stage a person is more likely than not to express their opinion if they have more public support of their perceived opinion (Neubaum, 2016). Besides the perceived climate of opinion, the individual's characteristics should also be considered. On SNS, environmental factors, such as the 'publicness' level of a communication channel, affect the opinion climate on outspokenness. This touches on an important factor of the spiral of silence, i.e., that the fear of isolation is why people avoid expressing their opinions. The environmental factors of SNS may foster a fear of isolation as one's expressed opinion may be viewed by many people. On the other hand, the ability to be anonymous may relieve this fear as one is not directly accountable for the opinion they would have posted. The archival nature of SNSs also influences outspokenness as information may be stored and used against a user in future. These environmental factors impact people's situational fear of isolation and outspokenness they evaluate these factors. Therefore, the characteristics of SNS affect outspokenness based on the interactions between situational perception and situational fear of isolation. People may then express their opinions explicitly but also express ambiguity or ask a question in order to avoid

confrontation. In SNS people express themselves with user-generated comments, "liking", "rating" or "sharing" messages (Neubaum, 2016). The lower part of this model (SNS), clearly shows the attributes of technology/SNS that may contribute to silence or the lack of reporting. That is, opinion cues that are created in SNS environments, the environmental characteristics of SNSs and the features for expressing opinions influence the act of and lack of speaking out. This may influence the way by which people feel they can report crimes using technology or crimes in which technology was used to commit these crimes.

3.3 Towards an Integrative theoretical framework for studying factors influencing under-reporting

The discussion above indicates that the economic, psychological and sociological models to understand reporting behaviour of crime have strengths and fundamental shortcomings especially regarding their areas of emphasis and focus. These models have also been applied independently in previous studies. Bullying and factors contributing to the failure to report this aggression, however, are complex and require a much broader model to guide their study. In addition, the inclusion of technological models is beneficial in understanding reporting behaviour in a digital environment. It has been suggested that to understand human behaviour better, multifaceted approaches are necessary (Barker, 1968; Bursik & Grasmick, 1993). This is especially important in South Africa as there remains significant under-reporting of electronic and traditional crime including sexual offences and domestic violence (Mbalula, 2017). Sibanda-Moyo et al. (2017) argue, for instance, that victimisation against women (VAW) in South Africa is still occurring in great numbers. Between 2002 and today, South Africa has been ranked number one in the world with regards to reported cases of VAW (Sibanda-Moyo et al., 2017). These researchers call for multifaceted approaches that consider the socio-economic realities of women (for example, education, income and employment) and the macro-level factors (for example, patriarchal structures, social and economic policies) that shape their lives and experiences to address such aggression. They also call for the strengthening of the existing laws' implementation and accountability for those already in existence.

The researcher, therefore, argues that it is not adequate to exclusively focus on simply micro-level, meso-level or macro-level factors or factors composing the social or technological context, but that the effects of all these factors on the reporting behaviour should be considered

simultaneously. By integrating the theoretical explanations of reporting behaviour into a single socio-ecological model, much could be uncovered on reporting digitally thereby informing the development of technologies that encourage this behaviour.

3.3.1 Using Bronfenbrenner's ecological model as a guide to developing an Integrative theoretical framework for studying factors influencing under-reporting

The development of the integrative theoretical framework begins by considering Bronfenbrenner's ecological model. This model serves as an overarching umbrella within which the complex factors and interactions that influence bullying behaviour can be examined and addressed (Pintado, 2006; Lee, 2011; Espelage, 2012, 2014; Swearer & Hymel, 2015). The model considers the different individualistic, social, physical, institutional and community aspects of bullying that affects young people (Pintado, 2006; Espelage, 2012) and recognises that youth exists in systems that directly, indirectly and dynamically affect their development (Pintado, 2006; Espelage, 2012).

The ecological systems model consists of the micro-, meso-, exo- and macro-systems. Microsystems involve interpersonal relationships that children may have (Pintado, 2006; Espelage, 2012). Mesosystems consist of social interconnections between participants, such as students, teachers, and peers (Pintado, 2006). The exosystem involves occurrences taking place in a social setting in which an individual does not have an active role, but may experience influence from those occurrences (Pintado, 2006). The macroystem encompasses the broad ideologies, attitudes, laws and customs of the culture that an individual lives in (Pintado, 2006). Innumerable theories can be applied within the ecological systems framework, at different times, sequentially or simultaneously to assist understanding of why victims do not report victimisation. Therefore at each level of the ecological model, theories can be identified that explain the victims' reporting behaviours. These behaviours may be explained by the economic, technological, social and psychological models, as well as those of the MVT.

Taking these factors into consideration, the researcher proposes the following integrative theoretical framework (Figure 10 below) to guide the examination of the factors that influence reporting behaviour among victims of mobile bullying and the development of a mobile app for reporting mobile victimisation.

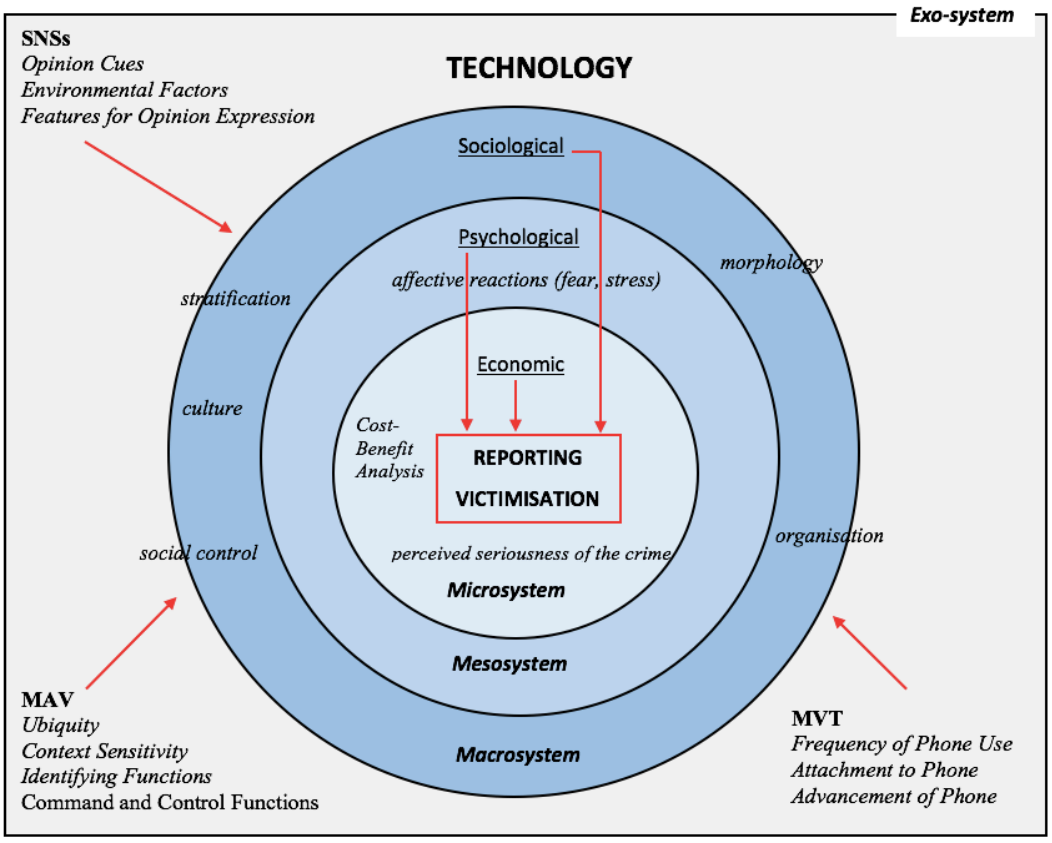


Figure 10: Integrative Framework for Understanding Reporting Behaviour of Mobile Victims

At each level of the integrative model, there are theories that help explain the victims' reporting behaviours. As shown in Figure 10, the micro, meso and macro levels of the integrative model are represented by the economic, psychological and sociological models of reporting respectively. Therefore, the micro-system of reporting mobile victimisation represents the cost-benefit analyses of reporting performed by mobile victims and the perceived seriousness of mobile bullying of the victims which influence reporting of mobile victimisation. The mesosystem represents the affective reactions that may influence the reporting of mobile victimisation. The macro-system represents the five social structural variables that predict variations in the behaviour of law as identified by Black (1976) – stratification, morphology, culture, organisation and social control – and influence reporting behaviour. Also presented in Figure 10 are the features of the technology that may influence mobile victimisation reporting. These technological influences represent the exosystem since mobile victimisation occurs in a technological setting which may influence reporting behaviour without active influence from a mobile user. These features include MAV, which are the attributes of the Mobile Added Value theory (Pousttchi et al., 2003); SNSs, which are the attributes of social networking sites

(Neubaum, 2016) and; MVT, which are the dimensions of the Mobile Victimisation Typology (Lusinga & Kyobe, 2017).

The models and theories used in the proposed integrative model have areas in which they overlap, complement and contradict one another. These interactions between the models bring about a need to integrate these theories so that we are able to understand the individual and broad contexts of reporting simultaneously can be understood without neglecting one or the other. An area of overlap that is observed, for example, is between the economic and psychological models. According to Goudriaan (2006), earlier researchers claimed that under psychological models of crime reporting, victims also conduct cost-benefit calculations. These calculations may be indirect, where instead of crime seriousness, a victim considers their affective reactions which in turn influence the decision making (Goudriaan, 2006).

Conflict is also observed between the sociological model and both the economic and psychological models in that the sociological model completely ignores individual decision making in social settings and focuses on broader contextual factors that may influence decision-making (Goudriaan, 2006). This conflict is, however, also complementary in that since the economic and psychological models do not address social and contextual factors, the integration of the sociological model complements the former models. The technological models also play a critical role in this integrative model since it interferes with psychosocial behaviours, having the ability to accelerate this behaviour (Swingle, 2016). This integrative theoretical framework may, therefore, be useful in understanding the reporting behaviour of students at the individual level as well as the broad social-cultural context of reporting in both technological and non-technological environments. The framework may also be useful in guiding further examination of the problem of under-reporting cyber-victimisation and informing the development of appropriate interventions in schools and communities. This is because understanding these factors that affect reporting behaviour provides essential information that may bring focus to those areas that are weak and need enhancing and in developing new approaches towards executing the SRGBV recommendations that are acceptable and suitable for the victims of SRGBV since, as stated earlier, factors that influence social and cultural norms have been found to discourage the reporting of SRGBV (UNESCO & UN Women, 2016). Furthermore, because of the value this framework may have in explaining the broad social-cultural context of victimisation reporting at the individual level, the integrative theoretical framework may also be used to inform the design, development and

evaluation of a mobile-based intervention for the reporting of mobile victimisation faced by high school students in South Africa. The development of the intervention would also have to be in keeping with a person-based approach which allows the researcher to gain information on what will make the proposed mobile application more meaningful, attractive, useful and easy to implement to those who engage with it (Yardley, Morrison, Bradbury & Muller, 2015; Band et al., 2015).

3.4 Summary

This chapter highlighted three theoretical models that have been used in studies that investigate the determinants of reporting of crimes, i.e., the economic, psychological and sociological models. Some of the technological determinants of reporting cyber and mobile bullying were also discussed and concluded with the development of an integrative theoretical framework for studying factors influencing under-reporting. The next chapter describes the methodology adopted to achieve the aim and objectives of this study.

CHAPTER 4 RESEARCH DESIGN AND METHODOLOGY

"Paradigm issues are crucial; no inquirer ought to go about the business of inquiry without being clear about just what paradigm informs and guides his or her approach"
(Guba and Lincoln, 1998: 218).

Chapter 3 presented an integrative framework based on the theory that guided the development of the digital-based tool that will monitor and report the mobile victimisation faced by high school students in South Africa. In this chapter, the researcher will give a detailed account of the methodology applied to this research in order to answer the research questions and to meet the research objectives. (Please refer to Figure 11 below for the chapter overview). The philosophical stance taken in this study will be discussed, as well as the research methodology, in which the research approach, strategy and purpose will be explained. The sampling strategy, research instruments, data collection and analysis, time horizon and the ethical concerns for this study are also discussed.

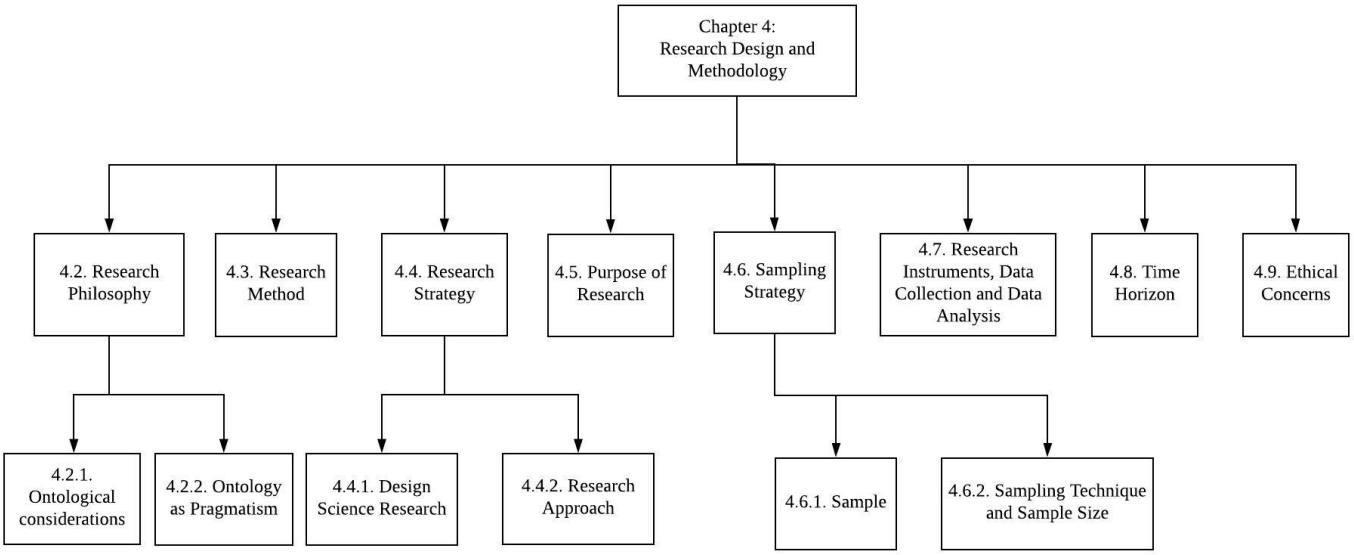


Figure 11: Research Design and Methodology Overview

4.1 Introduction

According to Mingers (2001), designing a research methodology is a significant step in conducting a study. A research design consists of philosophical assumptions, methods, plans, procedures or techniques that guide activities that assist in acquiring reliable and valid results of research (Cavana, Delahaye & Sekaran, 2001; Mingers, 2001). One's choice of methodology determines how one must conduct research, what data are required and how to collect that data

(Hatch, 2012). This section presents the research methodology used in this study considering the philosophies, approaches, strategies, choices, time horizons and the techniques and procedures used in the collection and analysis of data.

4.2 Research Philosophy: Ontology, Epistemology and Methodology

Research philosophy refers to the nature and development of knowledge (Saunders, Lewis & Thornhill, 2012). It contains important assumptions about the way we view the world, and these assumptions subsequently underpin research as they form the development of the knowledge one is attempting to develop (Saunders et al., 2009). There are three ways in which research philosophy may be viewed: ontology, epistemology and methodology (Saunders et al., 2009, 2012). Ontology is "a branch of philosophy that examines assumptions about existence and definitions of reality" (Hatch, 2012: 11). Epistemology is the study of "how we know and what counts as knowledge" (Hatch, 2012: 11). Methodology is a branch of philosophy that studies "how the researcher can go about finding out whatever he or she believes can be known" (Guba & Lincoln, 1994: 108). These three views contribute to the explanation, appreciation, understanding and practical guidance of the research process one wishes to embark on (Hatch, 2012; Saunders et al., 2012).

While these three branches of philosophy exist separately, there is a space in which they interlink and may inform one another (Guba & Lincoln, 1994). For instance, epistemological assumptions determine the type of knowledge that could be used to address what our ontological assumptions define as real, and this makes these two branches of philosophy interrelated. In a similar manner, the methodology that is adopted in inquiry may be informed by the epistemological assumptions undertaken in the research. Hence, these three being intertwined forms the basis of paradigms that could be used to inform research (Guba & Lincoln, 1994).

A paradigm is a set of beliefs that represent a world view. The idea behind paradigms is that knowing one's world view places one in a position in which the nature of the world, one's place in that world and the possibilities that exist within that world (in relation to the world and its parts) will determine what falls within the limits of legitimate inquiry (Guba & Lincoln, 1994). Orlikowski and Baroudi (1991) also argue that it is of great importance that researchers in information systems have awareness and understanding of the possible assumptions that may

underpin research because this ensures that the most appropriate and effective perspectives may be used in studying phenomena of interest to information system researchers. Guba and Lincoln (1994) suggest that the order in which a paradigm is formed should be in answering the ontological, epistemological and the methodological questions respectively. They suggest that this reflects a logical primacy. For this reason, the ontological stance taken will be discussed before the epistemological and methodological positions taken in this study are respectively discussed.

4.2.1 Ontological Considerations

4.2.1.1 Ontology as Objectivism or Subjectivism

Ontology is that branch of philosophy that has to do with assumptions about existence and definitions of reality (Hatch, 2012). While there can be various views on ontology, two extremes have been predominantly represented in such a way that the term ontology itself may refer to a phenomenon under investigation and whether its existence is objective (independent of humans) or subjective (existing because of interactions with humans) (Orlikowski & Baroudi, 1991; Saunders et al., 2009, 2012). (Please refer to Table 2 below). Table 2 explains these views in general and in the field of information systems as stated by Orlikowski and Robey (1991).

Table 2: Ontological views: Objectivism Vs Subjectivism (Orlikowski & Robey, 1991)

	Objectivism	**Subjectivism**
In general	• Social reality is objective • Social systems exist independent of human behaviours. • Emphasis is placed on the different aspects that make up the objective world and the relationships that exist between these aspects. • Theories grounded on objectivist assumptions target institutional properties of social systems. • The exploration of phenomena using objectivist theories aims to understand phenomena by exploring how these institutional properties affect and influence human behaviour and relationships over time.	• Social reality is subjective • Meaningful human behaviours and interactions influence social systems. • During research in which knowledge is created, modified and interpreted, great emphasis is placed on subjective human experiences. • Humans are central to theories that are grounded on subjective assumptions. • The exploration of phenomena using subjectivist theories aims to explain the creation of social reality by individuals who are knowledgeable and are the cause of that social reality.

In Information Systems Research	• Presumes that technology and organisational structures are objects. • Focuses on the "cause and effect" relationships that exist between these objects.	• Assumes that there is a "social action" perspective on information technology. • Focuses on the "humanistic-interpretive" process in which consequence is as a result of the interactions that those using the technology engage in.

Fitzgerald and Howcroft (1998) argue that many dichotomies (concerning philosophical standings) have been proposed in IS research. These dichotomies exist on the ontological, epistemological, methodological and axiological levels. As has been discussed, on an ontological level these exist in the form of objectivism and subjectivism (Fitzgerald & Howcroft, 1998). Scholarly work has often overlooked that there must be a "middle ground" between the two. Pragmatism provides that middle ground. Pragmatism is not just a philosophical school of thought. It is that way of thinking that suggests that applying either objectivism or subjectivism is unrealistic (Saunders et al., 2012; Ihuah & Eaton, 2013). It, therefore, provides that middle ground that offers flexibility between objectivism and subjectivism (Pratt, 2016; Ihuah & Eaton, 2013). Tashakkori and Teddlie (1998) also argue that researchers could benefit from looking at philosophy as a continuum rather than choosing and following one position throughout their studies. They suggested that within a study, the knower (subject) and the known (object) at some point might interact with one another while at other points the two may act separately of each other. Therefore, adopting pragmatism as an ontological stance may benefit researchers whose research questions are neither of an objective nor a subjective nature.

4.2.2 Ontology as Pragmatism

> *"we come down to what is tangible and conceivably practical, as the root of every real distinction of thought, no matter how subtle it may be; and there is no distinction of meaning so fine as to consist in anything but a possible difference of practice"*
>
> *(Peirce, 1878: 294)*

According to Giacobbi et al. (2005), pragmatism was a means of providing practical solutions to contemporary problems and not about answering questions about absolute truth. Pragmatists believe in multiple realities and hence believe that no one theory is closer to the truth than the other is (Saunders et al., 2012; Pratt, 2016). As a result, pragmatists do not bother arguing about what is true and what is not (Saunders et al., 2012), but rather focus on the value of different types of knowledge as tools that that help one cope in one's environments (Rorty, 1990), on

what is of the researchers' interests and on what is of value to the researcher (Saunders et al., 2012). Pragmatists focus on the methods and theories that are relevant within different contexts and not those that unmask truths about the nature of reality (Giacobbi et al., 2005). Many researchers have thus often applied pragmatism as an epistemological and methodological approach and neglected the ontological aspects of pragmatism (Pratt, 2016).

Pragmatism is a diverse school of philosophy and a distinct approach to understanding which attempts to dismiss the epistemological and ontological thinking and highlights cognition as the core of a constructivist, practical, and non-dualistic world view (Pratt, 2016). It originates from the works of Charles Sanders Pierce, William James, John Dewey and George Herbert Mead (Pratt, 2016; Goldkuhl, 2012). Dewey's work was the first to call for pragmatism as an ontology. According to Dewey, pragmatism as an ontology is mainly concerned with actions and change (Goldkuhl, 2012). The theory of the act was thus central to Dewey's pragmatism (Pratt, 2016). It has to do with "humans acting in a world that is in a constant state of becoming" (Goldkuhl, 2012: 139), therefore suggesting that actions are a critical role in pragmatism as an intermediary in changing existence. These actions must be informed by purpose and knowledge so that any change that occurs is through reason and action (Goldkuhl, 2012), so that human knowing and human action are linked. This leads to cognitive/conceptual development and clarification being the result of actions and their consequences (Goldkuhl, 2012). Simply put, central to pragmatism is that the meaning of an idea is the practical consequence (different actions one portrays based on one's beliefs in that idea) of that idea.

Another central concept of pragmatism is that of "inquiry". The inquiry has to do with the investigation of reality in order to create knowledge for a controlled or directed change of that reality (Goldkuhl, 2012). It is the systematisation of human beings' natural efforts to improve their situation. The main aim of the inquiry is thus to create knowledge in order to change or improve. This implies that pragmatism has an interest not only in what is but in what might be. It has an orientation towards prospective worlds and prescriptive change (Goldkuhl, 2012). Subsequently, knowledge developed through pragmatism is not bound to explanations (as is the case in positivism) and understanding (as is the case with interpretivism). It includes other knowledge forms such as prescriptive (giving guidelines), normative (demonstrating values) and prospective (suggesting possibilities). Figure 12 below is a diagrammatic representation of the pragmatic process, as presented by Goldkhul (2012).

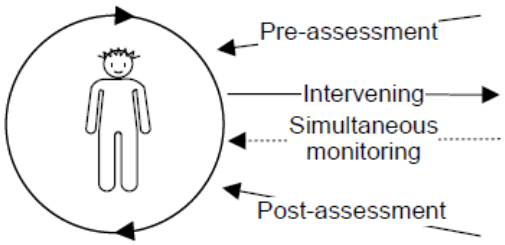


Figure 12: A cyclic model of human action (Goldkuhl, 2012)

The first phase is pre-assessment. In this phase, the actor observes the world and its action possibilities in order to know the different courses of action (Goldkuhl, 2012). In the second phase, the actor enacts the action in order to "intervene" or influence the world. This phase occurs simultaneously with monitoring of the action on the external world (Goldkuhl, 2012). The last phase is the post-assessment phase in which the actor observes and evaluates the effects of the interventive action. It is through this cycle that all the possible knowledge forms may be created. In particular, the interventive phase may produce prescriptive and prospective knowledge (Goldkuhl, 2012).

4.2.2.1 The Researcher's Ontological Stance

The ontological stance taken in this study is that of pragmatism. This is because pragmatism suggests that applying either objectivism or subjectivism is unrealistic and that looking at philosophy as a continuum rather than choosing and following one position throughout a study is more realistic and appropriate (Tashakkori & Teddlie, 1998; Saunders et al., 2012; Ihuah & Eaton, 2013). The researcher explains why this is the case by using the research question to argue why pragmatism would be most appropriate for this study. This is because Giacobbi et al. (2005) and Saunders et al. (2012) suggest that the research question is one of the most crucial elements of selecting an appropriate research philosophy. They also argue that pragmatism is an appropriate philosophy for answering questions that are neither objective nor subjective.

The research question "*How can a digital tool monitor and report mobile victimisation of South African high school students?*" is neither objective nor subjective alone. Rather, it is both objective and subjective. Exploration of phenomena using objectivist theories aims to understand phenomena by exploring how these institutional properties affect and influence human behaviour and relationships over time (Orlikowski & Robey, 1991). In addition, objectivism tends to offer an explanation (Goldkhul, 2012). Therefore, for this study it was

necessary to examine mobile victimisation and reporting behaviour objectively as there was a need to understand both phenomena, what causes them and the relationships that exist within themselves and their parts. In addition to understanding these phenomena, the researcher had to investigate what digital interventions for mobile victimisation exist for South African youth through the literature. Therefore, it was useful to take an objectivist stance during this enquiry so that the researcher got an understanding of the existing theories and literature on mobile victimisation, reporting behaviour and existing interventions for this aggression. This gave the Researcher a sense of what has worked and what has not worked in intervening mobile victimisation digitally. This subsequently informed what to avoid and what to focus on in developing a digital tool that would work in reporting mobile victimisation.

At that point, a digital tool was to be developed informed by what the researcher had come to know, through literature, about mobile victimisation and it's reporting interventions. Although the literature provided a starting point, there was, however, still a need to engage with the people that the intervention is for. The opinions of those who will use the proposed digital tool were vital in identifying whether or not the tool is effective as a means to monitor and report mobile victimisation. Throughout the "interventive" phase (which is iterative) (please refer to Figure 12 above) of the study (where the digital tool is being used by the high school students), the opinions and suggestions of the students will, therefore, continuously inform the development of the digital tool as well as the theory that was used to inform the development of the tool through each iteration in order to suit the students and their needs as well as to meet the goals for which it was developed. This aligns with the belief that the knower (subject) and the known (object) at some point might interact with one another while at other points the two may act separately of each other, as stated by Tashakkori and Teddlie (1998). It also asserts that reality is constantly being renegotiated, debated and interpreted. This is important; as Grimstad (2013) alludes in Table 3 below, "reality is constantly renegotiated, debated, interpreted in light of its usefulness in new unpredictable situations" when taking pragmatism as an ontological stance. In that sense, what the researcher had come to know about mobile victimisation and the interventions that existed had to be negotiated, debated and interpreted such that its usefulness in theory and in the real world may be determined. Also, since pragmatists believe in multiple realities, the subjective realities of the students as they used the digital tool, influenced the development of the tool and informed whether or not the research question was answered.

Table 3: Research Paradigms (Guo & Sheffield, Creswell & Plano Clark, Creswell, Tribe & Mackenzie & Knipe, as cited by Grimstad, 2013)

Research Paradigm	Ontology	Epistemology	Research approach	Strategy of Inquiry	Strategy of Researcher	Data collection method
Positivism/Post-positivism	Objectivism. There is one reality.	Knowledge is: Positive data, i.e. facts that can be measured, verified and replicated. Assumes that science can objectively measure the world. Theory is tested through measurement and deduction.	Quantitative "Measurer/ Verifier"	Reductionist in that it reduces the ideas into small sets that can be tested against theory.	Researcher is an objective/neutral observer. Events happen uninterrupted by researcher.	Surveys Experiments Predetermined instruments Statistical analysis
Interpretivist	Subjectivism. There is no single reality. Instead, reality is created by individuals.	Knowledge is: Understanding socially or historically constructed meanings of reality by individuals or groups.	Qualitative "Observer/ Meaning-making"	Inductive process, theory is generated "afterwards" out of the data collected in the field.	Researcher is subjectively involved with stakeholders to achieve a good understanding of their world.	Ethnographies Grounded theory Case studies Phenomenology Narrative Research
Critical Theorist	Realities are socially constructed entities that are under constant internal influence.	Knowledge is: Uncovering injustice and suggesting actions that would lead to social empowerment.	Qualitative "Emancipator/Action-oriented"	Inquiry is part of a political agenda and should suggest action to improve the situation. Inquiry is practical, collaborative and emancipatory.	Researchers and participants are actively involved in creating awareness and implementing alternatives.	Action research Historical contextualisation.
Pragmatism	Reality is constantly renegotiated, debated, interpreted in light of its usefulness in new unpredictable situations	Knowledge is: A combination of facts and words/meanings in order to solve problems. Combining inductive and deductive thinking, measuring, observing and developing new meanings.	Mixed Methods "Pragmatic problem-solver"	Inquiry is practical and pragmatic in that it uses the paradigms and methods that seem to best fit the problem researched.	Researchers are pragmatic, uses many methods to seek convergence or divergence of analysis outcomes.	Triangulation. May use both positivist & interpretivist methods, interviews, surveys, Text analysis. Sequential procedures

To summarise the researcher's choice of pragmatism as the best paradigm (i.e., ontological and epistemological stance) for this study, Goldkuhl's (2004) characteristics of pragmatism when conducting research of phenomena are useful and are the following:

1. *Pragmatism shows a greater interest in actions*. While other issues are of concern, pragmatism places a stronger emphasis on the effects of actions on the empirical world. These actions are considered to be significant and fundamental to study. In the current study, mobile victimisation and the use of a digital tool by high school students in an effort to intervene on mobile victimisation are of great importance.

2. *Pragmatism also shows an interest in actions in their practice context*. "A practice is a web of actions that are related and combined in a meaningful way" (Goldkuhl, 2004: 17). It consists of human actions, humans and their shared practical understandings, and also the material objects (artefacts) used in practice. This entails practice being a holistic notion. In this study, this refers to high school students as humans, mobile victimisation as human action, and the digital tool as the material object which intervenes mobile victimisation. These then create a practice in which there is a holistic notion in understanding and intervening mobile victimisation.

3. *Pragmatism acknowledges that action permeates knowledge*. Pragmatism assumes ordinary knowledge is influenced by human action, i.e., what humans do, can do and want to do in the world. This includes what humans know about each other. In adopting pragmatism, it was assumed that through the development of a digital tool informed by theory (i.e., MVT and the integrative model) and its use by high school students, knowledge on mobile victimisation that is not explicitly expressed by theory may be created in the process. The use of such a tool would thus elicit some insightful and intriguing information on mobile victimisation and other behaviours that students portray that may lead to or reduce mobile victimisation.

4. *Pragmatism considers the practical consequences of knowledge*. Pragmatists believe that knowledge is not just the observation and generalisation of phenomena. They believe that

the world is ever-changing and in a state of becoming, and research should capture this process in order to create knowledge. Therefore, a pragmatist researcher becomes interested in how this knowledge will influence practice by translating knowledge into action and he takes a special interest in what practical consequences this knowledge may have. This was shown in this study by using theories of victimisation as well as victim typologies to inform the development of the digital tool. In so doing, the use of the tool would generate useful knowledge that could assist in the development of mobile victimisation theories and knowledge. Therefore, the use of this tool within this study captured the process of knowledge being created.

5. *Pragmatism evaluates what works and what does not work*. There is an interest in actions and practices which lead to a concern of what works and how and why it works and what does not work and how and why this does not work. Since *pragmatism evaluates what works and what does not work*, knowing what would work and what would not work in developing a digital tool to report mobile victimisation was another primary concern in this study. This means that the researcher relied not only on theory but also on any reliable sources of information that informed the development of the digital tool so that when it was finalised, the tool worked appropriately and efficiently.

4.3 Research Method

Methodology is a branch of philosophy that studies "how the researcher can go about finding out whatever he or she believes can be known" (Guba & Lincoln, 1994: 108). The research methodology is another philosophical level that shows polarity in that the research methodology adopted in a study is often either quantitative or qualitative (Venkatesh et al., 2013). Quantitative research methods are methods which are often adopted by objectivist researchers who believe that phenomena can be quantified, measured, verified and replicated (Kaplan & Duchon, 1988). These methods involve the collection and analysis of numerical data (Saunders et al., 2009). Qualitative research methods, on the other hand, are methods often adopted by subjectivist researchers who believe that phenomena are understood by investigating the conceptualisation and understanding of others (Kaplan & Duchon, 1988). Qualitative methods aim to avoid theoretical constructs or the

formulation of hypotheses and involve detailed observation of natural setting in which the study is being conducted (Kaplan & Duchon, 1988). Qualitative research methods also allow researchers to explore people and the social and cultural contexts within which they live and involve the collection and analysis of non-numerical data (Myers, 1997; Saunders et al., 2009).

There is, however, what has been termed the "third methodological movement", i.e., mixed methods, which is one of the two strands of multiple methods. Multiple methods involve the collection and analysis of data using more than one technique or procedure (Saunders et al., 2009; Venkatesh et al., 2013). There are two types of multiple methods: mixed methods and multi-methods. Multi-methods involve the collection and analysis of data using more than one technique or procedure; however, these may be done in one world view (either qualitative or quantitative) (Tashakkori & Teddlie, 2003; Saunders et al., 2009; Venkatesh et al., 2013). Mixed methods also involve the collection and analysis of data using more than one technique or procedure and allows for multiple world views. Mixed methodology, therefore, involves the concurrent or sequential use of quantitative and qualitative methods within a single study (Venkatesh et al., 2013; Saunders et al., 2009).

For this study, the researcher deemed mixed methodology the most appropriate. This is because the current study, as stated earlier, took pragmatism as its philosophical stance and thus considered both an objective and a subjective world view. As a result, data that are both quantitative and qualitative were required in this study. Both quantitative and qualitative data were used to capture the understanding and opinions of the students with regards to mobile victimisation and the utilisation of the proposed digital tool as a means to monitor and report mobile victimisation. The qualitative data were very useful and informative in the development of the tool as the views of students were taken into consideration when developing the tool.

Mixed methods have many other benefits, as highlighted in Table 4 below. These reasons may also benefit the current study appropriately. For example, using mixed methods may give a bigger picture of mobile victimisation and the intervention methods that have been used to counteract it. Qualitative data may also fill in the gaps that may have been neglected by capturing quantitative data in accordance with a "conceptual framework" and vice-versa.

Table 4: Reasons for using Mixed Methods (Bryman, as cited by Saunders et al., 2009; Kaplan & Duchon, 1988; Venkatesh et al., 2013)

Reason	Explanation
Corroboration/Triangulation	Using more than one method allows the researcher to validate research findings. Improves robustness.
Facilitation	Aids research in collecting data that would have not been collected by other means.
Complementarity	Using more than one methodology uncovers different aspects/views of phenomena or relationships.
Generality	Contextualises study in a broader sense.
Compensation/Aid interpretation	Qualitative methods may be used to "compensate" findings of quantitative methods and vice-versa.
Diversity/Study different aspects	Obtain many views of a phenomenon. For example, quantitative methods may capture macro aspects of phenomena while qualitative methods may capture the micro aspects.
Completeness	Alternative methodologies may fill the gaps were one methodology failed to/paints a fuller picture of a phenomenon.

4.4 Research Strategy

This section discusses the research strategy that was employed in the current study. While some research strategies belong to either a deductive or inductive approach, all strategies may be used for any research purpose (Saunders et al., 2009). Research strategies include experiment, survey, case study, action research, design and creation, ethnography and archival research. According to Saunders et al. (2009), the choice of strategy depends on the research questions and objectives, the extent of existing knowledge and philosophical assumptions that underpin research. As the aim of this study was *to develop a digital tool that will intervene in mobile victimisation of high school students as well as to create knowledge and understanding of the phenomenon itself*, the research strategy that was employed in this study had to be of a design nature. Of the design strategies that exist, Action Research (AR) and Design Science Research (DSR) have been the most commonly used strategies in information systems (IS) research (Baskerville, Pries-Heje & Venable, 2009). While the two approaches may seem the same, they are different (Baskerville et al., 2009). Action research is the "organisational action to create change in order to discover new knowledge in a *clinical mode*" (Baskerville et al., 2009: 10) while Design Science Research aims to create an artefact in order to discover knowledge in a *generalised mode* (Baskerville et al., 2009). Refer to Table 5 below for further comparison of the characteristics of the two strategies.

Table 5: Comparison of Characteristics between Design Science Research and Action Research (Vaishnavi & Kuechler, 2004; Baskerville et al., 2009)

Characteristic	Action Research (AR)	Design Science Research (DSR)
Roots	Socio-technical	Engineering
Goal/Intention	Problem-solving and/or *behavioural understanding*/Cure the social illnesses	Problem Solving/ Building of artefacts
Specificity	Situation Specific and Generalised	Generalised
Design Role	Application or (Invention and Application)	Invention/Generative
Outcome	Situated *organisational improvements* and (*Behavioural Theory* or Design theory)	Design Theory or Artefact shown to have utility

As seen in Table 5 above, the goals/intentions of both DSR and AR are somewhat similar in that problem solving is a central goal in both strategies. In addition, specificity may be generalised in both cases. However, they differ in that AR also aims to understand behaviour and cure social illnesses while DSR focuses on building artefacts (Baskerville et al., 2009). This is very important because this study does not attempt to "cure" mobile victimisation. Instead, it aims to develop an artefact in the form of *a digital-based tool that intervenes mobile victimisation by monitoring and reporting mobile victimisation so that students have a means by which to cope with their victimisation*. With regards to specificity as well, AR tends to be situation specific and this is not the case for this study as the focus of the intervention is high school students in South Africa. In investigation mobile victimisation to develop a tool for a large population, as this study does, this intervention, as it is being informed by theory, could be generalised to a broader audience. Most importantly, the outcome of AR as shown in Table 5, is that of organisational improvements and behavioural theory while that of DSR is design theory or artefacts shown to have utility. This difference in the outcomes shows how the two strategies differ and how one would fit this study better than the other. An artefact shown to have utility would be the outcome of this study because of the mobile application that would be developed to monitor and report mobile victimisation. This study, therefore, adopts DSR as its strategy as it would best suit the goals, intentions and outcomes of this study. The following section discusses DSR further and its suitability for this study.

4.4.1 Design Science Research

The essence of design science research is *innovation and solving problems*. Design Science Research (DSR) is thus a lens that provides techniques and perspectives for performing IS research in order to generate new knowledge through the development of innovative artefacts and the evaluation of these artefacts (Vaishnavi & Kuechler, 2004; Baskerville et al., 2009). It focuses on the creation of the artefact as well as learning through their use and creation of knowledge. Figure 13 below shows a general model for creating knowledge. In this model, knowledge is created through a knowledge-building process. Once this knowledge has been created, it goes through a knowledge-using process that produces works (construction).

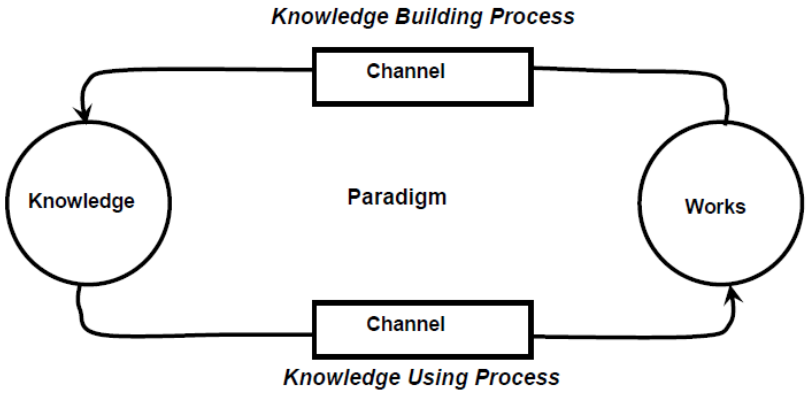


Figure 13: Model for generating and accumulating knowledge (Owen, 1997)

This model also fits in design science. In design science, the knowledge base of design has been building-evaluation-reflection and abstraction (Baskerville et al., 2009; Vaishnavi & Kuechler, 2004). Within the model presented in Figure 13 above, the knowledge-building process and the knowledge-using processes would be evaluation and building phases within design science. Reflection and abstraction then take place throughout the iterative process of this model and serves as a means by which knowledge may be created.

In addition, the basic nature of Design Science Research methodology is somewhat similar to that of the "scientific method" that it has become accepted as an assumption. In it, the researcher formulates hypotheses in order to learn about artefacts and natural settings (a design), creates and runs experiments with the artefact (instantiate an artefact), then compares the results with the

expected results (evaluates) (Baskerville et al., 2009). This, therefore, distinguishes DSR from DS and design. Although these three concepts are related, they are different. Design means to bring into existence a product, while design science is the knowledge of creating constructs, techniques, methods, and models that satisfy predefined functional requirements and DSR is a research process that creates the former through design, analysis, reflection, and abstraction (Vaishnavi & Kuechler, 2012). There are many different DSR processes that one may use when conducting research. Alturki, Gable and Bandara (2011), summarised the different processes in Table 6 below.

Table 6: Design Science Activities /Steps/Tasks Distilled from the Literature (Alturki, Gable & Bandara, 2011)

Author/Year	#	Design Science Activities/Steps/Tasks presented in the paper								
Nunamaker Jr etal.[29]	5	Construct a conceptual framework	Develop a system architecture	Analyse and design the system			Build the (prototype) system	Observe and evaluate the system		
Walls et al.[22]	7	Design Product					Design Process			
		Meta-requirements	Meta-design	Kernel theories	Testable design product hypotheses		Design method	Kernel theories	Testable design process hypotheses	
March & Smith [13]	2	Build				Evaluate				
Rossi & Sein [15]	5	Identify a need	Build	Evaluate			Learn	Theorise		
Hevner et al. [18]	7	Design as an Artifact	Problem Relevance	Design Evaluation	Research Contributions	Research Rigour	Design as a Search Process	Communication of Research		
Vaishnavi & Kuechler [16]	5	Awareness of a problem	Suggestion	Development			Evaluation	Conclusion		
Aken [39]	4	Choosing a case	Planning and implementing interventions	Reflecting on the results	Developing design knowledge to be tested and refined in subsequent cases					
Cole et al.[40]	4	Problem Definition	Intervention	Evaluation	Reflection and Learning					
Venable [17]	4	Solution technology invention	Theory building	Artificial evaluation	Naturalistic evaluation					
Peffers et al. [14]	6	Problem identification and motivation	Define the objectives for a solution	Design and development	Demonstration	Evaluation	Communication			
Gregor & Jones [25]	8	Compulsory						Optional		
		The purpose and scope	Constructs	Principles of form and function	Artifact mutability	Testable propositions	Justificatory knowledge	Principles of implementation	Expository instantiation	
March & Storey [4]	6	Identification and clear description of a relevant organizational IT problem	Demonstration that no adequate solutions exist in the extant knowledge-base	Development and presentation of a novel IT artifact that addresses the problem	Rigorous evaluation of the IT artifact enabling the assessment of its utility	Articulation of the value added to the knowledge-base and to practice	Explanation of the implications for IT management and practice			
Pries-Heje et al.[31]	4	Risk identification	Risk analyzing	Risk treatment	Risk monitoring					
Pries-Heje et al. [30]	8	Ex Ante Evaluation Activity				Ex Post Evaluation Activity				
		Naturalistic Design process	Naturalistic Design product	Artificial Design process	Artificial Design product	Naturalistic Design process	Naturalistic Design product	Artificial Design process	Artificial Design product	
Baskerville et al. [9]	7	A specific problem is identified and delineated	Problem must then be expressed as a specific set of requirements	The specific problem are systemically abstracted and translated into a general problem	General solution design (a class of solutions) for the general problem	General design requirements are compared with the specific problem	A declarative search is made for the specific components that will provide a workable instance of a solution to the general requirements.	An instance of the specific solution is constructed and deployed into the social system		

This study adopts the DSR process by Vaishnavi and Kuechler (2004) because it strongly conveys where the knowledge using and knowledge building processes are occurring throughout the DSR process. Additionally, it shows the outputs that are produced, as well as the cognitive processes at each stage of the process. Furthermore, this DSR process is widely used in conducting DSR due to its popularity and acceptance level as indicated in Google Scholar by the high number of citations. (Please refer to Figure 14 below which shows the DSR process model.)

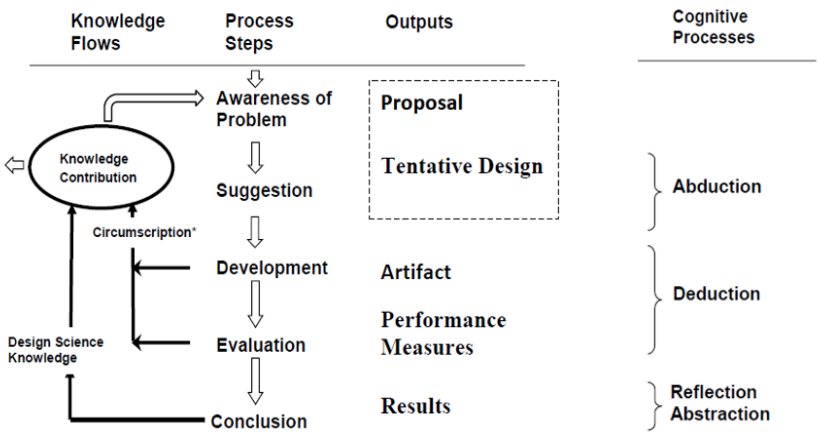


Figure 14: Design Science Research Process Model (Vaishnavi & Kuechler, 2004)

This Design Science Research (DSR) process model shows five steps in conducting DSR. These include awareness of the problem, suggestion, development, evaluation and conclusion (Vaishnavi & Kuechler, 2004) and are described briefly below in relation to the current study. These are discussed in more detail in subsequent chapters. It is believed that through following these steps, the researcher was able to meet the objectives of this study.

Awareness of problem: This step involves bringing into focus an interesting issue within research or practice that needs to be addressed. This awareness may be informed by the industry or the discipline itself. At the step, the proposal for the research is produced. This research will take from one of the principles highlighted by Sein et al. (2011). They state seven principles in what they refer to Action Design Research. In problem formulation, they highlight two principles: practice-inspired research and theory-ingrained artefact. The former refers to field problems as knowledge creation opportunities that emerge from the convergence of the technological and organisational domains. The latter (theory-ingrained artefact) places emphasis on artefact development and evaluation being informed by theories (systems of statements that have the power to allow generalisation and abstraction). This is done by using theoretical elements in the development of the artefact such that the development of the artefact establishes or demonstrates the theory. The use of theory is often in the initial stages of the design of the theory-ingrained artefact. As the proposed mobile victimisation typology was derived from theory and the purpose of this study is automate this typology, the proposed tool will be a theory-ingrained artefact.

Suggestion: This is a creative step in the process where solutions to the problem are proposed in the form of a tentative design. The tentative design offers new, creative ways of solving the problem. As was stated in the introduction, a solution has already been suggested, that of developing a mobile-based tool that could be used by students to identify and report mobile victimisation. In the 2013/14 annual report by the Department of Basic Education (Department of Basic Education, 2013/14), it was suggested that the intervention methods that exist were not sufficient to curb the bullying that occurs in schools in South Africa. Developing an intervention tool that addresses mobile victimisation in high schools may then be considered an innovation means of intervening mobile victimisation is intervened. In this step, the design for the artefact was drawn up.

Development: Depending on the artefact to be developed, this stage converts the tentative design into that artefact. Greater emphasis is placed on the actual design process more than on the construction of this artefact. At this phase, the researcher developed a mobile artefact that high school students could access on their mobile phones.

Evaluation: At this stage, the artefact is evaluated where its use and the results obtained are compared to the initial requirements made in the proposal phase. If any differences between the two are noted, they are explained. Once the tool had been developed, the researcher intended to test and evaluate the tool among high school students. The students would use the artefact and data were be gathered from with regards to the functionalities and performance of the tool. Such an evaluation phase would assert or dismiss the intended use for which it was done, i.e., to monitor and report mobile victimisation.

Conclusion: This marks the end of the research cycle. In this phase, the results of the research were consolidated and written up. The information and knowledge obtained through this process could then be communicated in order to inform the broader field of mobile victimisation.

Within this study, the DSR process by Vaishnavi and Kuechler (2004) informed the steps taken by the researcher in reaching the aims of the study. Therefore, in the subsequent chapters, each iteration of the DSR process by Vaishnavi and Kuechler (2004) will be explained and applied to fit the context of this study.

4.4.2 Research Approach/Cognitive Processes

There are three main research approaches that may be taken up in research: deductive, inductive and abduction approaches. The DSR process involves abduction, deduction and circumscription (please refer to Figure 14 above). In design science, these approaches to research give rise to new knowledge. The abduction process often takes place in the suggestion phase where the researcher envisions a solution to a problem by abductively drawing from existing literature from that problem area (Vaishnavi & Kuechler, 2004). Deduction takes place during the development and evaluation phases where the researcher uses existing literature to create a tentative design. Circumscription is the accumulation of new knowledge from both the development and evaluation phase that is gathered throughout the DSR process. These cognitive processes are shown in this study because theory was used to guide the development of the tool. In going through iterations, the initial application of the theory had to be revised. In doing so, a more suitable tool may be developed for the students for whom it was developed. In addition to this, information gathered from each iteration then contributed to the further development and validation of the theory used in this study.

4.5 Purpose of Research

According to Hevner (2004) and March and Smith (1995), DSR aims to produce prescriptive design knowledge through the development of innovative artefacts that solve problems and knowledge about developing artefacts that may solve similar problems. These are the basic principles of design. Research may be conducted for other purposes such as those identified by Runeson and Höst (2009): exploratory; descriptive; explanatory and; improving. These research purposes serves as a basis upon which the researcher may, with regards to phenomena, seek new insights and generate ideas and hypotheses for new research (Robson 2002); describe a situation; attempt to explain phenomena and; attempt to improve some aspects of phenomena respectively. The research purpose of this study is prescriptive. This is because its aim is to produce design knowledge through the development of a mobile application that helps solve the problem of students not having an outlet to report their victimisation and knowledge about developing artefacts that may solve similar problems. Therefore, this study is prescribing the mobile application as a means by which students may report their victimisation.

4.6 Sampling Strategy

To collect data that are manageable and sustainable, sampling techniques are employed. These techniques reduce the amount of data gathered by the researcher to a sub-group that may be considered for analysis rather than an entire population (Saunders et al., 2009). A population consists of all possible cases from which a sample is taken. The sub-group taken from the population is referred to as the sample. Within the sample are individual cases or elements (Saunders et al., 2009) (please refer to Figure 15 below). This section discusses the sampling strategy employed in the current study.

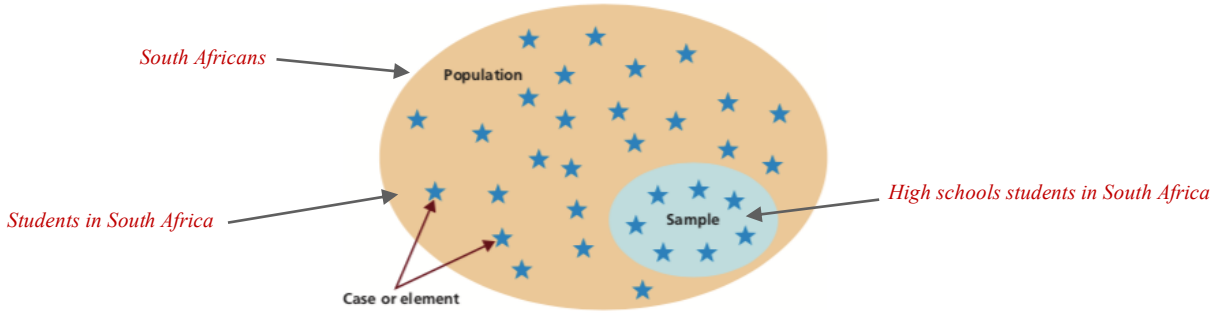


Figure 15: Population, Sample and Participants

4.6.1 Sample

The sampling population for this research comprised all South Africans. Thus, South African students would offer information that would answer the research questions and meet the objectives of this study. It has been reported that 84.2% of South African children access the Internet via their mobile phones (Global Kids Online, 2016). Additionally, there is a high number of students being victimised by mobile bullying. With this being the case, targeting South African students would give results that could be generalised for South African high school students. As has been noted earlier, this study involves an iterative process of design-build-evaluate (the common aspect of DSR), which puts these aspects through an iterative process until the requirements for which the artefact was built, are met (Baskerville et al., 2009). Therefore, the samples that were used in each iteration of this study changed depending on their cultural and socio-economic conditions to accommodate the diversity of the youth in South Africa. In doing so, the researcher preserved key characteristics of the samples in order to maintain consistency within the overall target sample. These key characteristics were that the participants had to be high school students between the

ages of 14 and 18; must own a mobile phone or have access to a mobile phone, and could be of any gender, religion, tribe and ethnicity. This is because according to Fleming and Jacobsen (2010), bullying is common among adolescents. It has also been reported that there are high numbers of adolescents that have been victimised through mobile phones on and off of school premises. Therefore, targeting high school students would provide this study with the relevant information since the students would have experienced bullying or at the very least be aware of the aggression. It would have been ideal to have the students that participate in this study to be students who have been mobile bullied or cyberbullied only. Research, however, shows that it is difficult to identify students who have been bullied. Li (2010) and Mishna, Saini and Solomon (2009) found that students are often reluctant to report cyberbullying because they prefer to sort out these situations on their own and find reporting to be pointless as often the bully is often never apprehended. Subsequently, having the researcher singling out victims of mobile bullying or cyberbullying would not have been achievable, appropriate or reliable as not all cases are reported.

The target sample for this study in the first iteration was high school students in the Western Cape of South Africa and for the second iteration was high school students in Limpopo. The Western Cape has 339 public high schools and 38 private high schools, while Limpopo has 1355 public high schools and 11 private high schools (DBESA, 2018). As such both provinces have less than 2% of it's high students' population attending private schools. In the Western Cape province, high school students between the ages of 14 and 18 from both private and public schools participated in this study. The level of crime in this province is relatively high, and studies show that the use and abuse of mobile phones are escalating among South African youth (Creecy, 2012; Lusinga & Kyobe, 2017; Kyobe et al., 2018). According to Aftab (as cited in Epstein & Kazmierczak, 2006) and Patchin and Hinduja (2006), cyberbullying was more prevalent in affluent suburbs, where students often have more access to the Internet and are, therefore, more technologically advanced. More recently, however, with the high penetration and accessibility of mobile phones to people from varying socio-economic contexts, this is debatable (Kyobe et al., 2018). There are many varying socio-economic contexts in which schools operate in South Africa and there is a need to understand the extent and nature of bullying in all of these contexts (Juan et al., 2018; Kyobe et al., 2018).

However, Akbulut et al. (2010) found that students at public schools were more likely to portray cyberbullying behaviour and be victims of this behaviour. They also found that students at public schools experienced feelings of being upset when they were victims of cyberbullying, whereas students at affluent schools perceived cyberbullying activity as a joke. Oosterwyk (2013) also found the prevalence of mobile bullying to be high in schools located in crime-ridden areas. Schools in these areas are predominantly public. This reinforces the statements made above, of sampling students from different cultural and socio-economic backgrounds as they may have different perceptions and consequently, different responses to mobile bullying. The researcher, therefore, believed that this target sample (of students from public and private schools) would be relevant in acquiring the data required for the present study.

The target sample for this study in the second iteration was high school students in Limpopo. The emphasis in targeting students in Limpopo was to include students from rural areas in the study as the students sampled in the first iteration were students from urban areas. According to Kreutzer (2009), the usage of mobile phones by students in townships is similar to that of students in urban areas. Mobile bullying is, however, not as prevalent in rural areas as it is in urban areas (Burton & Leoschut, 2013). Conversely, Kyobe et al. (2018) state that not enough research on mobile bullying has been conducted in rural areas to conclusively know whether or not this aggression is as prevalent as has been previously reported. In their study, they claim that such high ownership of mobile phones may result in mobile bullying being predominant in rural schools and should be studied. They also insinuate that studies of the generalisability of mobile bullying should account for both rural and urban circumstances. Due to rural communities experiencing relatively different social-economic and cultural conditions compared to urban areas, the study included students from these areas as well. As stated earlier, students in rural schools were used in this study as Limpopo as a province provided such areas in which schools are predominately located in rural areas.

4.6.2 Sampling Technique and Sample Size

Time and resources are often factors that influence sample choice and sample technique. When the topic under investigation is of a sensitive or threatening nature, however, there is also the possibility that participants hide their involvement in that phenomenon and it may be difficult to sample them (Faugier & Sargeant, 1997). According to Lee (1993: 60):

> *"In many situations, there are well-developed strategies for realising the twin aims of representativeness and cost-effectiveness. Neither, however, may be easy to obtain where the topic under investigation is a sensitive one. First, other things being equal, sampling becomes more difficult the more sensitive the topic under investigation, since potential informants will have more incentive to conceal their activities. Second and related to this, the less visible an activity the harder it is to sample.*"

With bullying and the resulting victimisation being a sensitive phenomenon to investigate, especially in a qualitative manner, this was the case when deciding which sampling technique would be appropriate for this study. According to Saunders et al. (2009), there are two sampling techniques: probability (representative) sampling and non-probability (judgemental) sampling. For this research, both techniques were used. Non-probability samples are samples in which the probability of an element being selected from a population is unknown. For non-probability sampling, the sample size is determined by the relationship between the purpose and focus of the research and the sampling selection technique. Subsequently, the sample size is dependent on what would be useful and what would create credible results (Saunders et al., 2009). For probability sampling, on the other hand, the likelihood of any case being selected is equal for all possible cases. Although probability sampling is often associated with survey-based research, the sample size of such sampling could be determined by the confidence one needs to have in one's data – that is, the level of certainty that the characteristics of the data collected will represent the characteristics of the total population (Saunders et al., 2009).

The types of probability and non-probability sampling used in this research were random sampling in identifying the schools, and self-selection sampling in identifying the students that would participate in this study (respectively). Random sampling involves the selection of a sample at random from a sampling frame (Saunders et al., 2009). This method is most suitable if the researcher has an accurate and easily accessible sampling frame that lists the entire population (Saunders et al., 2009). Examples in which this sampling would be appropriate is when researching employees within organisations or members of clubs or societies where adequate lists are often available for use. Such was the case when identifying the schools to participate in this study. The researcher did so by establishing schools within the Western Cape which are private and schools that are public and schools in Limpopo that are rural schools. Schools were then randomly chosen

based on the type of schools they were (public, private or rural), the cultural and socio-economic factors that affect the schools and the students in the schools. Although many more schools were approached, only the schools that were responsive and accepted to participate in the current study were selected. In the Western Cape, five private schools were approached. Two of them accepted the invitation but only one participated. The other school, in fear of students' confidentiality with regards to the exposure of their victimisation then declined. Six public schools were approached but only one agreed to participate in the study. The other five had difficulty inserting sessions with the researcher in their busy year calendars. In Limpopo, six schools were approached. The researcher foresaw a language barrier within five of these schools. One of the six schools, however, assisted the researcher by providing a teacher from the school to help the researcher in communicating with students.

Within the selected schools, the researcher then used self-selection sampling, which occurs when each case identifies their desire to take part in the research. This sampling entails the researcher publicising their need for cases and collecting data from those that respond (Saunders et al., 2009). This was done by approaching high school principals from the schools and students' parents (or guardians) with consent letters that detailed the research, its aims and goals and the process in which the students would take part in the study. Students who returned signed consent forms then participated in this study as they showed interest in doing so.

The sample size was, therefore, dependent on what would produce useful and credible results. What was found in cyberbullying research was that researchers often emphasise that sample sizes need to be significant for research within this field. A large sample offers greater generalisability and more thorough exploration may be possible (Smith et al., 2006; Olweus, 2012). This being the case, there was no limit to the size of the sample. The sample size was merely dependent on obtaining as much data as possible from high school students within both the sample frame and the time frame of the current doctoral programme.

The purpose of a sample is to collect information that represents an entire population. The following section discusses how information with regards to this study was obtained from the selected sample.

4.7 Research instruments, Data Collection and Data Analysis

There are many methods in which data may be collected, such as observation, interviews, documents and questionnaires. Any of these methods may be used for data collection, however, the research instrument used in this study was chosen based on the philosophical stance and research strategy taken in this study. This study adopted semi-structured interviews as well as questionnaires. Given the nature of this research, that of pragmatism as its underpinning, both these instruments were useful in gathering qualitative and quantitative data critical for obtaining information from students about reporting behaviour as well as developing and evaluating the proposed mobile application.

The data for the study were collected using semi-structured interviews in order to maintain consistency of data collected from all participants as well as to give the interviewees the opportunity to elaborate or provide more relevant information if they chose to do so. In an attempt to maintain anonymity that arises when collecting data through interviews, the researcher assigned pseudonyms to all the participants that took part in the study and the schools they attended. In addition to using pseudonyms, the process of self-selection sampling allowed for the researcher to approach high school principals and students' parents (guardians) with consent letters that detailed the research. This meant that only the teachers at the schools knew which students participated in the study. The teachers at the schools were also requested by the researcher not to divulge any identifiable information about the students to the researcher. The precautions taken to maintain anonymity are discussed further in Section 4.9.

The data collected from the interviews were useful in understanding mobile victimisation, reporting behaviour and evaluating the proposed mobile application. (Please see Appendix 1for the interview schedule.) The interviews lasted between 30 and 45 minutes each and were recorded (permission was granted by the research participants). These interviews were later transcribed by the researcher. The transcribed data were then coded and analysed using thematic analysis to identify concepts and themes linked to reporting, intervening mobile victimisation and perceptions

of the proposed mobile application. The semi-structured interviews were, therefore, conducted in the first iteration of the DSR process.

According to Braun and Clarke, (2006: 79), "thematic analysis is a method for searching for, identifying, recording, analysing and reporting patterns (themes) within data.". It is often used in analysing text and therefore seemed appropriate for analysing the data collected. The six phases of thematic analysis provided by Braun and Clarke (2006) were used to discover the themes to be discussed. This involved an iterative process through which the researcher familiarised herself with the data through transcription, reading and re-reading the data and making notes of initial ideas, generating initial codes by developing "labels" or codes to identify important features in the data set, examining codes to identify broader patterns of meaning (themes) that were in line with the proposed integrated framework, and evaluating the usefulness of the proposed mobile application, then reviewing identified themes (checking the themes against the coded extracts, data set and the research objectives). The thematic analysis done for this study was conducted on ATLAS.ti, a computer program used mostly, but not exclusively, in qualitative research or qualitative data analysis (refer to Figure 16 below). The software provided a means by which Braun and Clarke's (2006) steps of conducting thematic analysis may be conducted.

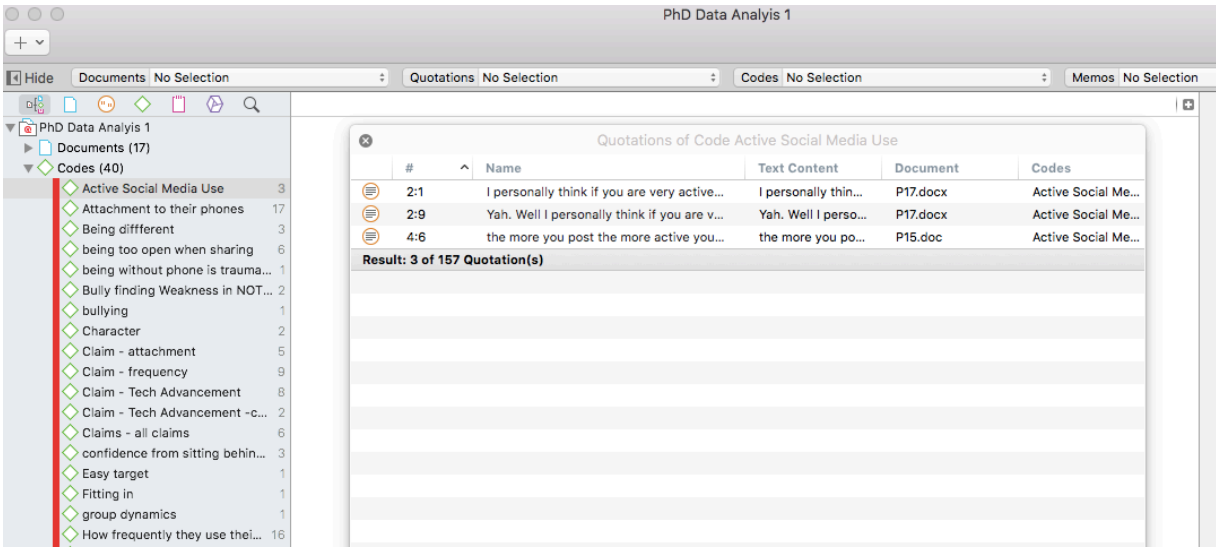


Figure 16: Screenshot of use of Atlas.ti software for qualitative data analysis

Administering a questionnaire is a data collection technique in which participants in a sample answer predetermined questions (Saunders et al., 2009). The data collected from these questionnaires are then standardised for easy comparisons. The questionnaire used in this study had both open-ended and closed-ended questions. Open-ended questions give respondents the opportunity to answer questions in their own way, therefore evoking spontaneous responses from individuals and avoiding the bias that may result from a researcher suggesting certain responses from individuals (Reja, Manfreda, Hlebec & Vehovar, 2003; Williams, 2003). Closed-ended questions, on the other hand, remove that liberty and provide answers from which respondents choose an appropriate response (Reja et al., 2003; Williams, 2003). In this study, the questionnaire was used mainly in evaluating the proposed mobile application and therefore administered in the second iteration of the DSR process. The open-ended questions offered a means to evoke spontaneous responses from individuals and to avoid the bias that may result from the researcher suggesting certain responses from individuals with regards to the proposed mobile application (Reja et al., 2003; Williams, 2003). One of the major disadvantage of these questions is that they take longer to complete than closed-ended questions, especially for less articulate respondents (Williams, 2003). To overcome this, the questionnaire had a section with some closed-ended questions to ensure that, if respondents' failed to answer the open-ended questions, at least data could be captured with regards to the respondents views of the proposed mobile application. Closed questions are quick to answer and require less effort in being coded for analysis as the responses would already be scaled. These questions may be used in capturing the opinions of respondents and must not be confused with scales, "which are a coherent set of questions or items that are regarded as indicators of a construct or concept" (Corbetta, as cited by Saunders et al., 2009: 378). The closed questions used in this study were rating questions, which are often asked in Likert-style rating scales in which the respondent is asked how strongly she or he agrees or disagrees with a statement or series of statements, usually on a four-, five-, six- or seven-point rating scale (Saunders et al., 2009). (Please see Appendix 2 for the interview schedule.)

The data collected from open-ended questions may be analysed in two ways. The first approach is to quote the responses from the respondents verbatim in the report (Williams, 2003). The second approach is to quantify the responses by examining and coding them in the same manner as closed-ended questions (Williams, 2003). This process of coding, however, is determine by the themes

that emerge for the data. The resulting quantitative data may then be analysed statistically (Williams, 2003). The choice of approach is dependent on the nature of the question and the answers to that question. To analyse data statistically, computer programs such as Microsoft Excel, SPSS or Statistica may be used as these are powerful statistical packages that are useful, flexible and easy to use for statistical analysis (Williams, 2003). The data collected from the questionnaires were, therefore, quoted verbatim and analysed using Microsoft Excel as it was readily available to the researcher.

4.8 Time Horizon

The time horizon indicates the amount of time in which the phenomenon under investigation will be studied and may either be longitudinal or cross-sectional. A cross-sectional time horizon pertains to the collection of data over a shorter period (for example, months) (Saunders et al., 2009). Given the nature of this study, a cross-sectional time horizon was deemed more appropriate than a longitudinal time horizon. A cross-sectional study would capture mobile victimisation and the reporting of it as it is occurring at present. This would give more insight into the phenomenon as it is currently happening in South African high schools.

4.9 Ethical Concerns

Within a research design, ethical considerations are to be made. Although built on trust between the researcher and participants, a research study must take explicit measures to avoid problems (Saunders et al., 2009; Runeson et al., 2009). These problems may be prevented by identifying, from the beginning, how information is handled and who handles the given information. This may be identified with the use of informed consent, review board approval, confidentiality and feedback.

Review board approval: It is recommended that research proposals be reviewed, accepted and approved with regards to ethical issues by a review board or a similar function at university level (Saunders et al., 2009; Runeson et al., 2009). After submitting the research proposal to the Department of Information Systems for review, the researcher had to present the proposal in front

of a panel of professors in the department. The professors then suggested corrections and brought up ethical concerns that the researcher had to address in the final proposal submitted. The University of Cape Town Ethics Committee then conducted a review of the proposal for this study. The Ethics form submitted to the committee is shown in Appendix 6. The review process took approximately three months and only after permission was obtained from the University of Cape Town Ethics Committee did this research proceed to seek permission from the relevant bodies that govern high school students.

Informed consent: Participants that participate in a particular study should explicitly agree to do so (Runeson et al., 2009). Initially, in the present study, consent was requested from the Western Cape Department of Education, the Limpopo Department of Education, the principals of the high schools that participated, as well as the parents and students of the respective schools. This was because the Limpopo and Western Cape Departments of Education and the principals of the schools needed to grant the researcher permission to approach high schools students within Limpopo and the Western Cape of South Africa. Consent letters were compiled by the researcher for the Departments of Education and the principals of the schools to sign. These consent letters asked the Departments of Education and the principals for permission to conduct the research within high schools (please see Appendix 3 and Appendix 4). In addition, it was important that the students understood what they were participating in. However, it was noted throughout the data collection process that the principals of the participating schools did not want the students of their schools to sign the questionnaires. They feared that the students' identities could somehow be traced back. Students were, therefore, not required to provide any personal information, including signatures. Instead, the parents or guardians of the students were asked to consent to their children participating in this study. This was also necessary because most of the students were minors (please see Appendix 5). Only after the Departments of Education, the school principals and the parents gave the researcher permission was the researcher able to conduct the data collection process.

Anonymity and Confidentiality: Literature often uses the terms "anonymity" and "confidentiality" interchangeably. This may be because "anonymity" in the research context is usually defined very broadly. According to Saunders, Kitzinger and Kitzinger (2015: 617), "confidentiality is a generic

term that refers to all information that is kept hidden from everyone except the primary research team". Anonymity, on the other hand, is one form of confidentiality in which participants' identities are kept secret. Confidentiality, however, also includes keeping what participants say private and is possible when researchers decide not to share some of the data they collected. An idealised view of anonymity is that a person will never be traceable from the data presented about them (Saunders et al., 2015: 617).

In an attempt to tackle the challenge of anonymity that arises when collecting data through interviews, the researcher considered assigning pseudonyms to all the participants that took part in the study and the schools they attended. Assigning pseudonyms is the most common form of anonymisation that is discussed in the literature and therefore was a suitable means by which to anonymise (Saunders et al., 2013). The assignment of the students' pseudonyms was the letter P, followed by a number. So a student was referred to as student P1, P2 and so on. The schools' pseudonyms followed the same principle outlined above and replaced the names of the schools with letters (for example, 'School A', 'School B').

In addition to using pseudonyms, the researcher used self-selection sampling, which occurs when each case identifies their desire to take part in the research. This type of sampling entails the researcher publicising their need for participants for their study and collecting data from those that respond (Saunders et al., 2009). This was done by approaching high school principals from the schools and students' parents (or guardians) with consent letters that detailed the research, its aims and goals and the process in which the students would take part in the study. Students who returned signed consent forms then participated in this study as they showed interest in taking part. This meant that only the teachers at the schools knew the students that participated in the study since they were the ones who would introduce the researcher to the students. The teachers at the schools also did not divulge any identifiable information about the students to the researcher.

Furthermore, in the continued effort to ensure anonymity by the researcher, no personal information of the participants was collected at any time during the interviews. The students were also made aware of the nature of anonymity for the study so that they do not divulge any personal or identifiable information about themselves during the interview process. Due to these precautions

taken to assure anonymity, there are minimal chances that the researcher can trace some of the interview responses to the participants. This, however, (as stated by Saunders et al., 2015) is not uncommon when conducting qualitative research of this nature, however, it must be and was managed by the researcher in a way that the children will not be harmed.

From a design and development perspective, qualitative data gathered through interviews and observations can be used to inform mobile app development. It is argued that although these qualitative data collection techniques have small samples, it is feasible to "scale up" the input gathered from the participants in order to help designers gain insight into large-scale deployments (Rooksby, 2013). Using data collection methods such as interview and observation is often a good practice in designing because by taking the time to communicate with people and observe them using technology, designers can get insight into what they want, need and do. Interviews and observations enable relatively open exploration, they leave room for surprise: not everyone (and sometimes not anyone) will use or experience technologies as the designers imagine (Rooksby, 2013). Since for the first iteration, this study was limited to Cape Town and there was a need to gather much information from these respondents that would inform the design better, interviews were conducted.

Feedback: To build long-term trust with participants and to validate the research, it is important to give feedback (Runeson et al., 2009). Therefore, the results of this study will be reported back to the participants, the schools as well as the departments of education in the provinces that were involved in this study as it is important to inform them about the findings on mobile victimisation and the reporting of the aggression. This will create awareness of influential factors regarding mobile bullying, mobile victimisation and the reporting of these two phenomena. It will also build relationships from participating high schools for further research.

CHAPTER 5 IMPLEMENTING DESIGN SCIENCE RESEARCH

"I do not think there is any thrill that can go through the human heart like that felt by the inventor as he sees some creation of the brain unfolding to success."
(Nikola Tesla, 1896, Inventor Of Alternating Current)

The previous chapter discussed the research design and presented the strategy for the study. In particular, ontological, epistemological, and methodological standpoints were presented. This was followed by an overview of the study sample, the data collection procedures, the measurement instruments, and data analysis techniques used. In this chapter, the researcher briefly details the design science research (DSR) process used in this study in developing and evaluating a digital tool for reporting mobile victimisation among South African high school students. (Please refer to Figure 17 below for the overview of this chapter.)

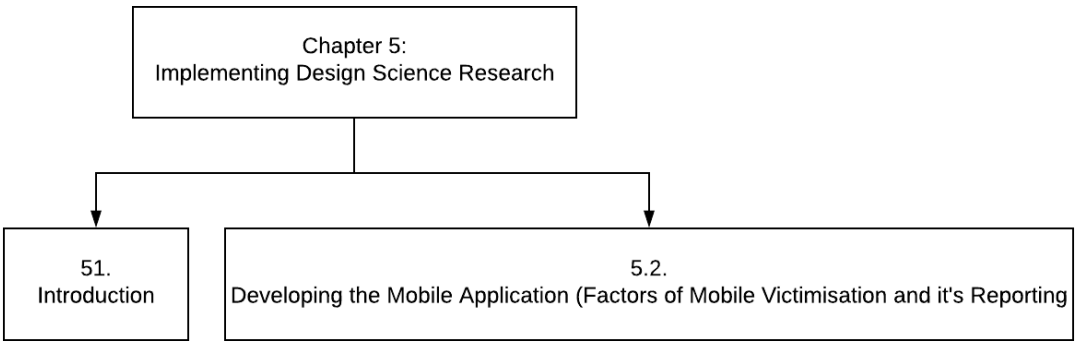


Figure 17: Implementing Design Science Overview

5.1 Introduction

As mentioned earlier, this study adopted Design Science Research (DSR) as the research strategy because it enables Information Systems (IS) researchers to generate new knowledge through the development of innovative artefacts and the evaluation of these artefacts (Vaishnavi & Kuechler, 2004; Baskerville et al., 2009). This fits well with the aims of the present study, i.e., essentially to develop a digital-based tool that intervenes mobile victimisation by identifying and reporting mobile victimisation. In addition, the study also aims to build on the understanding of mobile victimisation itself.

Figure 18 below shows the design science research (DSR) process model proposed by Vaishnavi and Kuechler (2004). This DSR process model provides five steps in conducting design science research, which includes awareness of the problem, suggestion, development, evaluation and conclusion (Vaishnavi & Kuechler, 2004). As can be seen in this figure, this process is iterative. Therefore, the development of this mobile application was iterative.

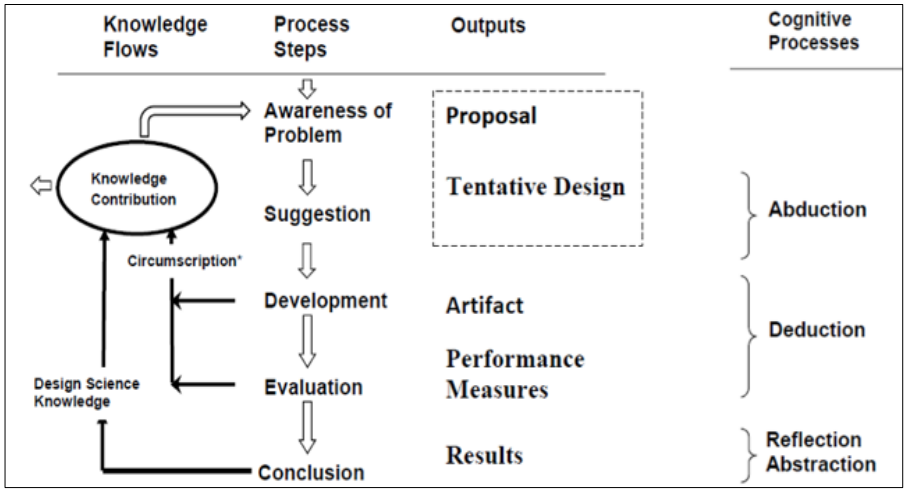


Figure 18: Design Science Research Process Model (Vaishnavi & Kuechler, 2004)

Applying this DSR process within a pragmatic paradigm, this study designed, implemented and evaluated a mobile-based intervention for the reporting of mobile victimisation faced by high school students in South Africa. The first iteration of the study analysed the problem through a literature review. Through the literature review, an integrative framework for understanding the under-reporting of mobile victimisation by students was developed to inform the development of the mobile-based intervention. A prototype of a mobile app named the Mobile Victimisation Monitoring and Reporting (MVMR) application was then developed in the first iteration. The evaluation of the MVMR app in the first iteration of development focused on gathering user requirements and on gaining insight from students about what they expect with regards to the mobile app. During the evaluation, the researcher focused more on the interface of the MVMR app and the details the students hoped to include in a report collected by the application. This was because the students interacted only with the front-end of the MVMR app. Their input was therefore vital in the development and evaluation of the MVMR app. The second iteration of the

DSR process then focused on implementing the changes suggested by the students in the first iteration as well as digitising aspects of the Mobile Victimisation Typology (MVT), i.e., the frequency of use, attachment to a mobile phone and the mobile phone advancement. The third and final iteration of the DSR process focused on digitising the entire integrative framework for the back-end of the MVMR app.

5.2 Developing the Mobile Application (Factors of Mobile Victimisation and it's Reporting)

Many applications exist for tackling bullying and cyberbullying, however, many do not seem to be developed based on the fundamental principles of mobile victimisation and the reporting behaviour. In addition, as Notar et al. (2011) suggest, the available interventions for cyberbullying cure the symptoms and not the issue itself. Kcom (2016) published a report on some of the best mobile applications available for cyberbullying intervention (please refer to Table 7 below).

Although Table 7 shows a few mobile applications as options for the youth, many, if not all of these apps are not available in South Africa and the rest of Africa. In addition to this, some of the mobile apps are available for iOS and not Android operating systems, which are the most common operating systems for phones in South Africa and particularly among the youth. Table 7 also shows that many applications are not designed specifically for reporting mobile victimisation and seem to be for different forms of bullying and not mobile bullying in particular. Furthermore, there seems to be a lack of consistency/synergy of the apps presented in Table 7 with any theoretical principles of reporting behaviour. This suggests that there is a sense of these applications being blanketed interventions.

Table 7: Top 10 anti-bullying apps (Adapted from Kcom, 2016)

App Name	Operating System	Paid/Free	Functions	Shortcomings
CyberBully Hotline	Android and Apple	Free	Provides schools with their own unique number for students and parents to use anonymously for sending text or voice messages to the school administration team when bullying, violence or harassment occurs. Discreet support can then be offered and the matter dealt with directly.	• Not available in South Africa
Block'em	Android	Free	Allows victims of digital abuse to block unwanted calls and messages in an easy-to-use and simple-to-manage way.	• Does not allow for the reporting of bullying events.
Stand Up To Bullying	Apple	*$9.99 (£7.71)*	Immerses children into an interactive video that teaches them how to identify various forms of bullying and what to do in unpleasant situations.	• Available on iOS and is paid for. • Does not allow for the reporting of bullying events.
tootoot	Android and Apple	*Dependent on number of students*	Allows students across all educational institutes to report concerns about bullying, racism, extremism, sexism, ableism and homophobia to their place of learning.	• Not available in South Africa
#BeStrong Anti-Bullying Keyboard by Vodafone	Apple	*Free*	Is a series of powerful emojis and stickers (to be used across social media) selected by young people who felt that the symbols reflected compassion and solidarity.	• Available on iOS • Developed by Vodafone for their network subscribers and so limits the reach. • Does not allow for the reporting of bullying events.
Family GPS Locator	Android	*Free*	Allows grownups to check the location of their child, as well as find out where they have been. It also notifies you and your child when their battery needs charging, so they are never left without the ability to contact someone in an emergency.	• Does not allow for the reporting of bullying events.
Find My Kids – Footprints	Apple	*Free*	Similar to Family Locator. Find My Kids allows you to track your child's movement and set up geofences, which notifies parents when crossed.	• Available on iOS • Does not allow for the reporting of bullying events.
Zipit	Android and Apple	*Free but charges may apply when texting*	Developed by Childline, the app offers advice and appropriate comebacks to the often-normalised sexting	• Focuses primarily on sexting. • Charges when students send texts to the service.
Choose Your Path	Android	*Free*	This educational game allows players to make a decision on how to react to bullying situations, thereby teaching children how to best deal with bullies.	• Does not allow for the reporting of bullying events.
Sit With Us	Apple	*Free*	Some children face eating lunch on their own every day, so this digital network allows pupils to set up inclusive lunches with their classmates.	• Available on iOS

Given the limitations of existing apps, an app that would strike a balance between the principles of mobile victimisation as well as the reporting behaviour of high school students was developed because the app had to conform to all these principles. At first, using an app development company that would develop and manage the app seemed suitable, but the researcher wanted to be able to manage the app so as to be aware of the intricacies of the data collected from the intervention.

This study is grounded in understanding mobile victimisation and the factors that influence its reporting by high school students. The development of a mobile application is, therefore, informed by the theoretical underpinnings of both these phenomena. In developing this artefact, the researcher had to ensure that the app catered well to the students' desire or need to report their victimisation, their need for their reports to be heard, and that the students themselves could evaluate its relevance and usefulness. In the same manner that Chinnery (2006) claims that technologies in language learning are just instructional tools and not instructors, the same may be said with technologies in behavioural interventions. This means that the people for whom the technological interventions are developed are the facilitators of these technologies and, therefore, the technologies offered by technology are used to promote the interventions.

The reporting principles that the app is based on are the factors captured in the proposed integrative model – the economic, psychological, socio-cultural and technological factors that influence students' reporting behaviour. At each level of the integrative model, there are theories that help explain the victim's reporting behaviours. As shown in Figure 19, the micro-, meso- and macro-levels of the integrative model are represented by the economic, psychological and sociological models of reporting respectively.

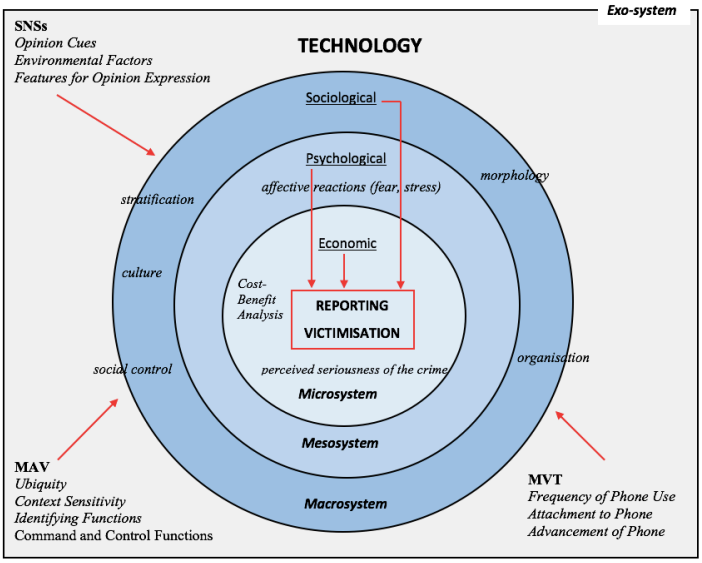


Figure 19: Integrative Framework for Understanding Reporting Behaviour of Mobile Victims

Therefore, the micro-system of reporting mobile victimisation represents the cost-benefit analyses of reporting performed by mobile victims and the perceived seriousness of mobile bullying of the victims which influence reporting of mobile victimisation. The meso-system represents the affective reactions that may influence the reporting of mobile victimisation. The macro-system represents the five social structural variables that predict variations in the behaviour of law as identified by Black (1976) – stratification, morphology, culture, organisation and social control – and influence reporting behaviour. Also presented in Figure 19 are the features of technology that may influence mobile victimisation reporting. These technological influences represent the exo-system since mobile victimisation occurs in a technological setting which may influence victimisation without active influence from a mobile user. These features include MAV, which are the attributes of the Mobile Added Value theory (Pousttchi et al., 2003); SNSs, which are the attributes of social networking sites (Neubaum, 2016), and MVT, which are the dimensions of the Mobile Victimisation Typology (Lusinga & Kyobe, 2017). In the first iteration of this study, it was proven that these factors influence mobile victimisation reporting through interviews with students. Therefore, these factors had to be taken into consideration when developing the mobile application. Data on the factors were thus to be collected in order to inform the necessary means by which to approach a student who reports their victimisation. Table 8 below gives the description of how these factors were digitised in the proposed tool.

Table 8: Incorporating Mobile Bullying reporting principles with the MVMR

Ecological System	Data collected to capture the ecological system	Reasons for data captured
Micro-system	The reports students submit	The researcher believes that at the moment when a student submits a report, they would have weighted reporting as being more beneficial to them than not reporting their victimisation.
Meso-system	Texts from the reports submitted by students – Run through an API to detect the emotions	According to the Oxford Dictionary, 'Emotion' is "a strong feeling deriving from one's circumstances, mood, or relationships with others" (Sailunaz, Dhaliwal, Rokne & Alhajj, 2018). Emotions are complex, nuanced, vary in intensity and tend to play a critical role in how we see and make sense of the world, therefore, influencing how people make everyday decisions (Mohammad & Kiritchenko, 2018). Text does not only communicate informative contents, but also attitudinal information, including emotional states (Alm, Roth & Sproat, 2005). Emotion detection focuses on finding out how a person feels about some event, person or thing based on some predefined emotion models according to psychological emotion theories. Emotion detection from text has its application in almost every aspect of our daily life, for example making efficient e-learning systems based on student's emotion, improving human-computer interactions, monitoring mental health of people, modifying or improving business strategies according to the emotion of customers, detecting public emotion on any national, international or political event, detecting potential criminals or terrorists from analysing the emotions of people after a terrorist attack or crime, improving the performances of chatbots and other automatic feedback systems, and so on (Sailunaz et al., 2018). Due to the necessity of detecting the correct emotion from a piece of text in various socio-economical areas, researchers have developed automatic emotion detection systems using different approaches (Sailunaz et al., 2018). Emotions (affectual reactions) can be detected in text. Therefore, reports submitted by students may be tested to reveal the emotional state of the student at the time of reporting.
Macro-system	Geographic location	*The geographic location of students may be used to infer the socio-cultural information of the students.* This is because maps are known to determine the socio-economic structures and demographic data in an area (Esri, 2010). *Maps show physical and cultural features* and so act as a mirror of culture and knowledge (Tyner, 1984). Maps document and display human values attached to the physical landscape so that these can be taken into account (Novaczek, MacFadyen, Bardati & MacEachern, 2011). Maps are one of the most essential sources of gaining intimate knowledge of the world graphic view of sizes, shapes and spatial relationships (Tyner, 1984). Geographic Information Systems (GIS) may then be used to visualise and

		examine these social and cultural values that are attached to geographic space (Novaczek et al., 2011). Maps that show both social and cultural knowledge are tools that can assist local governments in planning and prioritising effective adaptation strategies (Novaczek et al., 2011). By understanding geography and people's relationship to location, we can make informed decisions with regards to that location (Esri, 2010). As such maps of urban areas often help cities target policies that are most efficient and effective for their communities, particularly for those who are less fortunate (Esri, 2010). Therefore, knowing the location of the victimisation and of where the victim is reporting from may help the receiver of the report to determine the resources a student may have for intervention.
Exo-system	**MVT** *For frequency of use*: the application begins to measure instances of the mobile phone in use and totals the time spent by a student using their phone. *For mobile phone advancement*: The application detects the advancement of the students' mobile phones by identifying the brand and model of the mobile phone as well as the version of the Android operating system. It is also able to detect the applications on the mobile phone that may be used to commit mobile bullying, e.g. Facebook, Twitter, WhatsApp etc.	Depending on the advancement of the phone and the social networking applications installed on the mobile phone, one may determine the extent of ubiquity, context-sensitivity, identifying functions and command and control functions (as illustrated by the Mobile Added Value (MAV) theory by Pousttchi, Weizmann and Turowski (2003)) of the mobile phone. One may also determine the opinion cues, environmental factors and the features for opinion expression a student is exposed to through knowing the social networks they frequent.

The following chapters of this thesis discuss, in more detail, the implementation of the DSR process model proposed by Vaishnavi and Kuechler (2004) in developing the proposed MVMR app. In developing the MVMR app, this study kept to the following design themes form Bowler, Mattern and Knobel (2014) that address students' recommendations for designing affordances on social media sites or mobile apps: *design for reflection, design for consequence, design for empathy, design for personal empowerment, design for fear, design for attention, and design for control and suppression*. These themes are described and discussed in the conclusion of the third and final iteration (Section 8.4), because these themes are fully encapsulated or seen at the end of the three iterations.

The next chapter details the five steps of the process in the first iteration of developing the proposed mobile application. While a prototype of the proposed mobile application had been developed, the main goal of this iteration was to gather insights from students on what they expect from a digital tool they would use for reporting their mobile victimisation. For this study, three iterations of the design science research process were conducted. The subsequent chapters after Chapter 6 present the second iteration (Chapter 7) and the third iteration (Chapter 8) of the DSR process.

CHAPTER 6 IMPLEMENTING DESIGN SCIENCE RESEARCH - FIRST ITERATION

This chapter discusses the first iteration of the implementation of the Design Science Research (DSR) process in developing the Mobile Victimisation Monitoring and Report (MVMR) application. (Please refer Figure 20 below for the chapter overview.) This chapter will describe how the steps of the DSR process by Vaishnavi and Kuechler (2004) were adopted for this study. In doing so, all the stages of the DSR process are discussed.

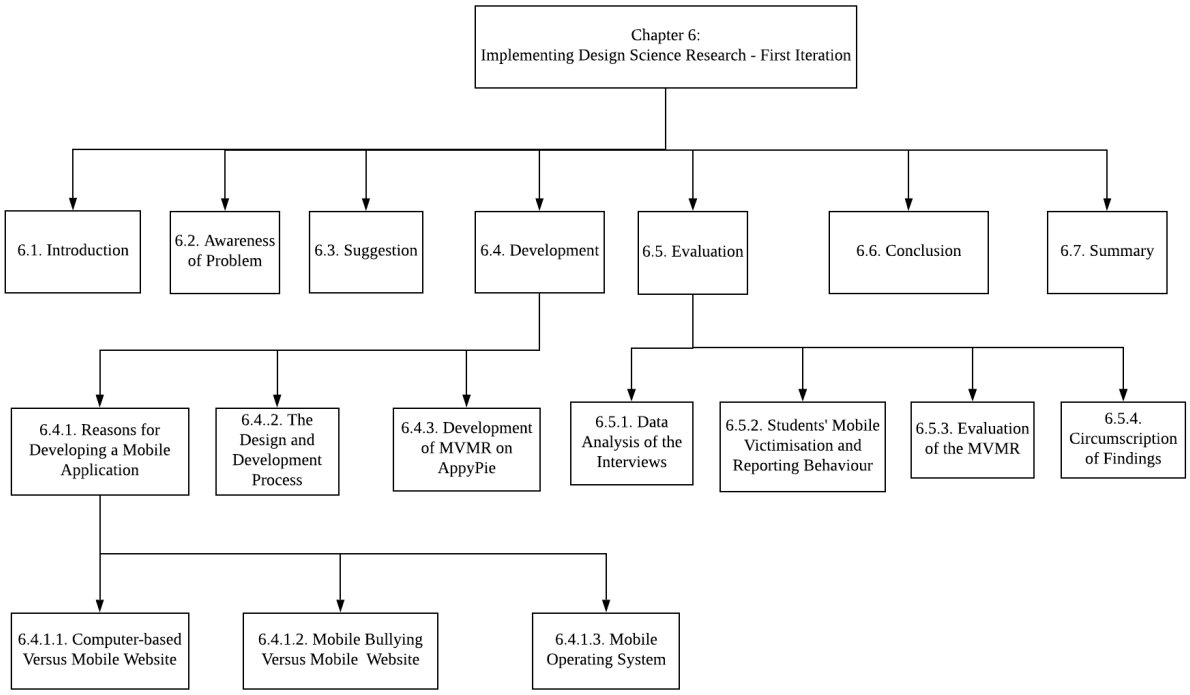


Figure 20: Overview of Implementing Design Science Research – First Iteration

6.1 Introduction

This chapter adapts the DSR process model by Vaishnavi and Kuechler (2004). Figure 21 below presents a diagrammatic overview of the adaptation of Vaishnavi and Kuechler's (2004) Design Science research process model and how it was applied for the first iteration of the development of the proposed application.

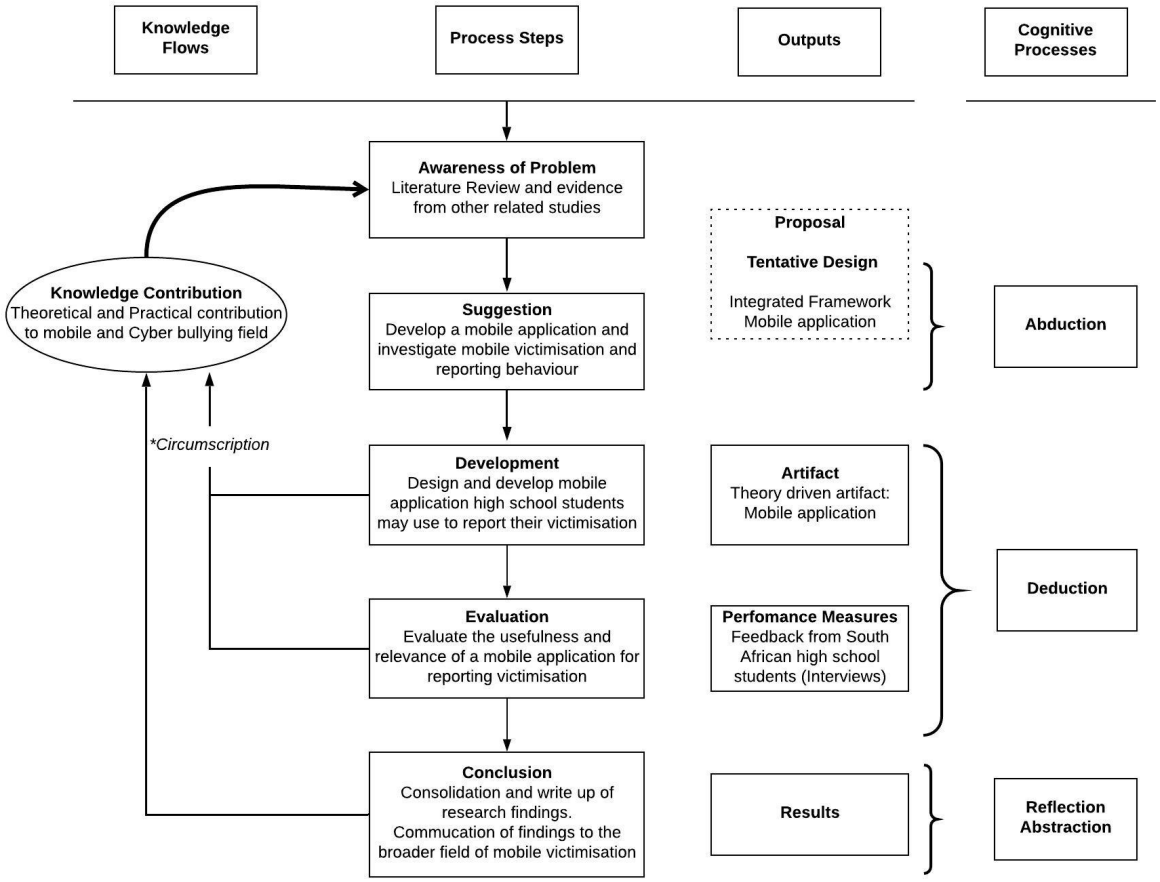


Figure 21: Implementation of Design Science Research Process Model (First Iteration)

6.2 Awareness of problem

This step involves bringing into focus an interesting issue within research or practice that needs to be addressed. This awareness may be informed by the industry or the discipline itself. At this step, the proposal for the research is produced (Vaishnavi & Kuechler, 2004).

At this step, the researcher conducted a literature review of mobile victimisation (Lipton, 2014; Smith et al., 2006) and the interventions that exist (Notar et al., 2013) in general and in the South African context. Through the literature review, it was noted by Notar et al. (2013), that of those interventions that exist, none meet all the requirements to counteract cyber victimisation and subsequently mobile victimisation. Notar et al. (2013) suggest that these interventions, individually, only cure "a symptom" of the problem and not the problem itself. In addition, while students may be experiencing victimisation, the suitability of these solutions to reduce cyberbullying may not fit the schools, their policies and structures. Creecy (2012)

adds that in South Africa, the interventions made by schools and the national and provinicial Departments of Education are also lacking. This may be due to South Africa's incapacity (for instance, limited institutional capacity, financial resources and other pressing concerns the nation may be facing) to address these problems, as is the case in many developing countries (Gasser et al., 2010).

Other researchers (Lieberman et al., 2011; Shand et al., 2013; Guille et al., 2015), suggest, however, that (i) mobile phones and the use of the apps available on them would allow people the opportunity to use them as aids in overcoming "help-seeking barriers", (ii) the key in intervening is to offer advice that is "personalised, specific and actionable" (Cruz-Cunha, 2014), and (iii) using theory as a basis to inform the development of digital interventions (DIs) could be beneficial in intervening in the occurrence of negative phenomena and the impacts thereof. DIs such as mobile applications offer an opportunity to address burdens in a potentially cost-effective way through the introduction and establishment of automated and remote support for self-management (Band, Bradbury, Morton, May, Michie et al., 2017; Bradbury, Watts, Arden-Close, Yardley & Lewith, 2014). Shand et al. (2013) found that as the use of mobile phones and of the apps available on them increases, there is ample opportunity to use them as aids in overcoming "help-seeking barriers" such as the aforementioned ones. Mobile Apps have been able to assist people in several health-related issues (Shand et al., 2013). These interventions also give users the benefits of flexible and convenient access and personalised advice and feedback (Band et al., 2017). Personalised, specific and actionable advice may be achieved through a similar process as a "person-based approach" to intervention development, whose main aim is to "establish the development of behaviour change interventions in a profound understanding of the perspective and psychosocial context of the people who will use them" (Yardley, Morrison, Bradbury & Muller, 2015:2). The person-based approach allows developers to gain vital insights into how different people experience and implement interventions, and helps developers identify the key characteristics that will make an intervention more meaningful, attractive, useful and easy to implement to those who engage with it (Yardley, Morrison, Bradbury & Muller, 2015; Band et al., 2017). This approach also integrates theory since theory-based approaches have provided valuable frameworks and models for anticipating and describing the likely influences on behaviour which can then be mapped onto appropriate behaviour change techniques (Yardley, Morrison, Bradbury & Muller, 2015). This makes it particularly suitable to combine person- and theory-based

approaches in developing appropriate user-centred design that is intended specifically for development of complex behavioural interventions (Band et al., 2017).

It was, therefore, suggested that a mobile-based application should be developed. The mobile application would act as a means to overcome "help-seeking barriers" and give students a platform to report their mobile victimisation. The mobile application would also collect data that could help parents and teachers with the intervention of mobile bullying by using the data collected by the application to enact "personalised, specific and actionable" advice. Bradbury et al. (2014) argue that besides DIs being extremely cost-effective, they complement practitioner-delivered interventions, increase access to interventions and are able to reach large numbers of people. The proposed mobile application would, therefore, consider both the person- and theory-based perspectives of the students who report their mobile victimisation, so that the parents and teachers that receive these reports may have understanding of the perspective and psychosocial context of the students. Thus, they may tailor the manner in which they approach victimised students in personalised, specific and actionable ways. This way, the data collected from the mobile application would complement interventions in place at schools or at homes.

6.3 Suggestion

This is a creative step in the process where solutions to the problem are proposed in the form of a tentative design. The tentative design offers new, creative ways of solving the problem (Vaishnavi & Kuechler, 2004).

Literature informed what could be done to understand and perhaps intervene mobile victimisation, i.e., to develop a mobile app students may use for reporting their mobile victimisation. As has been mentioned in Section 2.8 above, theory as a basis to inform the development of digital interventions could be beneficial in intervening in the occurrence of negative phenomena and the impacts thereof (Shand et al., 2013; Guille et al. 2015). Theory explains and identifies the behavioural traits exhibited by individuals under investigation, thereby providing a means to understand them. Therefore, for this study, using the integrative framework presented in Chapter 3 to inform the development of a mobile-based application that enables students to monitor and report mobile victimisation was appropriate. This is because the framework suggests that the economic, psychological, cultural-sociological and

technological factors of students determine their reporting behaviours at the individual level. Understanding and capturing these behavioural aspects of the students, if and when they report their victimisation, could, therefore, assist the adult figures to whom they report to tailor their approaches in intervening the mobile bullying in a more personalised manner. The use of the integrative framework in informing the development of digital tools that address mobile victimisation of high school students may then be considered an innovative means by which mobile victimisation is understood and intervened. Including the insights of students in the development process further improves the necessity and viability of the proposed digital tool. This is in line with Peffers, Tuunanen, Rothenberger and Chatterjee (2007: 55) who state that "conceptually, a design research artefact can be any designed object in which a research contribution is embedded in the design. This activity includes determining the artefact's desired functionality and its architecture and then creating the actual artefact". The proposed artefact is embedded in research and includes the desired functionalities from the students who would use it.

In this step of the DSR process, the design for the artefact, in the form of a mobile application, was conceptualised and was named the Mobile Victimisation Monitoring and Reporting Application (MVMR app). This step involved the process of drawing up ideas on how to: (1) automate the integrative framework in such a way that it might inform the researcher on the mobile victimisation reporting behaviour of the student, and (2) provide a means by which students may report their mobile victimisation and provide information on the victimisation. For the former, the most suitable way at the time seemed to be to use a survey that might capture the dimensions of the MVT. The use of a survey was a starting point to collect students' demographic information and data on their mobile victimisation behaviour. One of the main reasons why the survey was used as a starting point is that in digital health, unlike conventional care, there is the affordance of administering questionnaires systematically. Health-related data may thus be collected remotely and directly from the patient while they are away from the conventional healthcare facilities or researchers. Therefore, one of the main non-functional requirements of digital surveys as a solution is the reliability of the data collected. Especially when designing self-management modules, digital health system designers have to ensure that all measures have been employed to guarantee reliable data collection (Triantafyllidis, Velardo, Salvi, Shah et al., 2015; Velardo et. al., 2017).

This survey is discussed below in Section 6.4.3. Only in the iterations will these attributes be collected digitally. This is discussed further in the second and third iterations. *The primary focus of this first iteration* was therefore to determine the requirements of the students for a mobile application they would be interested in using for reporting their mobile victimisation. This was in keeping with a person-based approach which allows the researcher to gain information on what will make the proposed mobile application more meaningful, attractive, useful and easy to implement to those who engage with it (Yardley, Morrison, Bradbury & Muller, 2015; Band et al., 2017). This means that this process also included designing a form students may use for reporting their mobile victimisation and collect enough information and/or evidence of the victimisation.

6.4 Development

Depending on the artefact to be developed, this stage converts the tentative design into that artefact. Greater emphasis is made on the ***actual design process*** *more than the construction of this artefact (Vaishnavi & Kuechler, 2004).*

6.4.1 Reasons for developing a mobile application

6.4.1.1 Computer-based Versus Mobile-based Solution

In developing a digital means by which students may report their victimisation, it had to be taken into consideration by which digital means this tool should be developed, i.e., computer- or mobile-based. The reason the researcher decided on a mobile-based artefact is that a study by the Department of Basic Education of South Africa (DBESA) revealed that 90% of schools at the time of the study had no computers (DBESA, 2008). BusinessTech (2018) also reported that structural problems still faced by South African schools lead to impediments to access to computers or the Internet, a problem that still places many students at a distinct disadvantage when compared to their peers. President Ramaphosa of South Africa, however, announced in his 2019 State Of the Nation Address that "Over the next six years, we will provide every school child in South Africa with digital workbooks and textbooks on a tablet device. We will start with those schools that have been historically most disadvantaged and are located in the poorest communities, including multigrade, multiphase, farm and rural schools … Several new technology subjects and specialisations will be introduced, including technical mathematics and technical sciences, maritime sciences, aviation studies, mining sciences, and aquaponics.

To expand participation in the technical streams, several ordinary public schools will be transformed into technical high schools." (South African Government, 2019: 1). Although this effort may ensure that students are introduced to computers at earlier stages of their education and lives, it may still take, as stated, six years. Before these endeavours are enacted, it could mean that many youths would only encounter a computer for the first time after high school, in the workplace or at tertiary institutions (Mohapi, 2017). Most of the students at these schools do not have access to computers in their homes or at schools. This lack of computers in high schools for even the subjects offered by the DBE (i.e., Computer Applications Technology (CAT) and Information Technology (IT)) results in a situation where many youths are not computer literate (Mohapi, 2017). More students have, however, been found to have access to the Internet at home; a possible reason for this can be that students use their cell phones or smartphones to gain access to the Internet (Schlebusch, 2018). In her study, Schlebusch (2018), found that 85.7% of undergraduate students showed moderate computer anxiousness and 13.9% of the students showed a high level of computer anxiety. She argues that this may be due to 74.6% of students who attended township schools, not having a computer at home. In addition, she attributes the moderate anxiousness to the background of students, with the majority of students sampled in her study coming from townships or rural schools.

Another reason why a mobile digital artefact was more suitable than a desktop digital artefact was that the growth of mobile phone usage for accessing the Internet has grown to surpass that of desktop computers. Google reported that most searches on the search engine were done on mobile technologies (Sterling, 2015). StatCounter (2016) also found that mobile and tablet Internet usage (51.3%) exceeded desktop Internet usage (48.7%) for the first time in 2016. Furthermore, Statista (2019) presented further evidence to show the increase in mobile technology for website traffic worldwide (see Figure 22).

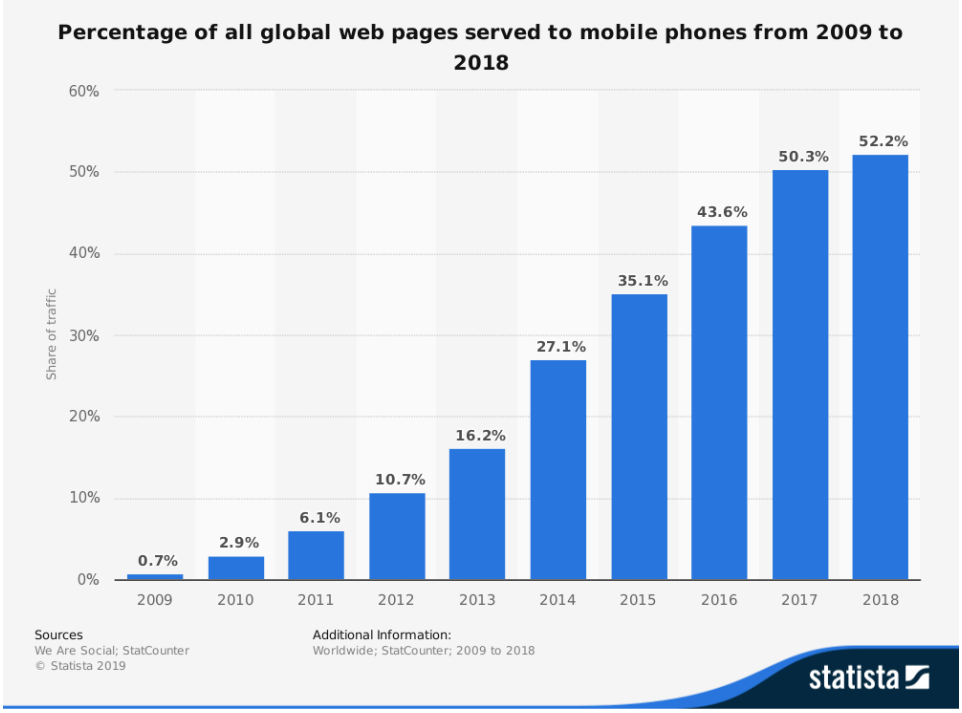


Figure 22: Percentage of all global web pages served to mobile phones from 2009 to 2018 (Statista, 2019)

StatCounter (2016) therefore advised that website providers make their websites mobile-friendly. This shows the push for mobile phone usage as people tend to access the Internet on their mobile phones as opposed to their desktops. This may be a result of the strong growth of the smartphone market in recent years, which provides more stable and reliable Internet connection through mobile Internet in regions that lack the infrastructure and money for traditional and more expensive landline connections (Statista, 2019). In addition to this, mobile phones possess qualities that enable them to be ubiquitous (the ability to receive and transfer data anytime and anywhere, removing any temporal and spatial restrictions to the transfer of knowledge), context-sensitive (the access to products and services that meet the needs of the user), to possess identifying functions (the ability to authenticate the user as well as their devices), and command and control functions – as illustrated by the Mobile Added Value (MAV) theory of Pousttchi, Weizmann and Turowski (2003: 414). The very nature of the mobile phone given by the MAV also helped in the decision to make a mobile-based solution since these features facilitate and improve communication and knowledge sharing (Pousttchi et al., 2003), thus making a mobile-based solution the appropriate choice for the development of a digital-based tool for reporting mobile victimisation.

6.4.1.2 Mobile Application Versus Mobile Website

The second aspect taken into consideration was whether the digital artefact if provided on a mobile phone, would be a mobile application (native applications) or a mobile website (mobile web applications). Choosing between whether to develop a mobile application and a mobile website is not easy. There has, therefore, been a lot of discourse, with several studies trying to compare these two options across different dimensions (Emidy, Gillis, Herrington & Moquin, 2018; Papadopoulos, Diamantaris, Papadopoulos, Petsas, Ioannidis & Markatos, 2017; Ros, 2016; Jobe, 2013). (Please refer to Table 9 below for the comparison of characteristics between the two.)

Table 9: Mobile Application Vs. Mobile Website (Emidy et al., 2018; Jobe, 2013)

	Mobile Application/Native Apps	**Mobile Website/Mobile web apps**
Performance	Maximum performance and access to device hardware/phone features.	Performance is dependent on JavaScript rendering and mobile web browsers, limited access to device hardware/phone features.
Create vs consume content	Access to performance and hardware which make it better for content creation.	Limited access to device hardware/phone features make mobile web apps less suited for content creation.
User experience	Integration with native operating system is seamless.	Limited integration, requires external frameworks.
Update frequency	Updates on applications are done through app stores and are therefore formal.	Updates are more informal and equivalent to website updates.
Functionality	All functionality in the mobile operating system is available.	Most of the functionality of the mobile operating system is available.
Development	Since there different operating systems, development may need to be specific for each mobile operating system.	Open web languages and browsers make "Write once, run anywhere" development possible which makes them easier to sustain as updates may be done on just one site, once. Development may also be done using many programming languages.
Data consumption	Lower Wi-Fi bandwidth required.	High Wi-Fi bandwidth required.
Profitability	App stores assist with the monetarisation of applications.	No clear, unified strategy for monetisation.

For the purpose of this study, the researcher opted to develop a mobile application based on the characteristics – create vs. consume content, user experience, performance and development. Native apps integrate well and easily with the hardware and software of a mobile device. They also give the developer access to the performance of the application and the hardware on which the application is installed. Another reason developing a native application

would be more suitable for this study is that updates of the application undergo more formal processes. The lower Wi-Fi bandwidth required also is suitable for this study as students were testing the developed artefact. With a lower Wi-Fi bandwidth, this meant that students would spend less money on mobile data.

Other reasons one would choose developing native applications over web applications include, interactivity, regularity of usage, they allow for complex usage and speed (Gupta et al., 2016). These reasons are also important in this study as access to the developed prototype would be of great importance as well as the speed and frequency at which students would use the proposed artefact for reporting their victimisation.

6.4.1.3 Mobile operating system

After establishing that the development of a native application would be more appropriate for this study, the operating system that this native application would be built for had to be decided on. As noted earlier, there are different operating systems for mobile phones and the development of mobile applications may need to be specific for each mobile operating system (Emidy et al., 2018). Due to the time constraints of the doctoral programme, it was appropriate to develop an application for the most common operating system that high school mobile phone users have. Data from Statcounter.com (2019) shows that android penetration in South Africa is by far the highest (81.25%), followed by iOS (15.26%). This may be because of the affordability, accessibility and ease of use of Android devices. (Please refer to Figure 23 below.)

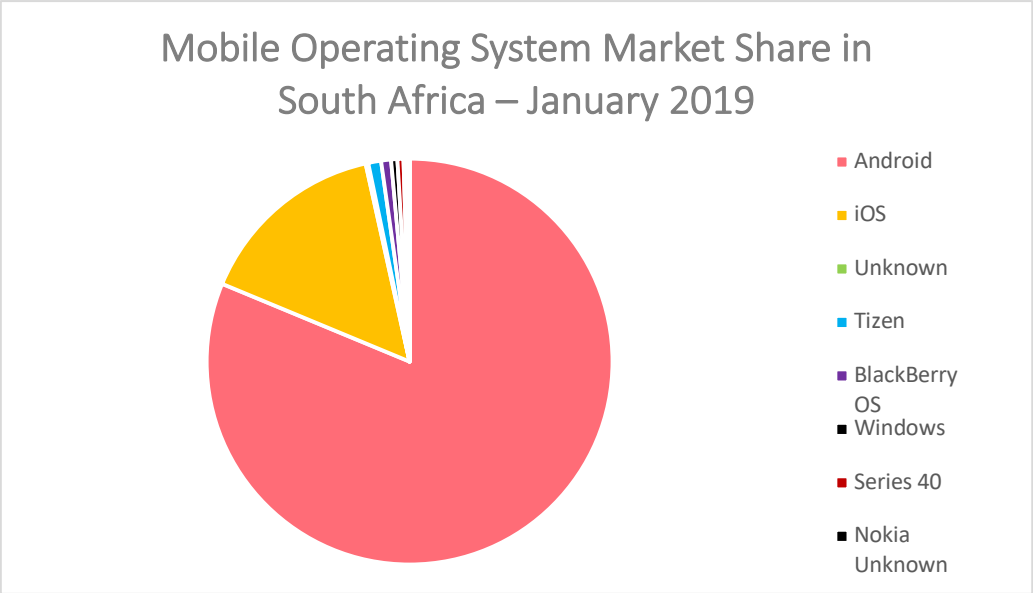


Figure 23: Mobile Operating System Market Share in South Africa – January 2019 (Statcounter, 2019)

It has also been found that high school students in South Africa who have access to a smart device are more likely to have access to an android device (Gelderblom, Matthee, Hattingh & Weilbach, 2019). Developing a mobile application with an Android operating system would, therefore, suit the purpose of this study. Also, compared to the second most common OS, i.e., iOS, Android applications are easily available from the Google Play marketplace. Google Play in 2017 reached three million applications on the Google Play marketplace whereas iOS applications only reached approximately 2.2 million applications in the iStore (BusinessofApps, 2019). The reason for this disparity is that Android OS was released by Google under open source licences. Many smart products from many companies have, therefore, been produced using these open source licences, making the market larger for Android applications than for iOS (BusinessofApps, 2019). According to Gupta et al. (2016: 669), "Android is one of the most popular open source platforms that offers the developer's full access to the framework Application Programming Interface's (API) so as to build innovative applications". Due to the nature of Android and its availability in the mobile application market, this study developed an android mobile application.

6.4.2 The Design and Development Process

For the first iteration, the researcher used an online designing tool called Appy Pie. The evolution and use of online tools has become a feasible alternative for mobile development

among researchers and companies to provide services with a low investment and still offer a great service to their clients (Gupta et al., 2016). Appy Pie is one such alternative that is available online and may be used for mobile app development. It helps its users to design and create their applications step by step with little to no coding skills (Gupta et al., 2016). The platform also allows its users to launch their applications in the relevant app stores or markets, for example Android apps are launched and sold in the Google Play store (Gupta et al., 2016). This makes it easier to disseminate the developed mobile application to customers.

The Appy pie platform offers a cloud-based service (i.e., software as a service (SaaS)), meaning that a consumer may use a service provider's applications on a cloud infrastructure (Mell & Grance, 2011). The applications are accessible to the user from various client devices without the user being able to manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings (Mell & Grance, 2011). Figure 24 below presents the architecture of Appy Pie and how it related to the development of the proposed mobile application, MVMR.

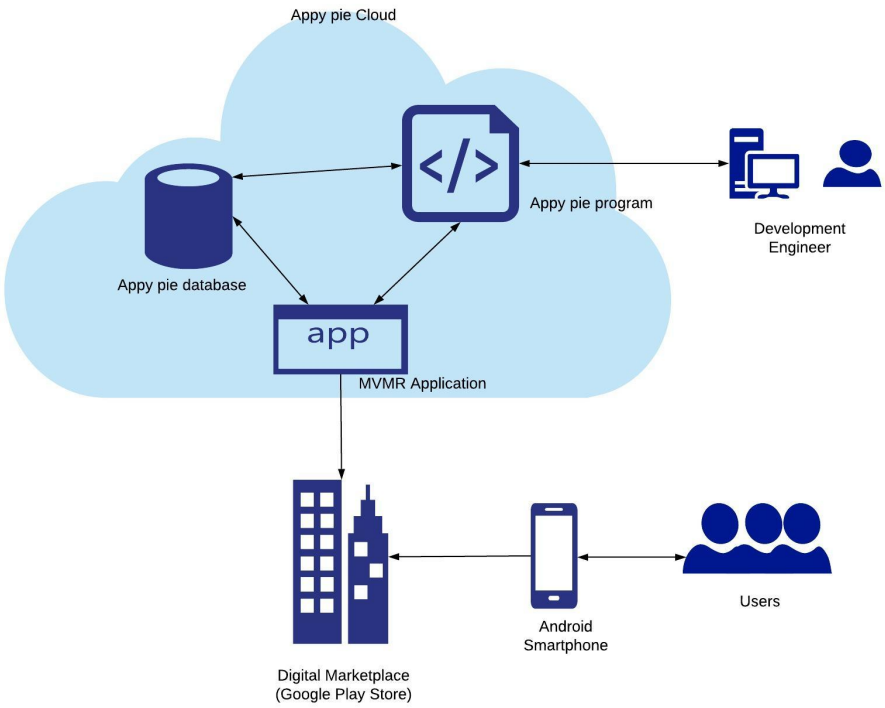


Figure 24: Architecture of MVMR (Adapted from Jug, 2017)

Appy Pie allows the "development engineer" to create mobile applications in three steps (Jug, 2017; Appy Pie, 2019):

(1) Selection or classification of applications,

(2) Application design, and

(3) Production and publishing of applications for all operating systems and their respective digital markets.

Developers who use Appy Pie to develop their mobile applications also have access to monitoring real-time application progression, tracking through GPS, integration of social media into the applications, access to the Appy Pie database, and the ability to add in-app purchases to their applications. The MVMR app was therefore developed using Appy Pie in the first iteration. This is because the platform is very user-friendly and allows its users to compile different templates of their desired apps. This was suitable for this iteration of developing the MVMR app since the two suggested main functions of the MVMR app could have been produced within the Appy Pie platform.

In order to use Appy Pie, one has to register an account with the service. The researcher, therefore, did so. (Please refer to Figure 25 below.)

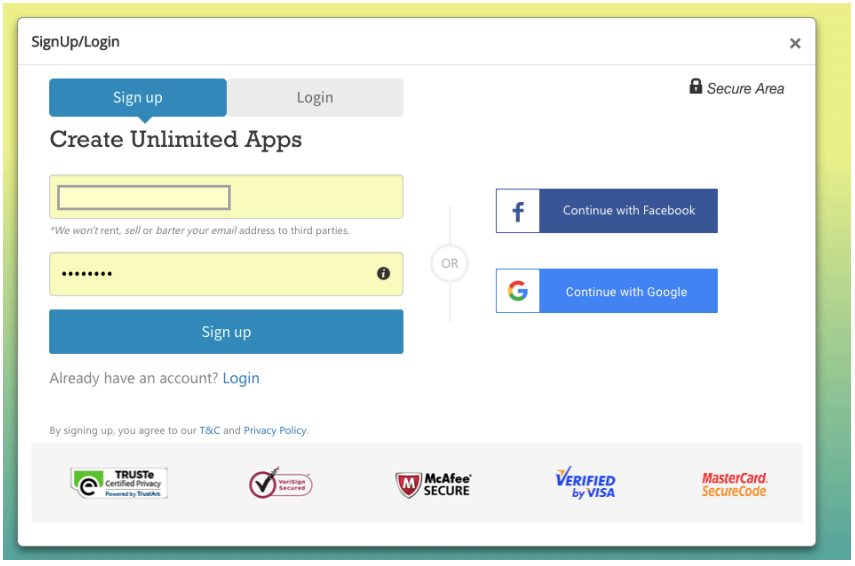


Figure 25: Registration an account on the Appy Pie Platform

After successful registration, the dashboard page, which acts as the “Home” page, appears. This dashboard page of the platform offers all the options available on Appy Pie to the user. (Please refer to Figure 26 below.)

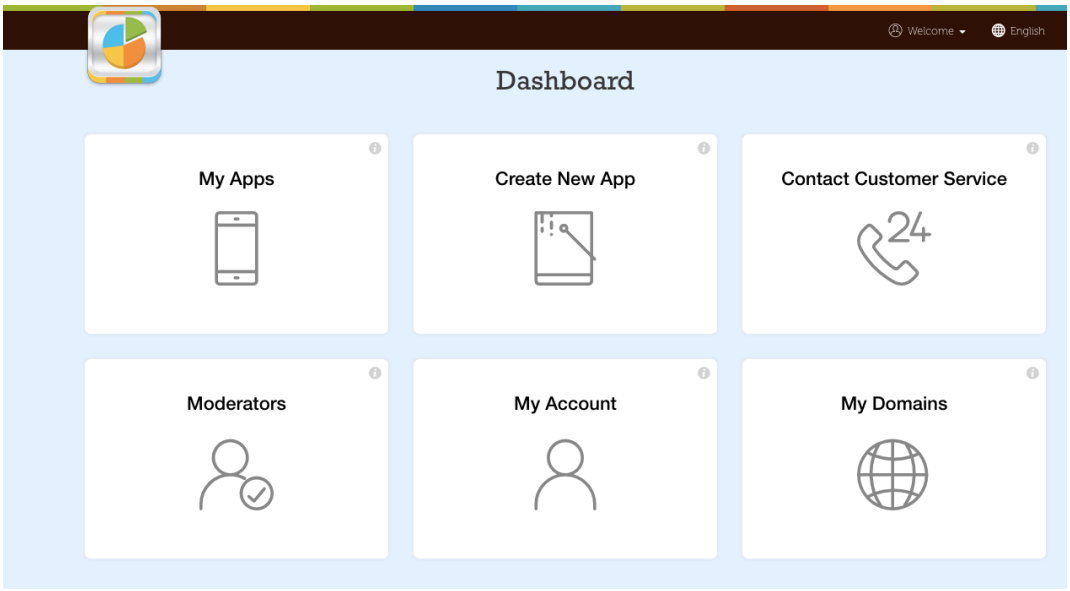


Figure 26: Dashboard of Appy Pie Platform

Figure 27 below shows the use case diagram of the Appy Pie application from the point of view of the dashboard. The development engineers (i.e., the users) may view their existing applications, where they may edit or publish them; create new applications based on their development ideas; contact customer services for assistance; select moderators to assist them depending on the their needs for new or upgraded functions, and access their account information to edit their account settings.

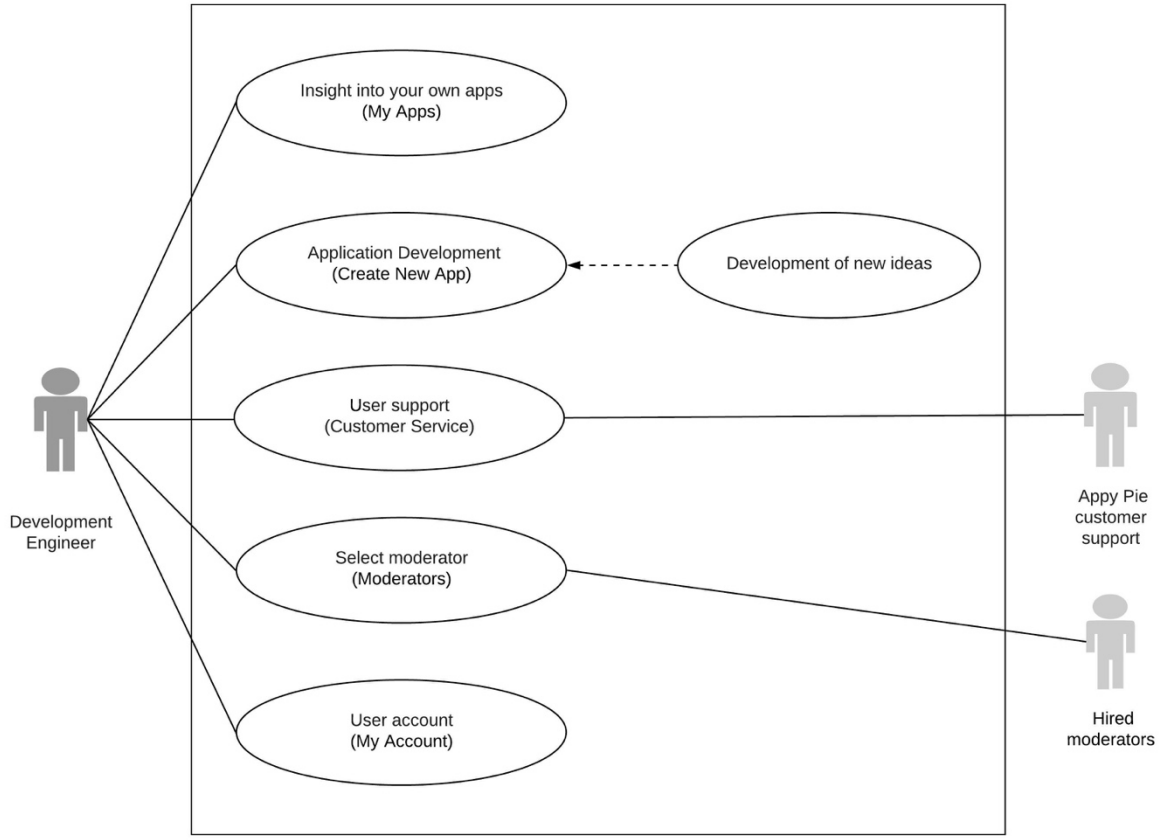


Figure 27: Use case for Appy Pie Platform (Adapted from Jug, 2017)

6.4.3 Development of MVMR on Appy Pie

The development of the MVMR app on Appy Pie followed the three steps mentioned by Jug (2017) and Appy Pie (2019). After registering for the platform, one is directed to choose a classification of the application they are developing. This is, of course, a formality because the selected theme may change through the designing of the application. Figure 28 below shows the page of Appy Pie from which one may select the necessary features for their application and customise the design of the application.

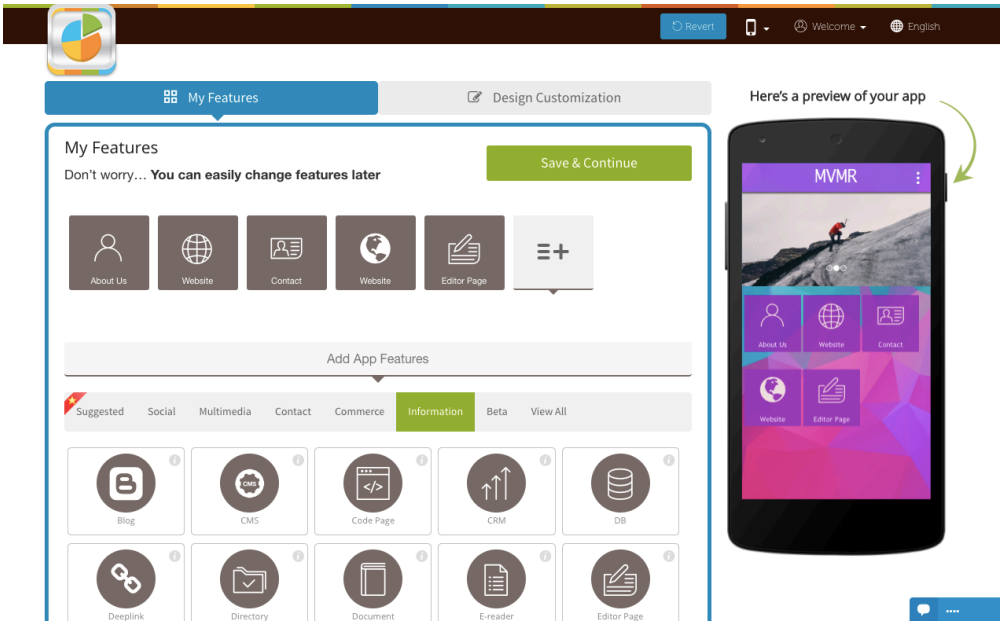


Figure 28: Designing MVMR application

On the right of Figure 28 there is an emulator of what the application would look like. This is also one of the advantages of using Appy Pie because the developer or designer may have a view of what the application looks like as they design it. Another advantage is that when using Appy Pie, the developer does not have to download an emulator to keep testing the functionality of the mobile phone as Appy Pie provides one. On the left of Figure 28 is where the features one may add to the application are available. Selection of the features that go into the application is dependent on the desire of the developer. As can be seen, there are many possibilities, but for this study, only seven functionalities were selected (see Figure 29) – an About page, How to page, the Survey page, a Reporting form, which are presented and explained below.

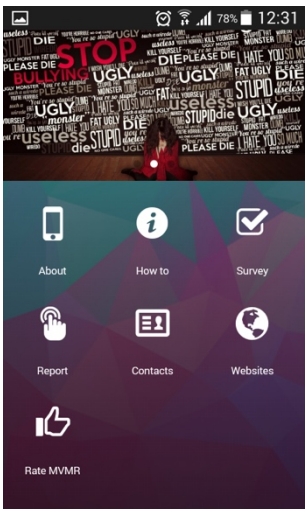


Figure 29: MVMR Application

Figure 30 and Figure 31 below are screenshots of the proposed mobile application. Figure 30, from the left, shows the About and the How To pages. The About page informs students about mobile bullying, mobile victimisation and their consequences. In informing students of these consequences, it is hoped that their perception and awareness of mobile bullying is raised and that they will see the benefits of them reporting their mobile victimisation and seeking help. According to Li (2010), reporting cyber victimisation is one of the most effective ways of combating cyberbullying, so it is imperative to establish many and easy methods of reporting. Bauman (2010) adds that since students are reluctant to report, it is important that adults and students are fully aware of cyberbullying so that essential strategies to prevent this aggression are well informed and understood. This feature of the MVMR app, therefore, aims to create awareness of mobile victimisation.

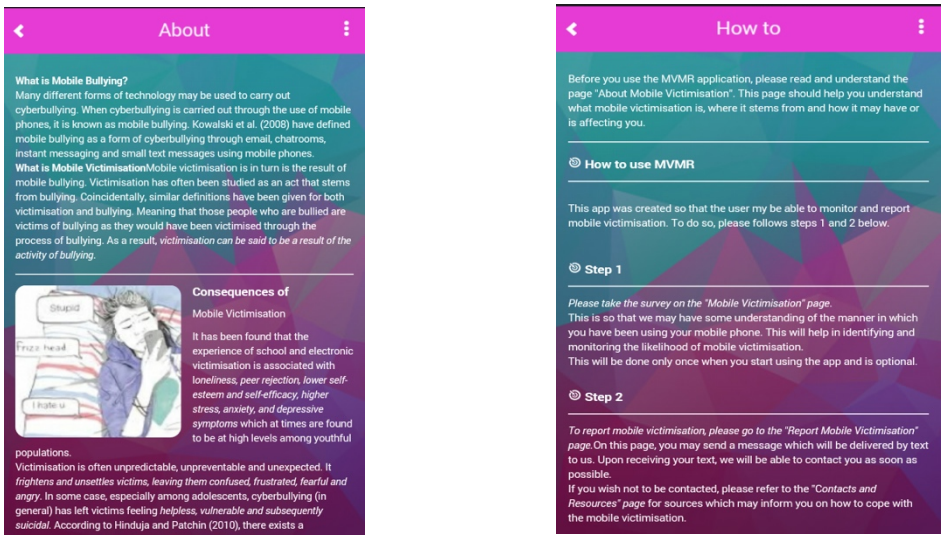


Figure 30: Screenshots of MVMR application About page and How to page

The How To page is instructional on how to use the mobile application. This page was included in the app so that students could easily familiarise themselves the MRMR app. This is of great importance as some of the flaws of anti-bullying applications that exist, such as Bully-Block, have been found to be flawed for not being instructional on how to use the application. This has led to children spending more time than they should learning how to use the application, and it is suggested that this may be off-putting to them (Carter, 2011). This feature of the MVMR app, therefore, attempts to reduce the time students would spend familiarising themselves with and learning how to use the application. It describes to them two steps. The first step is to take a survey. Figure 31 shows the Mobile Victimisation Survey and the Reporting Form pages of the mobile application.

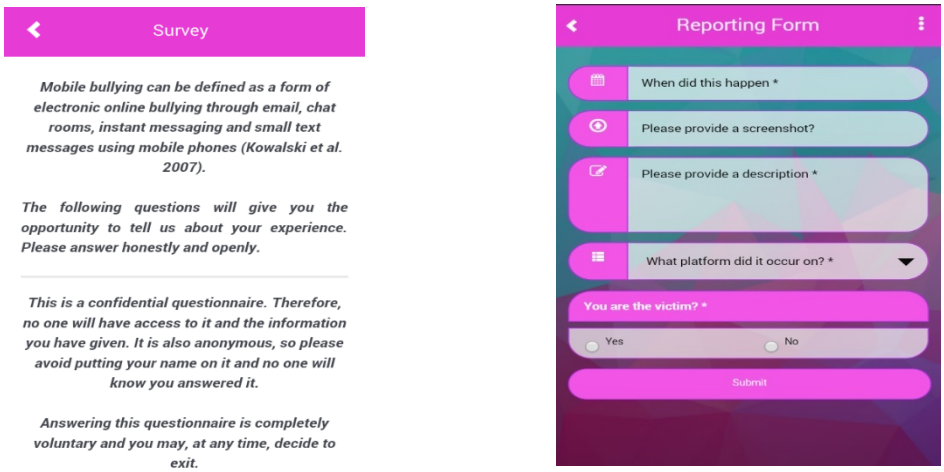


Figure 31: Screenshots of MVMR application Survey page and Reporting form

This survey is based on the MVT and is informed by literature. The survey was developed using questions adapted from other studies and issues that were identified within the body of literature of mobile bullying and victimisation (for example, Oosterwyk, 2013; White et al., 2010; Walsh et al., 2011; Hamburger, Basile & Vivolo, 2011). The intention of this survey was to capture mobile victimisation and its contributing factors (frequency of phone use, mobile phone attachment and mobile phone advancement) quantitatively, as highlighted by Lusinga and Kyobe (2017). This, of course, was necessary only as a starting point, in order to get generic information of the students who downloaded the MVMR app, and also to easily collect different kinds of information about their bullying and victimisation behaviour that is sometimes difficult to gather and safeguard when the students are off-line.

The second step and the main function of the mobile application is to report mobile victimisation on the Reporting page. The researcher regards this as the most important function of the MVMR application for its users because this is where they will be able to report their mobile victimisation. On this page, students can report their mobile victimisation by adding details with regards to when and how it occurred (please refer to Figure 32 below). They also have the option to upload screenshots of the incidents as evidence.

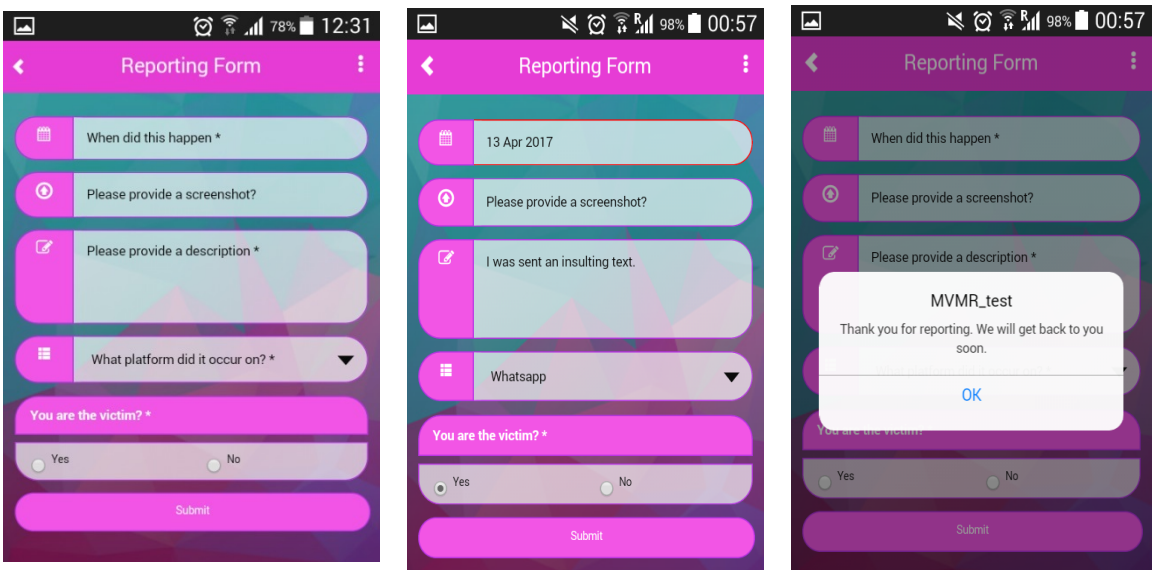


Figure 32: The Reporting page of the MVMR application

Once this form has been submitted, the data collected from it are received by the researcher via e-mail (please refer to Figure 33 below). According to Lewis (2011), research has shown that the best way to stop bullies is to document or record their behaviour so that it may be turned in to the relevant authorities. The submission and reception of this report in the form of an e-mail acts as a form of documentation of the mobile bullying activity and may be turned in to the relevant authorities that may deal with the aggression facing the student who reported it. This may also be collected so that the researcher will be able to view and analyse it for the purpose of this study.

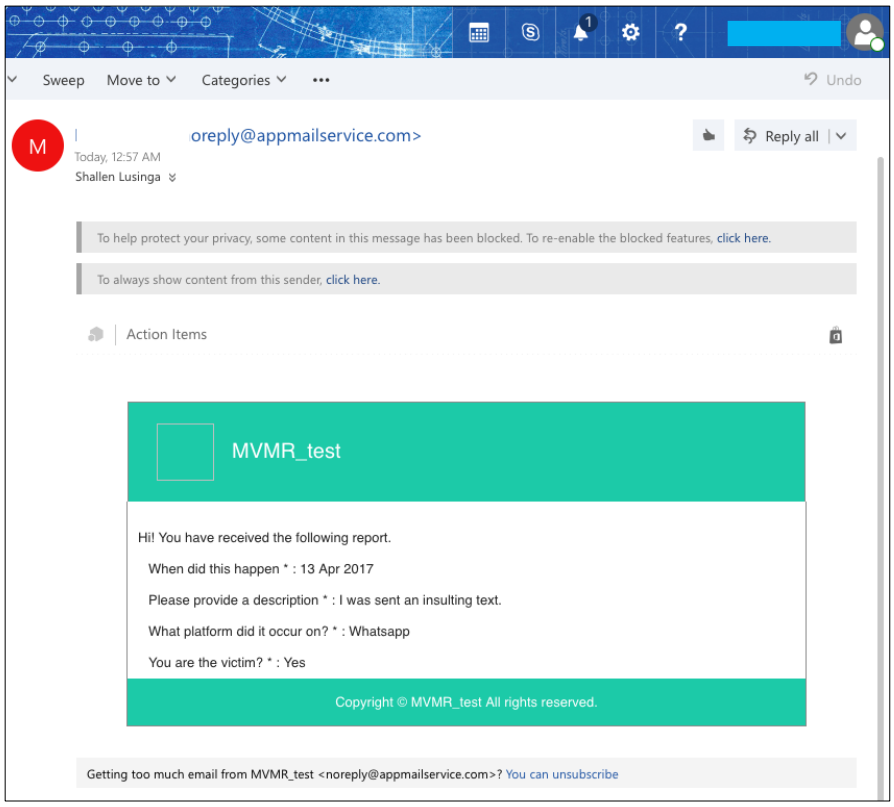


Figure 33: E-mail received for a report submitted by a student

The last two pages of the mobile application are the Contacts page and the Websites page. These pages provide users with contact details of people or agencies that students may connect with for assistance with their victimisation, and information on bullying, cyberbullying and mobile bullying. This is so that students may stay informed, educated and understand all forms of bully behaviour (traditional, cyber or mobile) and the victimisation that occurs from it.

6.5 Evaluation

The following stage of the DSR process model is the ***evaluation stage***. *At this stage, the artefact is evaluated where its use and the results obtained from it are compared to the initial requirements made in the proposal phase* (Vaishnavi & Kuechler, 2004). *If any differences between the two are noted, they are explained (Vaishnavi & Kuechler, 2004) or corrected.*

According to Peffers et al. (2007), evaluation of an artefact may take many different forms. This is dependent on the nature of the problem and the artefact. Evaluation may, therefore, be conducted through comparing the artefact with the suggested solution, objective quantitative

performance measures, the results of satisfaction surveys, user feedback or simulations (Peffers et al., 2007). Within this study, the proposed mobile application, MVMR, which was developed in the first iteration, was evaluated by high school students. At this stage, the researcher evaluated the prototype by data collected from the students through interviews. The evaluation of the artefact in the first iteration focused on evaluating the interface and the reporting pages and not the survey page (which only served as a starting point).

To evaluate the prototype, the researcher conducted interviews with seventeen high school students from two different schools in the Western Cape province of South Africa. School A was a government school and School B was a private school. (Please refer to Table 10 below for the demographic information of the students that were interviewed.) During the interview process, the measures taken into consideration by the researcher to maintain anonymity (see Section 4.9) were applied. These measures included assigning pseudonyms to all the participants that took part in the study and the schools they attended. In addition to using pseudonyms, students had their parents or guardians sign consent letters for them to participate in this study. The teachers at the schools also did not divulge any identifiable information about the students to the researcher. Furthermore, no personal information of the participants was collected at any time during the interviews.

Table 10: Demographic information of students interviewed

School	Participant	Gender	Grade	Age
School A	P1	Female	9	14 years
	P2	Female	9	15 years
	P3	Female	10	15 years
	P4	Female	10	15 years
	P5	Female	10	16 years
	P6	Female	10	16 years
	P7	Female	11	17 years
School B	P8	Female	8	13 years
	P9	Female	9	14 years
	P10	Male	9	15 years
	P11	Female	10	15 years
	P12	Male	10	15 years
	P13	Male	10	16 years
	P14	Male	11	16 years
	P15	Female	11	16 years
	P16	Female	11	16 years
	P17	Male	11	17 years

All the students interviewed had experienced some form of cyberbullying themselves or as bystanders. (Please refer to Appendix 7 for more details on the students experiences with bullying and their reporting behaviour.) The manner in which the interviews were conducted with the participants ensured that there were minimal chances that the researcher could trace some of the interview responses to participants. This is, however, not uncommon when conducting qualitative research of this nature, however, it must be – and – was managed by the researcher in a way that the child would not be harmed. The purpose of these interviews was twofold: (1) to gather information on mobile victimisation, its reporting and the students' experiences with both phenomena, and (2) to evaluate the proposed MVMR application with emphasis being on the students' perceptions on the reporting page and the interface of the application. The researcher asked the students questions regarding the assumptions of the MVT to gain knowledge on a subjective level of the MVT as well as to gain knowledge on how the MVT may be refined. In addition, students were asked about their perceptions of victimisation as well as the interventions for reporting that they had available to them, their effectiveness and shortcomings.

6.5.1 Data Analysis of the Interviews

The data collected through the interviews were analysed using thematic analysis. The six phases of thematic analysis provided by Braun and Clarke (2006) were used to discover the themes around why students do not report their victimisation; who they report to should they choose to report, and the digital means by which students report their victimisation. The analysis also helped in identifying themes regarding the MVMR app. This analysis involved an iterative process through which the researcher familiarised herself with the data through transcription, reading and re-reading the data and making notes of initial ideas, generating initial codes by developing 'labels' or codes to identify important features in the data set, examining codes to identify broader patterns of meaning (themes), and reviewing identified themes (checking the themes against the coded extracts, data set and the research objectives). The findings from the analysis are presented below.

6.5.2 Students' Mobile Victimisation and Reporting behaviour

The following main and sub-themes emerged from the dataset explaining why students do not report mobile victimisation: Theme (1) Economic factors (pointless to report as there is no benefit in doing so; nothing changes or consequences for bullies are rarely severe enough).

Theme (2) Psychological factors (fear; fear cuts across mediums; fear cuts across all racial groups; adults and schools do not take students seriously). Theme (3) Cultural and social factors (students do not involve adults right away; students prefer to figure it out themselves first; embarrassment; victim blaming). Theme (4) Technological factors (ineffective technological reporting tool; reports not acknowledged; poor response rate; anonymity). These themes are discussed in the following sections.

6.5.2.1 Economic Factors

6.5.2.1.1 Nothing changes/Consequences are rarely severe enough

The findings indicated that many of the students did not report bullying behaviours because they felt that it was pointless, with no benefit in doing so (P3, P4, P6, P7, P8, P12, P16, P14). For example, P8 (who had experienced all forms of bullying – that is, traditional, cyber- and mobile bullying) claimed that *"... we don't want to say anything because we don't know what the point is of saying something when it can't exactly be fixed*". P6 (who had experienced both cyber and mobile bullying from friends) mentioned that the school had light punishment for bullying behaviour and she said did not trust the school to deal appropriately with her bullying incident. P3 (who had also extensively experienced verbal and emotional bullying, and was a bystander to cyber- and mobile bullying), on the other hand, reported victimisation to the school and her mother, and pointed out that reporting was not effective because in her experience, even after the bully was warned, the bully would only stop for a while, but continue with his/her aggressive behaviours thereafter.

These findings indicate that there is a trade-off between reporting or not reporting, consistent with the economic model which predicts that the victim determines whether reporting a crime is worth it or not (Li, 2010).

6.5.2.2 Psychological factors

6.5.2.2.1 Fear

Victims are too emotional or fearful to make rational decisions after a crime. Students did not report their victimisation because they feared the bullying continuing or getting worse once the accused bully realised he or she had been reported (P4, P9, P10, P13, P14, P15). P10 (who had experienced only one bullying event in which he did not do anything about it even though he felt threatened) was concerned that if the bully got to know that "*...you reported, could make*

it worse". P15 (who had experienced both traditional and mobile bullying since primary school through to Grade 10 of high school and had attempted to deal with the bullying by telling the school and her parents) said "*... the person may retaliate or do things ... physically to me*". Also, P13 (who had experienced both traditional and mobile bullying and often retaliated to the bullying) said that even though reporting may be anonymous, there would still a fear of the bully. The results also showed that the fear of a bully translated across mediums in that even when one was bullied online, further victimisation could happen offline in reaction to reporting (P4, P15). P4 (who had experienced traditional bullying in Grade 6 and did not report the incident) said, *"... reporting someone that's bullying me online, ...that person can get you anywhere in school*". P15 also stated that "*... she[bully] would actually threaten to come to my school ...".*

It also appeared that fear to report cuts across all the students that participated in the study. This may be attributed to the general culture of fear that has gripped South Africa for years. According to SA News.gov.za (2011), violent crime in South Africa has roots in apartheid, by which millions of boys and young men were exposed to humiliating police harassment and a violent prison system (SA News.gov.za, 2011). During apartheid, the rule of law was also undermined by the state-sponsored violence in townships. These issues that are uniquely South African, cultivated a culture of violence that has reproduced itself ever since (SA News.gov.za, 2011). This culture has led to distrust of authority figures and created fear and insecurity among the communities (Schonteich & Louw, 2001).

6.5.2.3 Cultural and Social Factors

Another reason for not reporting victimisation was that students did not want to involve adults (school staff and parents) in their matters (P8, P6, P4, P3). Students P8, P6, P4 and P3 had experienced some form of bullying. (Please refer to Appendix 7 below.) They showed a reliance on figuring things out on their own or amongst themselves. For example, P8 (a black female who had experienced all forms of bullying) said that "*if you don't feel strong enough to confront a person, you can talk to a friend .... I don't like the idea of bringing in adults into that situation… you can just talk to that person (offender)*". P4 (a coloured female who had experienced traditional bullying at Grade 6 and did not report the incident) and P3 (a black female who had also extensively experienced verbal and emotional bullying and, was a bystander to cyber- and mobile bullying) said that reporting to a teacher is embarrassing. P6 (a

black female who had experienced both cyber- and mobile bullying from friends) said that "... *telling them [teachers] about stuff that happened out of school, ... they[teachers] had nothing to do with them really*". Only at times when there seems to be severe of the bullying of a victim would students approach adults for assistance in their bullying. P14 (a coloured male who had experienced traditional bullying and was a bystander to a mobile bullying event and often retaliated to the bullying) confirmed this by saying "*I wouldn't tell my parents… unless it's very bad…*".

These responses came from black and coloured students who belong to collectivist ethnic groups. While lack of reporting crime among these ethnic groups has been blamed on the perceived "unquestioning obedience" for elders, respect for elders among Africans is a cultural value with good intentions (Emeakaroha, 2002). The term 'elder' represents parents, elderly relatives, neighbourhood elders, elders in the workplace, and older adults in general. For many Africans, elders are believed to be the teachers and directors of the young. Emeakaroha (2002: 8) cites several African cultural beliefs as follows:

> "*Among the Efik, it is said: 'The words of one's elders are greater than amulets', it means that they give more protection than the amulet does. ... the Igbo say: He who listens to an elder is like one who consults an oracle. The oracles are believed to give the infallible truths. Thus the elders are also believed to say the truth, and their words and instructions are heeded to for the promotion of good behaviour among the young. ... the elders are taken to be the repository of communal wisdom, ... they have conceded leadership in the affairs of the people. One of the reasons for this is the nearness of the elders to the ancestors. And in the African concept, 'Legitimate power lay in the office sanctioned by ancestral norms, not in the person; and the person lost his right to exact obedience once he abused that office*'".

Given the roles and responsibilities teachers and elders carry out in society, it is, therefore, possible that some young people would find it rather embarrassing to approach the elders without having thought through the issues and their consequences.

6.5.2.3.1 Victim Blaming

We found instances where lack of reporting was attributed to victim blaming. In these cases, when these victims reported victimisation, they too were disciplined, which discouraged further reporting (P1, P7, P17). For example, when P1 (who was bullied over the phone and

received threats through voice notes) reported threats by a schoolmate over voice notes on WhatsApp, "*Mr. Peters said should anything like this happen again, he will have both of us suspended and make sure other schools don't accept us*". This highlights that the victims also face consequences for their victimisation. In cases such as this, the bully may manipulate facts to get the victim in trouble as well. Most of these themes point to victim blaming, defined as "a devaluing act that occurs when the victim(s) of a crime or an accident is held responsible – in whole or in part – for the crimes that have been committed against them (CRCVC, 2009: 2). This blame can appear in the form of negative social responses from professionals, the media and immediate family members and other acquaintances (Bagshaw, Chung, Couch, Lilburn & Wadham, 2000). This has a negative impact on reporting victimisation. Technology can, however, also be useful in providing evidence that the bully indeed committed the aggression (Law, 2012) and it can store information that can be shared.

6.5.2.4 Technological Factors

6.5.2.4.1 Technology does not facilitate efficient and effective means of reporting

Most of the students felt that reporting digitally was ineffective. They find it insufficient when the action taken is to delete a bully's post, comment or account. P1 (who was bullied over the phone and received threats through voice notes) thought the digital reporting facilities were not effective *"... because most people can just create new accounts ... It's like they're not stopping them from doing it again*". P16 (a victim and bystander of mobile bullying) also said that "*you have the power to report that person but ... after they are suspended, they can just come back and that's nothing*".

Although many of the SNSs have implemented and continuously update their policies, guidelines and tools to aid in reporting bullying behaviour, most students do not use these when they are victimised even though many are aware of their existence, especially for Facebook, Instagram and Snapchat. However, two coloured female students indicated having used the tools and found them effective. P4, who had used the reporting facilities online, said: "*Yes ... recently when I went back on my old account, I saw something about 'your report has been acknowledged, and we have cleared the problem' ...*". P9 (who had experienced both traditional and cyberbullying) also claimed that it was effective in that they closed the bully's account instantly. She said "*...I reported it to a group of friends, so I think many people reported it, that's why it was so effective*".

Students also felt that unless there were some people reporting, their reports were not taken into consideration. P16 (a victim and bystander of mobile bullying) and P3 (who had also extensively experienced verbal and emotional bullying and was a bystander to cyber- and mobile bullying) also agreed that the reporting tool would be more effective if more people reported. P6 (who had experienced both cyber- and mobile bullying from friends) felt that these applications are not effective as they do nothing after a report has been received. She said "... *you report it and you don't get a reply ... nobody gets to listen to me ... so what's the point of me reporting* ...". When asked if getting a response to her reporting would suffice, she said "... *obviously, every platform that you report to does that, but we want a result about what has been done about it. How has the situation been approached?*". This also highlights the automatic responses that these applications have been found to send to users who report. There is definitely a lack of human interaction: students want to be heard, and auto responses to reporting do not seem to do so.

The comments by P3, P6, P9 and P16 suggest that victims would rather not report digitally as their opinions would be insignificant. This resonates with the "spiral of silence" theory, i.e., if one's opinion is in the minority, it is silenced. Reporting using technology may, therefore, encourage silence regarding victimisation or abuse if victimisation is experienced and reported by one individual. Another challenge to reporting is that technology makes the bully anonymous (P7, P9 and P17).

6.5.3 Evaluation of the MVMR Application

As the mobile app developed was informed by literature, the opinions of the students about the application were required in order to make the artefact useful and relevant to the students. Therefore, the researcher had the students evaluate the proposed MVMR app developed using the Appy Pie platform in order to reduce the time spent developing the application since time spent developing an artefact has often been considered one of the limitations of design science (Ball, 2001).

During the interview process, the researcher described, explained and demonstrated the MVMR app prototype. The students were themselves able to install, view and explore the prototype in its entirety without assistance from the researcher. This was to demonstrate and verify the ease of use of the application. Questions were asked on how the MVMR app may be

of use to them, what they expect from it and how best the application would be essential in the moments they experience mobile victimisation.

6.5.3.1 Relevance of MVMR (Q11)

The MVMR app was well received by the majority of the students that took part in the study as a relevant tool for reporting mobile victimisation. P2 (who had only experienced mobile bullying once and responded by blocking the bullying and reporting to the school) stated that "*I think it is a good app. I would definitely download it if it were out because I think this could actually help some people who can't really communicate*". P6 (who had experienced both cyber and mobile bullying from friends) stated, "*for someone who wants to put it out there, this could be of use to speak about it."*. Many students shared the same sentiment – that having a platform through which they could communicate their victimisation was welcomed (please see Table 11 below). The students felt that the MVMR application was a relevant, impressive, insightful, and useful means by which mobile victimisation would be reported. (Please see the comments shown in Table 11 below.)

Table 11: Relevance of MVMR Application to students

Participant	Comments
P1	*"I like it because it shows everything."*
P6	*"for someone who wants to put it out there, this could be of use to speak about it"*
P7	*"Yeah I think I'd use it even if the school doesn't do anything about it because this is maybe I could feel relief because I have reported it"*
P16	*"I think it could be very useful not only with being able to like report more than just on Instagram a comment that I don't like because I saw there it said "please provide a screenshot". So it's more detailed and that it will also contribute to telling you what you could do to reduce it and what could be the reason for it. So I think it would be very useful."* *"I think that them knowing that they have somewhere to report and somewhere to tell things and not have it be, not being isolated"* *"Oh I hope it's not just for research because if it actually becomes an app I think it will be very useful tool especially to students in grade 8 and 9 and lower levels."*
P17	*"I think it's a very good idea. We are on our cellphones so much that it just makes it a bit easier and maybe like if someone bullied me, I wouldn't have the courage to go to the principal or to a teacher or whatever. I would just sit and report what happened there."* *"It makes it look like a safe space which I think is important for that."*

Some students (P13 and P15 – both of whom had experienced traditional and mobile bullying) were, however, somewhat sceptical about the application, P13 stating as a response to what his thoughts were about the application, "*I'm not sure. I'm not quite sure what other people would think. They could have this app but some people could be too naive to report it or think about it too much and over-think it and be like it's just a small little thing*". The scepticism shown by P13 (who had experienced both traditional and mobile bullying and often retaliated to the bullying) revealed some of the beliefs that many of the students showed with regards to reporting their victimisation. That is, they tended not to report their mobile victimisation due to some psychological beliefs. P15 (who had experienced both traditional and mobile bullying since primary school through to Grade 10 of high school and had attempted to deal with the bullying by telling the school and her parents) added to the scepticism of the MVMR app by stating, "*I think it will take time, like if I am honest, I think it's gonna take time I mean I think if people hear about their friends using it*". Although the remaining students showed enthusiasm for the application, others were also concerned about creating awareness for the application and believed that this would be an impeding factor to the success of the application.

6.5.3.2 Usefulness and Benefits of MVMR Application

Nine of the students interviewed (P5, P7, P10, P11, P12, P13, P15, P16 and P17) said how useful and necessary the proposed MVMR app would be for reporting mobile victimisation. (Please refer to Table 12 below for their comments.)

Table 12: Usefulness and Benefits of MVMR Application

Participant	Comment
P5	*"I like the fact that he has a picture on top of that girl and all the things she has in her mind. and the colour is not too much, it's like perfect, it's just fine"* *It's [the report] also good for them to actually write what happened"*
P7	*"it's good… Yeah I think I'd use it even if the school doesn't do anything about it because this is maybe I could feel relief because I have reported it"*
P10	*"It looks actually very presentable. It actually looks like it comes from Android. When I looked at it, it looked like an Android app because Android apps look very similar to this, like the website and the contacts thing."* *"But it looks very nice as it is now. It's very nice."* *"Yep. It looks very friendly. "*

P11	*"Oh that's cool that you have to provide a screenshot as well. I love it."* *"I really like the way it looks, because it's very like simplistically put out, I like that."* *"I like that you put the website as well so like there is websites"*
P12	*"Besides that, it should be a pretty solid app if you get what I mean by that… As in it will be easy to understand, easy to use…"* *"Report-wise it should be simple enough to understand"*
P13	*"I would be actually interested to see how much I use my phone."*
P15	*"I like it. I like the color."*
P16	*"I think the way it looks is fine. Well it would grab my attention, it's simple enough to use I think."*
P17	*"So it's good to include that [screenshot] so they can see what's wrong. But then if someone reports an incident of bullying and you get the data,"*

The students confirmed that the MVMR app was very explicit, with a simple interface and perceivable ease of use. They liked the way it looks, it's simplicity (ease of use) and functions. This was of great importance since the intended MVMR app was developed considering the students and their need for ease of use. They also seemed intrigued by the possibility that the MVMR app would be able to monitor their frequency of usage (P13).

6.5.3.3 Opinions on the Features and Functionality of the MVMR Application

The students seemed to appreciate the interface, with the exception of student P10 (who had only experienced one bullying event about which he did not do anything about it even though he felt threatened) who suggested that the visualisation on the MVMR app on Figure 29 might be inappropriate or "would put off people". (Please refer to Table 13 below for other opinions given by students regarding the MVMR application.)

Table 13: Opinions on the features and functionality of the MVMR Application

Participant	**Comments**
	MVMR Interface
P10	*"It looks actually very presentable. It actually looks like it comes from Android. When I looked at it it looked like an Android app because Android apps look very similar to this, like the website and the contacts thing. Maybe just a little bit more colour… I don't know."* *"But it looks very nice as it is now. It's very nice."*

	"It looks very friendly. Maybe the pictures that say like "stop bullying" and "ugly" and stuff like that, maybe they would put people off because it would seem like they are trying to point out if they are being bullied or something like that."
P16	*"I think the way it looks is fine. Well it would grab my attention, it's simple enough to use"*
P17	*"Uhm the app seems simple enough to use. It's nicely laid out and it's easy to see where you must go and all. And it's also good that you said to include a screenshot if you can because your description of it may be…"* *"I think it's simple enough and it looks calm and like, I almost want to say inviting but I don't want to use that word in this context. It makes it look like a safe space which I think is important for that."*
MVMR Features	
P4	*"What if the bullying is not, because I see here provide a screenshot, what if the bullying is not online and maybe someone is getting abused at home"*
P11	*"Oh that's cool that you have to provide a screenshot as well. I love it."* *"I really like the way it looks, because it's very like simplistically put out, I like that."* *"I like that you put the website as well so like there is website"*
P12	*"Uhm screenshots might be a problem because sometimes they'll attack really personal things like family issues"*
P16	*"So it's more detailed and that it will also contribute to telling you what you could do to reduce it and what could be the reason for it. So I think it would be very useful."*
P17	*"It's nicely laid out and it's easy to see where you must go and all. And it's also good that you said to include a screenshot if you can because your description of it may be…"* *"I think it's simple enough and it looks calm and like, I almost want to say inviting but I don't want to use that word in this context. It makes it look like a safe space which I think is important for that."*

The other students thought that the interface was simple, pleasant and welcoming which is of great importance as the proposed MVMR is to give the students a sense of comfort in reporting their victimisation. With regards to the features, the students were complimentary about the addition of an option to upload screenshots of mobile bullying victimisation as evidence to corroborate their report. Only student P12 showed some reservations with uploading screenshots of his victimisation since he feared that the screenshot would display some sensitive material from his mobile victimisation, such as family-related comments.

They also showed an appreciation for the explanation of how to use the MVMR app on the How To page, although others thought the explanation was too long. The students also liked the website and contacts pages. One student, however, suggested that a direct contact number

to the school should be added to the contacts list. P10 (who had only experienced one bullying event in which he did not do anything about it even though he felt threatened) suggested, "*I would put the counsellor's phone number there … For the school, if there is one. If there isn't, put in a counsellor in case, let's say, the person would like to speak to a counsellor."* Another issue raised was by student P4 (who had experienced traditional bullying in Grade 6 and did not report the incident) who questioned the option of reporting traditional bullying, since the bullying would not be technological. In asking this, P4 also indicated a concern for an option to reporting abuse at home.

6.5.3.4 Issues with the MVMR Application

Of all the students interviewed, nine students identified what they did not like about the proposed application. (Please refer to Table 14 below for their comments.)

Table 14: Issues students had with the MVMR Application

Participant	Comments
P2	*"Probably that the words are too small, just the font size but otherwise I want to download the app"*
P3	*"the fact that it is taking long"*
P4	*"font size is very small because I wear specs."*
P9	*"I think like some of the writing is a bit small"* *"Oh because I don't think like if I was a victim, I wouldn't download it because I wouldn't know what it would do. If you get what I'm saying, like I wouldn't know it would send to the school and stuff like that."*
P10	*"Yap. It looks very friendly. Maybe the pictures that say like "stop bullying" and "ugly" and stuff like that, maybe they would put people off because it would seem like they are trying to point out if they are being bullied or something like that."*
P12	*"Uhm…screenshots might be a problem because sometimes they'll attack really personal things like family issues"*
P14	*"There's nothing I don't like about it"*
P15	*"I mean I don't have a problem"*
P16	*"[The "About" page] I think it's too long. I feel like if I saw this, I wouldn't read it… It's necessary to define things and not make it vague, but it's also difficult to do that without it becoming too much."*
P17	*"not much actually… I was going to say like maybe an interactive tutorial to show how it works but it gives a step by step instruction."*

With regards to the statement made by P3, data were collected at a school in Simon's Town that did not provide Wi-Fi connectivity to its students, so mobile data was used to demonstrate the MVMR app. The mobile application thus responded slower as the network connectivity was weak. Student P3 (who had also extensively experienced verbal and emotional bullying and was a bystander to cyber- and mobile bullying) said that this was not pleasant for her. Another issue that students experienced with the application was that the text was too small on the About and How To pages. They also conveyed that perhaps it was lengthy and that this could have been problematic as they tend not to read texts that contain too many words. Before seeing the How To page, student P17 had suggested that an instructional page that would be interactive. He found no problem with the instructions being step by step on the How To page.

Student P12 also questioned the availability of the application and whether it would be free. This raised concern brought on by their feelings of how bullying has been dealt with in their schools where if students report, very little would be done by the school to handle the situation. A major concern for students was also what would happen after they reported their victimisation on the MVMR app. This was an issue that was raised by other students who otherwise felt they had no issues with the application (P1, P6 and P12). Throughout many of their experiences with bullying in the past, the students had reported their victimisation mainly to their friends, parents or staff at the school, as explained in the section below.

6.5.3.5 Reporting Channels for Students

6.5.3.5.1 Reporting to friends

Only two students reported victimisation to their friends. For example, P15 (who had experienced traditional and mobile bullying event and often retaliated to the bullying) said "*yeah so now I can tell someone especially like my boyfriend because we are kind of very close … I would tell him …* ". These findings are consistent with those of Patchin and Hinduja (2006) and Slonje and Smith (2008), that students often seek help for their cyber victimisation from their friends more than they do from adult figures (i.e., parents, school staff).

6.5.3.5.2 Reporting to parents

Some students reported their victimisation to their parents (P5, P9, P14, P15). For example, P5 (who had experienced anonymous verbal attacks through both cyber and mobile bullying) said

after telling her mother, "*she said 'don't let it get you down, don't let it bother you because you don't know the person so you can't feel like you did anything wrong…*".

6.5.3.5.3 Reporting to the school

Some students report their victimisation to the schools (P1, P3, P4, P5). Students also indicated that in more serious cases, the schools take the issue to the bully's parents. For example, P4 (who had experienced traditional bullying in Grade 6 and did not report the incident) said, "*they [school officials] go confront the parents*". In some cases, regardless of race, many students resorted to blocking their bullies, ignoring them and forgetting about it, especially on WhatsApp (P2, P4, P5, P8, P10, P12, P13). For example, P10 (who had only experienced one bullying event in which he did not do anything about it even though he felt threatened) said that he believed that "*... just try to forget about it, and then block that person [bully] …*".

Due to students indicating that failure to report is, in part, due to them not wanting to get adults involved, failure to get the problem resolved and the consequences rarely being severe enough for bullies, the researcher asked the students who they felt would be the most appropriate person, people or organisation to receive the reports submitted on the MVMR app. Their responses are shown in Table 15 below.

Table 15: Preferred person to receive the reports

Participant	Comment
P1	*"like in our school Mrs S, the English Teacher, she handles all the cases between the fs if there is any disruptions. She handles it so I think like in our school she could be the one to get it but I don't know if other schools have teachers who are in charge of that"*
P2	*"I think it should come to the parents or to the principal like if it's a school-related thing you should go to the principles so that the principal can help you sort it out but mostly to your parents so that they know what's going on and they can help you"*

P3	*"somebody who you trust, somebody who knows what they're doing, somebody who's going to take further action, somebody who's gonna do something about it and not just look at your information and just go… maybe the police...So that they can take further action. Because the teachers they have no power, they can't do anything"* *"Maybe there is a certain teacher I trust and know will take further action, and I will take it to them."* *"Plus people don't feel comfortable going to a teacher and talking, because it's a bit embarrassing. You would rather do it on your phone because no one will be looking at you, no one can see you, only the person on the other end"*
P5	*"A person who knows this thing, a person who does bullying or a person who knows everything about bullying"* *"Someone who has been bullied or someone who was a bully.* (P5 didn't mind if a school mate received the report, suggesting *"if they understand, for me it's fine"*)
P6	*"They can send it to someone like Mrs S. She deals with these types of problems here at school. And I feel like she's the type of person to be receiving this information. Basically if there's been a fight she calls those people into her room and she speaks about what has happened. She indulges in all types of situations. If you have a problem at home that you want to speak about she's there to speak about it with you. She basically deals with every type of problem"* *"Yes it would be useful because the people that did this are in the same school with me so that she is the only person that kind of has the power to deal with it but at the same time I feel like she wouldn't give them the suitable punishment but I do think she would be the suitable person to receive it"*
P7	*"...if it is my parents they wouldn't do anything about it...I'd have to solve it myself. They would be like go and fight back, and that's not what I want, I want the thing to be solved not to go and fight back"* *"It should go to a person that you trust to solve it. Actually here every time I have a family problem I go to Mrs S... [she's] Someone who doesn't like, let's say I come to you with my problem, someone who doesn't go out with it out there and just keep it like it never happened or we didn't talk or anything"*
P9	*"Mrs M"*
P11	*"I think the school, I think if they are younger than 18 and like I think the school should have adopted it yeah. So they can see like what's going on."* *"[Not parents] because if it's like, it is confidential, so then it is difficult then to break the confidentiality and save a child of being bullied "*
P14	*"I am not sure. It could be like the head of a school or heads of different schools…because maybe they can sort out the bullies in their schools."* *"For me I wouldn't tell my parents I'm being bullied unless it's very bad but yeah Because I feel like they wouldn't need to know cos I can sort out my own things. So if it was going too far and I told this person to stop and they kept going and I can't do it anymore, then I'll tell my parents then my parents will help me"*
P16	*"Somebody in the school"*

The findings revealed that the students would rather the reports be received by the schools and/or their parents. They seemed to favour the schools more so than the parents because they wanted to keep some of their issues confidential (P11). The students also felt that their parents would not do anything about it or advise the students to fight back (P7, P14). Nine of the students indicated that a teacher, a principal or someone at the school would be preferable in handling mobile victimisation cases. They emphasised that they wanted to submit reports to someone they could trust (P3, P7), someone who would know what to do or what they were doing if they received a report (P3, P5), someone they could speak to about any problem (P6) and, someone who would get something done (P2, P3).

The findings presented in Table 15 above also show two figures mentioned by the students, "Mrs. S" and "Mrs. M". They had dealt with some of the bullying incidences that had been reported in both the schools. They had created trust and have made themselves visible as options for the students to approach them with their victimisation. "Mrs. S" is the Life Orientation teacher at School A who has acted as someone students could approach with their issues. Students from School B found reporting to the school counsellor, "Mrs. M", a means of dealing with their victimisation. They all acknowledged her presence within the school and her role in offering emotional support as well as dealing with their bullies. For example, P15 said "*I talked to her about it because … I was very comfortable and also she wanted to explore where my depression was coming from … She helped me get past it because I held onto it for a long time*". With regards to reporting to "Mrs. M", P12 highlighted "*that's more to just get your own feelings out, I don't think action is taken*". P13 (who had experienced both traditional and mobile bullying and often retaliated to the bullying) also said *"... everyone has a different way of dealing with it. If I'm feeling sad, I like to talk about it because even if the person can't really help you, even if they can't completely empathise with your situation just having someone to talk to and someone who's listening, you can tell that they care, that sort of helps sometimes*". P16 (a victim and bystander of mobile bullying) even went on to say about intervening victimisation, "*maybe talking to her is probably the most effective*...". This is shown as P11 (who had only experienced two bullying events in Grade 6 and Grade 10 and always resorted to blocking the bully) stated that after seeing the counsellor, she felt better "*because I feel like I had dealt with my feelings and that I had sifted through what was wrong*".

This is similar to findings by Ezell, Richardson, Salari and Henry (2018) in their study which focused on rural juvenile courts, and assessed practices, barriers, and recommendations around

trauma-informed practice using an evidence-based approach for addressing trauma and reducing delinquent behaviour and recidivism. One particular finding was that the trauma-based protocol envisaged by respondents involved co-locating trauma-informed clinicians on site at the courts on at least a part-time basis. One of the participants of the study stated:

> "*The easy answer is provide me [with] one staff [member] to run the whole thing out of here. And we would support that. [..] If we had that, we would support that. […] But if there was somebody who came; like if we identified risk factors through a checklist, whatever it may be, and then we say, 'You've gotta meet with so-and-so next time at this time.' If we had that person, I think it could be successful.*" – A Juvenile Court Referee

6.5.4 Circumscription of findings

According to Vaishnavi and Kuechler (2015), the circumscription process in design science research is especially important because it creates understanding of knowledge that could have only been generated through the act of construction. Circumscription is "a formal logical method that assumes that every fragment of knowledge is valid only in certain situations and that the applicability of knowledge can only be determined through the detection and analysis of contradictions" (Vaishnavi & Kuechler, 2015: 12). This means that design science researchers discover knowledge when things do not work in accordance to theory (Vaishnavi & Kuechler, 2015). This happens often and is due to the incomplete nature of many knowledge bases. While this study assumed that the MVT was sufficient to understand victim behaviour, and subsequently their reporting behaviour, through this first iteration of the design science research process, it was discovered that the attributes of the MVT may be only a part of the factors that influence the reporting behaviour. Through the data analysis, economic, psychological, cultural and social, technological factors emerged as other major contributors that influence mobile bullying reporting behaviour.

6.5.4.1 Suitable Receiver of Reports from MVMR Application

Stauffer (2012) believes that it is a priority for schools to take action to reduce cyberbullying incidents both inside and also outside the school and that it is important for teachers to take reports of cyberbullying seriously. If they do not, the school's efforts are simply wasted when implementing anti-cyberbullying programmes. Styron et al. (2016) also stress that another critical factor that should be included in cyberbullying prevention and intervention school

programmes is to create an environment where students feel comfortable reporting cyberbullying. The counsellor and Life Orientation teacher, "Mrs. S" and "Mrs. M" respectively, discussed in section 6.5.3.4, represent two figures in the sampled schools who may be approachable to students. They have already created trust between themselves and the students and have provided safe and comfortable spaces for students to report bullying behaviour and seek help. Styron et al. (2016) also add, however, that this, if coupled with increased parental or guardian involvement would lead to effective interventions. Therefore, the findings confirm that the schools are to prioritise reports of mobile victimisation and that the administrators of mobile victimisations must be from the schools. The parents must thus be notified by the schools when they receive reports. This would be a more holistic means by which the reports of the MVMR application would be of value to students.

6.6 Conclusion: Insight from the First Iteration

The conclusion marks the end of the research cycle. In this phase, the results of the research are consolidated and written up (Vaishnavi & Kuechler, 2004). The information and knowledge obtained through this Design Science Research process may then be communicated to inform the broader field about mobile victimisation.

Although very useful in the development of the MVMR app in the first iteration of its development, Appy Pie had some restrictions. It did not allow the researcher to implement some of the features that are necessary in detecting dimensions of the MVT. While developing the application, the researcher had anticipated that using a survey would be adequate in capturing the dimensions. This would, however, detract from the essential goal of automating the MVT. The application should be able to record and detect the dimensions of the MVT by itself with as little interference from the users. While applications such as Bully-Block attempt to prevent mobile bullying, the MVMR app provides a means by which students may report their mobile victimisation and assists in understanding the students that report their victimisation as a means to approaching intervention in more appropriate ways.

Appy Pie offered an excellent platform for the researcher to build the proposed application in its first phase. It offered the researcher ideas on how the application could look and function. However, it did not allow for the flexibility required to capture frequency of mobile phone use, attachment and advancement of the phone as these were not offered by the service. The

researcher, therefore, had to revise the MVMR app before deploying and testing it among users for a longer period of time.

Given that, through the interviews conducted with the MVMR, more knowledge was discovered with regards to factors that may influence the reporting of mobile victimisation. The integrative framework for understanding reporting behaviour of mobile victims must, therefore, be taken into consideration when developing a mobile application that supports students in reporting incidents of mobile victimisation. In its revision, the researcher drew up functional and non-functional requirement specifications to be incorporated into the MVMR application from both the researcher and the information gathered from the interviews.

Functional design requirements included:

- For capturing victimisation – The MVMR app must collect reports of victimisation created by users. This report must capture data like that which was captured in Appy Pie.
- For capturing attachment mobile victimisation – The MVMR app must allow users to answer a questionnaire to assess the extent of their attachment to their mobile phones. A survey is to be used to capture the attachment because this is a factor that can be measured and captured better using a survey. Therefore, when a user installs the application on their mobile phone, survey questions must be answered. The data captured through this survey may be used to determine the extent of the user's attachment.
- For the frequency of mobile phone use – The MVMR app must measure mobile phone usage statistics measured by how long the user device was in use.
- For capturing the advancement of the mobile phone – The MVMR app must be able to capture the type of mobile phone the user is using and the social networking applications available on their mobile phone.
- The MVMR app must generally collect all the specified data anonymously and this must not be invasive, i.e., it must not go through any of the information on the mobile phone and it must not disrupt the usage of the mobile phone.
- To address the issue of something being done and reports being taken seriously – the researcher would respond to these reports to see if the student would like to take the issue further. If that were the case, the researcher would communicate this to the

authorities in the school which the student attends. Therefore, the application should be able to respond to the reports submitted to the researcher. The researcher hopes that this would prove to the students that steps towards something being done are taken.

- With regards to evaluating the MVMR app, there is to be short survey with closed and open-ended questions. Students will be required to answer this survey so that the researcher gets their reviews of the application.

The non-functional requirements included:

- The design of the MVMR app maintained and prioritised the simplicity of the MVMR app that was developed using AppyPie.
- The design of the MVMR app should prioritise small development and the cyclical nature of the design science strategy to allow continuous improvement.
- The design of the MVMR app should be able to be used by for as many users as possible so that there is an increases in the quantity and quality of data collection.
- The design of the MVMR app should be done maintaining anonymity in mind and not exposing the details of users to those who are not to see it.
- The design of the MVMR app should focus on having an efficient and effective working solution.
- The design of the MVMR app should also continue to provide materials for students to educate themselves on what victimisation is and advice on assistance services.
- The data collected by the MVMR app must be kept in a database that is simple, discrete and easy to be managed by the researcher. The data for each individual must be collected and stored appropriately in the database so that each student has their individual records. In addition, the data collected must be received by the researcher in real time.

6.7 Summary

This chapter successfully presented the first iteration in the development of the Mobile Victimisation Monitoring and Reporting (MVMR) application. The development of the application was guided by Vaishnavi and Kuechler's (2004) design science research process, which includes the steps awareness of the problem, suggestion, development, evaluation and conclusion. Through the process, the MVMR app was developed. The application was

evaluated by seventeen high school students in the Western Cape province of South Africa. The interviews gathered information regarding mobile victimisation and reporting behaviour. The following chapter presents the second iteration and describes the steps taken throughout the cycle.

CHAPTER 7 IMPLEMENTING DESIGN SCIENCE RESEARCH - SECOND ITERATION

The previous chapter discussed the implementation of the Design Science Research (DSR) process in developing the Mobile Victimisation Monitoring and Report (MVMR) application in the first iteration. This chapter presents the design and development of the MVMR application in the second iteration of the DSR process. (Please refer Figure 34 below for the chapter overview.)

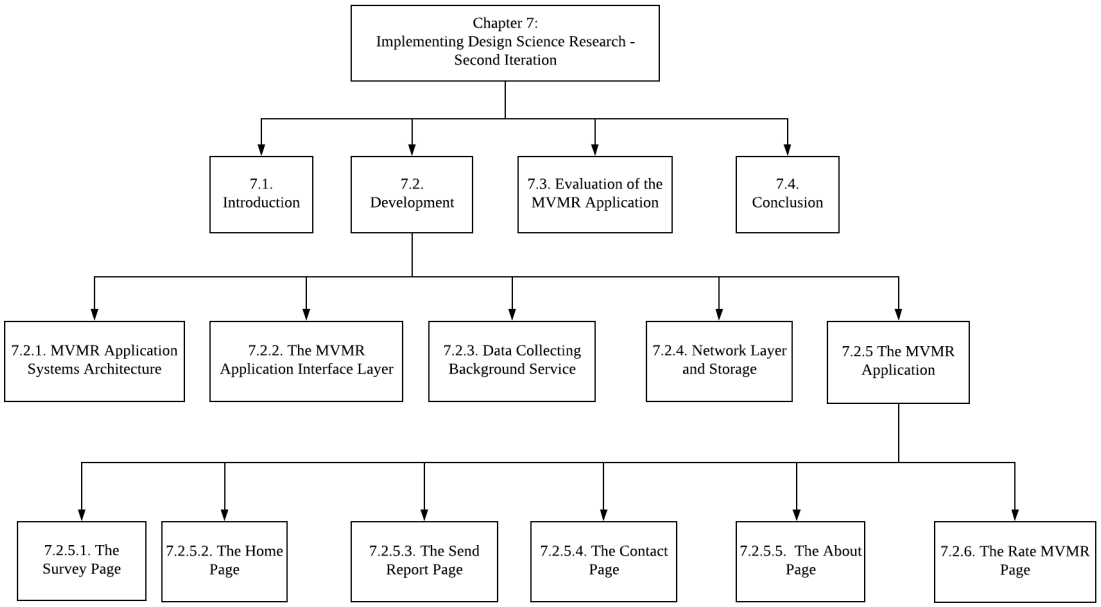


Figure 34: Overview of Implementing Design Science Research – Second Iteration

Since the problem statement and suggestion stages of the DSR process model required no significant changes in the second iteration (as indicated by the evaluation of the MVMR app in the first iteration), this chapter focused on the integration of the suggestions made by students (in the evaluation stage) in the first iteration on how to improve the MVMR app. This chapter will focus on implementing the feedback from the evaluation of the MVMR application in the first iteration into the development of the application in the second iteration. This chapter, therefore, starts with the introduction and goes straight into the development stage of the DSR process model of the second iteration, i.e., integrating changes to the pages of the MVMR app, its features and its functionality requested by students in the first iteration by students. (Please refer to the red arrows in Figure 35 below for a depiction of this adaptation.)

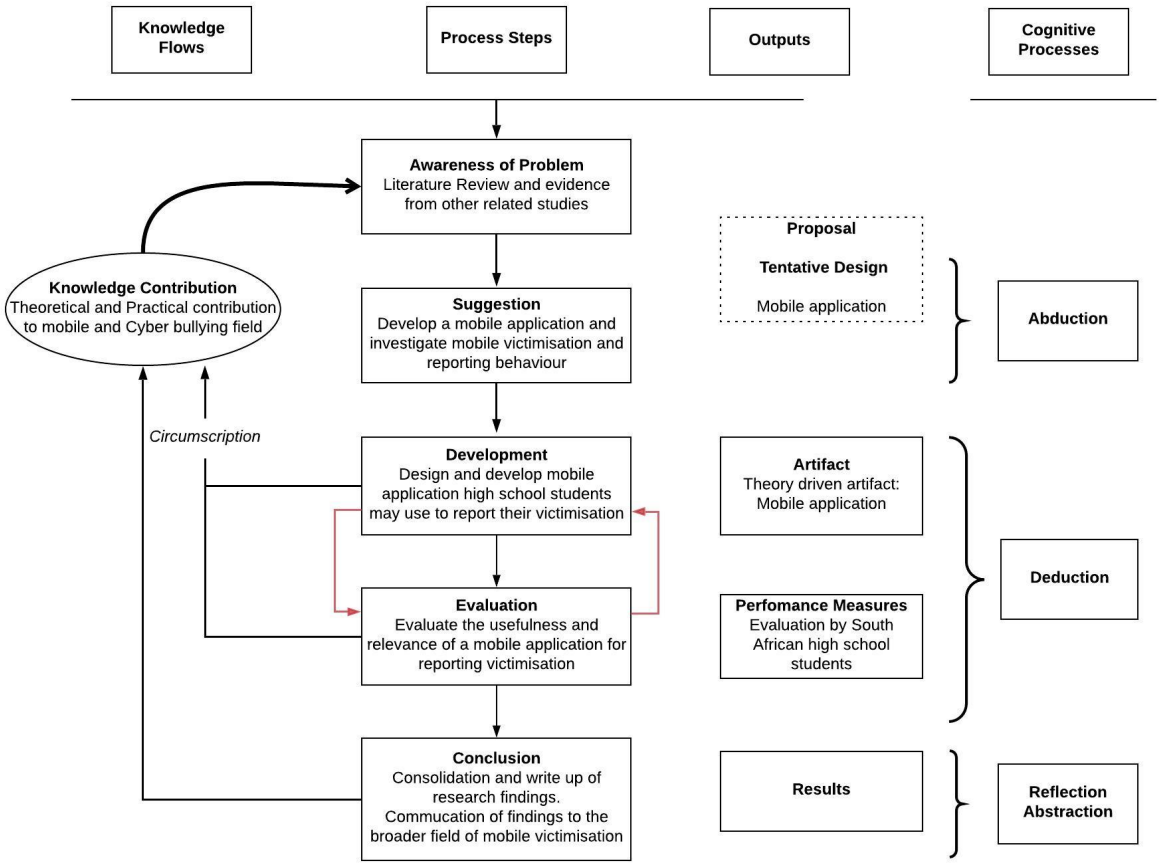


Figure 35: Implementation of Design Science Research Process Model - Second Iteration

7.1 Introduction

The first iteration of the development of the MVMR app was completed on the popular app development website Appy Pie. The MVMR app developed in that iteration collected data from students in a survey, allowed students to report their victimisation and provided them with resources to support those who suffered from mobile victimisation. The application also provided an interface that students were more likely to engage with, provide feedback on and comment on its effectiveness. Based on the evaluation of the MVMR app, the overall design was popular with students but required further refinement. In addition, the full concept of the MVMR app itself was not fully accomplished. The MVMR app managed to collect data from students using a digital survey when instead it should have collected data to capture the dimensions of the MVT digitally. Not only does using a digital survey limit students' perception of usage, filling in the digital survey was cumbersome for students since other pages had a significant amount of reading as well. Other limitations of the MVMR app included its

very large application size of 50 megabytes and a reliance on stable Internet connectivity, which meant students would often need significant amounts of credits to allow reporting.

Due to the use of Appy Pie, the MVMR app in its first iteration was simple and quick to develop and easily distributable to students. However, because of the rigidity of Appy Pie in allowing users to integrate features that are not offered by them, a new platform would be required to build the final research solution to be given to students. Of concern when choosing a different platform was whether the platform used could support the functions and features required for developing the MVMR app and the cost (both temporal and financial) of using the platform. While many platforms exist that may be used to develop Android applications (such as Xamarin, Ionic, Eclipse and Vysor), Android Studio was the platform chosen to develop the final version/s of the MVMR app. Android Studio is the official Google IDE (integrated development environment) for the Android platform (Studio, 2017). Android Studio and its accompanying Android SDK (software development kit) are thus the best choices for many Android application developers as it gives them access to advanced features of the platform, speeds up the development process and helps build applications of high quality by providing a set of tools that enables users to create applications (Mockplus, 2018; Grills, 2018; Stone, 2018; Sinicki, 2018; Zechner, DiMarzio & Green, 2016). They also are the fastest to set up, with plenty of learning resources online to guide development and they present the best possibility of being able to perform all the functional requirements with the least challenge. Furthermore, the researcher was more familiar with Android Studio and its capabilities.

7.2 Development

This section will first discuss the architecture of the MVMR Application and then go into the actual application and its functionalities.

7.2.1 MVMR Application Systems Architecture

Figure 36 below shows a high-level depiction of the MVMR application's architecture. The figure shows the main sub-modules of the MVMR and how they communicate and relate with each other.

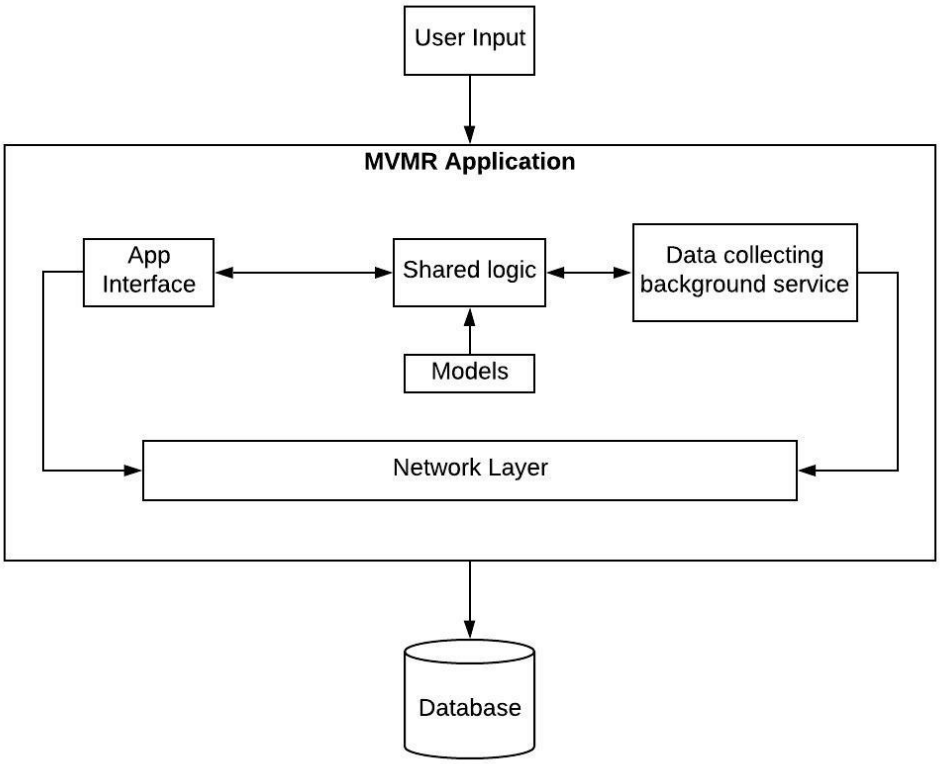


Figure 36: Systems Architecture of MVMR Application

As can be seen in Figure 36 above, the MVMR application has two major components communicating with each other, i.e., the application installed on mobile phones and the external storage where the collected data are stored. The application component consists of five layers – the app interface, shared logic, data collecting background service, network layer and the models. The app interface is the interface that students interact with to navigate the application. It conveys the components that capture and display information. The data collecting background service collects information about the application usage and functions unobstructed in the background. The shared logic layer permits common functions of the app interface layer and the data collecting background service layer to occur. These three layers interact with the network layer which then sends data to the database that stores the data collected. These layers are discussed further below.

7.2.2 The MVMR Application Interface Layer

The app interface layer consists of many components called activities. In an Android application, an activity represents a single page of the application. Every screen of the

application is thus an activity which contains subcomponents which perform various tasks. Each activity consists of a view and a controller (Fan & Wong, 2016). User interface elements in an Android application are built using View and ViewGroup objects (Fan & Wong, 2016). The view subcomponent is what the user of the application sees and interacts with on the application (Fan & Wong, 2016). It also displays output from the MVMR application to the user. The controller subcomponent manages the functionalities of the parts of the view by displaying data in the view object and by responding to user input (Fan & Wong, 2016). The controller also calls on shared logic to gather the data collected from the view so that it may be stored in an external database through the network layer. This way, every activity is self-managed and contained. (Please refer to Figure 37 below for the architecture of the App Interface layer.)

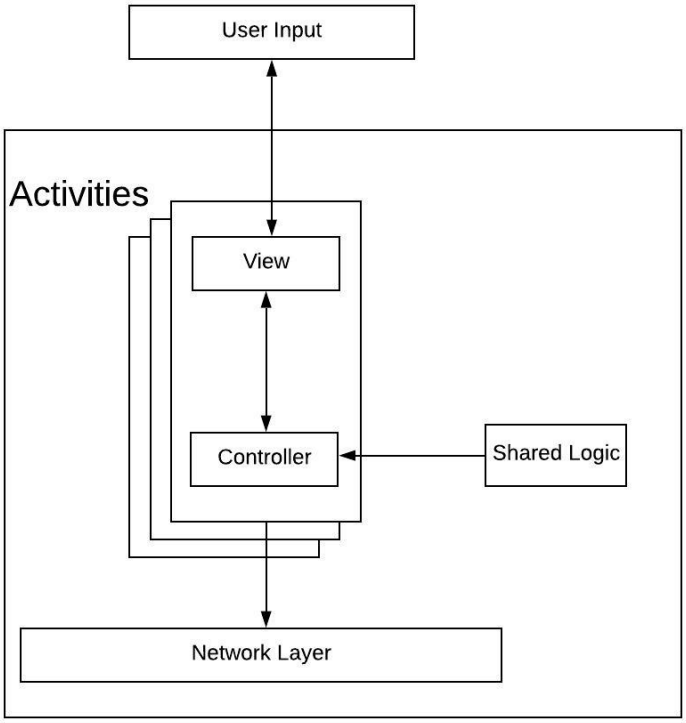


Figure 37: App Interface Layer

Each activity is presented to the user as a different screen and performs specific tasks on the MVMR app. The main activities of the MVMR application are the Survey Activity (which manages the questionnaire users complete), the Report Activity (which allows the user to report victimisation), Home Activity (which is the root activity of the application) and the Rating activity (which allows students to rate the MVMR application).

7.2.3 Data Collecting Background Service

Once the MVMR app is installed and first started on a mobile phone, a listener service is created. A listener service is the core of the data collecting background service because it records user actions discretely in the background. The listener service creates receivers which listen for particular events broadcast by the Android operating system and acts accordingly (Figure 38). For the MVMR app, there are two receivers. One receiver is for a "screen on" event and the other is for a "screen off" event.

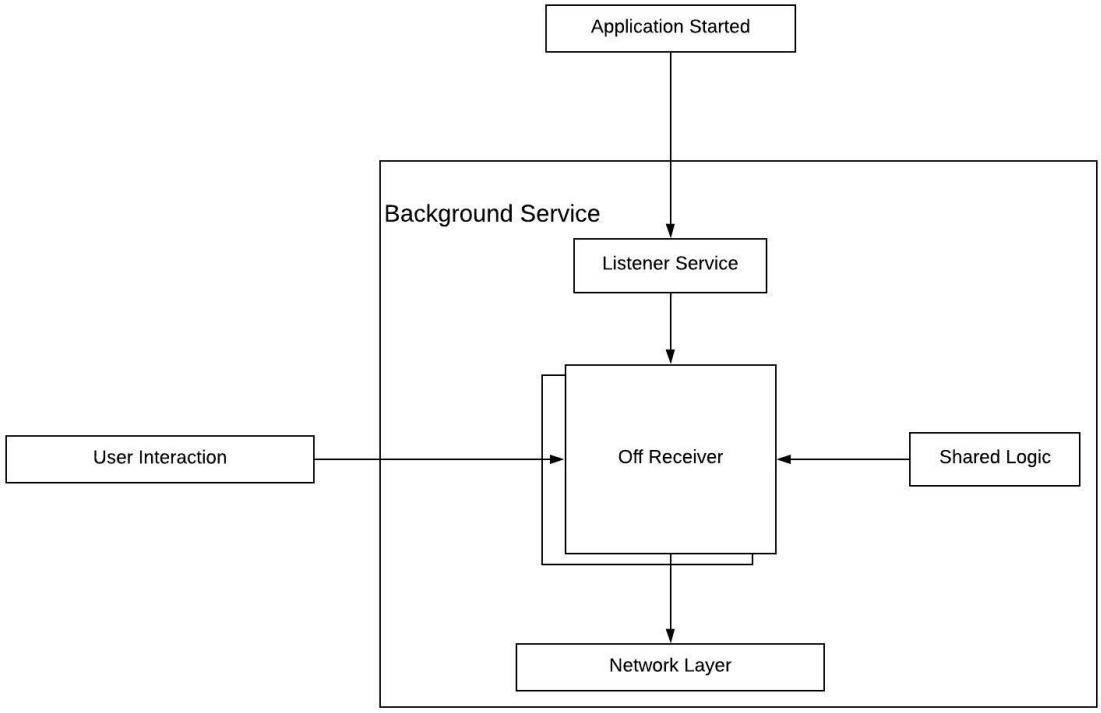


Figure 38: Data Collecting Background Service

The background service component runs behind the scenes on the device and does not interact with the user directly. Similar in a way to the controllers on the App Interface layer, the receivers are broadcast an event by the user's interaction with the MVMR app, they then perform the task that has been communicated and finally use the network layer to send the data to external storage.

7.2.4 Network Layer and Storage

As has been shown by the app interface layer and data collecting background service layer, much of the information that is collected using the MVMR app goes through the network layer.

This is because the network layer sends all the data collected to external storage. The primary means by which the data is stored is in a NoSQL database hosted by Firebase and the secondary means is e-mails as backup of the data collected and also as a means by which reports are seen as they come in (Figure 39).

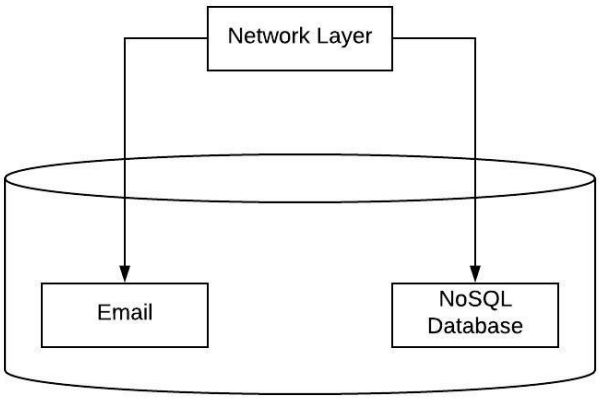


Figure 39: Network Layer and Storage

To accommodate the students' recommendation, changes were made to the MVMR app's interface. These changes are discussed in more detail below.

7.2.5 The MVMR Application

Once the application is installed and opened, the opening page gives the students a "**How to use MVMR**" page. This page begins by giving the definitions of mobile bullying and mobile victimisation. Effort was made to give students these definitions because of the controversies in defining mobile bullying and victimisation. Researchers in the field of bullying also recommend that one should start by defining bullying to avoid potential confusion which may confound the findings. The page then instructs students on how to use the application in the form of steps. This is so that the students are aware of these terms as they are used in the steps and in the application. It also gives them an idea of the purpose of the application before they actually use it. (Please refer to Figure 40 below for the How To Use MVMR page.)

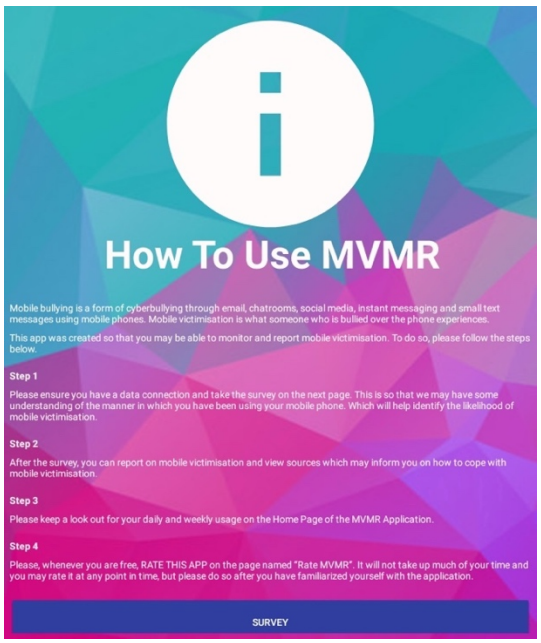


Figure 40: How to use MVMR page

This page is unavoidable and appears once per installation of the MVMR app. This is in response to comments from students such as P16 (a victim and bystander of mobile bullying) who stated, "*It's necessary to define things and not make it vague, but it's also difficult to do that without it becoming too much.*". Student P9 (who had experienced both that is, traditional and cyberbullying) added, "*...if I was a victim, I wouldn't download it because I wouldn't know what it would do.*". The following steps were given in brief and were:

> ***Step 1 –*** *Please ensure you have a data connection and take the survey on the next page. This is so that we may have some understanding of the manner in which you have been using your mobile phone, which helps understand the likelihood of mobile victimisation.*
> ***Step 2 –*** *After the survey, you can report on mobile victimisation and view sources that may inform you on how to cope with mobile victimisation.*
> ***Step 3 –*** *Please keep a look-out for your daily and weekly usage on the Home Page of The MVMR Application.*
> ***Step 4 –*** *Please, whenever you are free,* ***RATE THIS APP on the page named "Rate MVMR".*** *It will not take up much of your time and you may rate it at any point in time, but please do so after you have familiarised yourself with the application.*

The data connectivity is of great importance when students use the MVMR app since students at School A (located on the shores of False Bay, on the eastern side of the Cape Peninsula) indicated that the MVMR app was responding slow in the area they were in. Student P3 (who

had also extensively experienced verbal and emotional bullying and, was a bystander to cyber and mobile bullying) showed frustration by stating that she did not like the application because it was "*taking long*". As with any mobile application, students were instructed to ensure that they had network connectivity when using the MVMR app.

The students were also informed on the reporting capability of the MVMR app as this is the main purpose of the application and also of the daily and weekly usage statistics the application would give them. These will be discussed further below. Also, of great importance for the purpose of this study is the evaluation of this application, so students are asked to rate and comment on the application.

7.2.5.1 Survey Page

After reading these steps, students take a survey that helps inform understanding of their mobile phone behaviour and their behaviours. The survey is directly after the steps, meaning that it is unavoidable as it has to be taken to get to the Home page of the MVMR app. Therefore, after reading the How To Use MVMR page, students take the survey. Please refer to Figure 41 below for the Survey page of the MVMR.

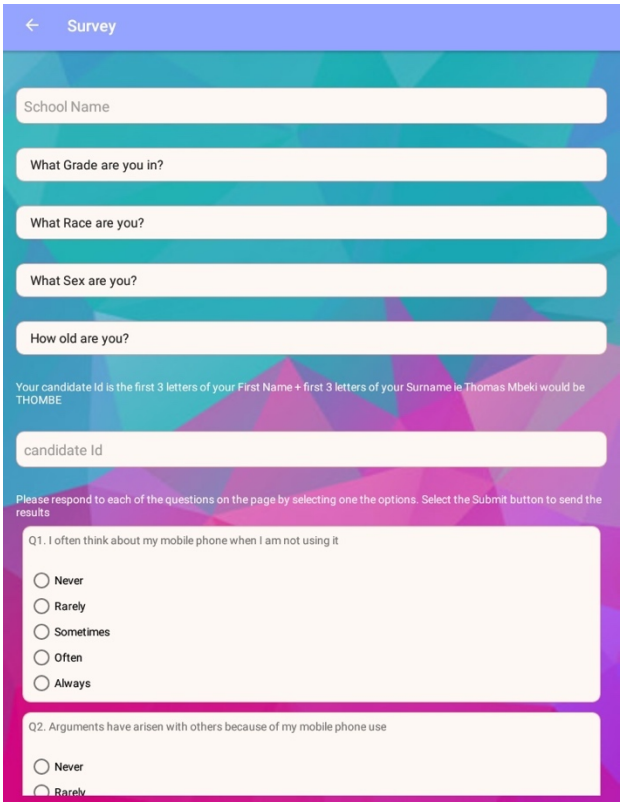


Figure 41: "Survey" page of the MVMR

Within the survey, the students' demographic information is asked for. This includes their Grade, Race, Gender/Sex and their Age. To maintain anonymity as promised in the Ethics application to UCT, students were not asked for their names but were assigned Candidate IDs. The Candidate ID was a six-letter identifier that consisted of the first three letters of a student's first name and the first three letters of their surname. For example, Shallen Lusinga's Candidate ID would be SHALUS. In this way, anonymity is secured where the students are anonymous to the researcher but the schools themselves would be able to assist with finding these students if need be.

After these details were entered, the students could take the survey. The students had to answer twenty questions in the survey so that the process did not become exhausting. (The questions are shown in Table 16 below.) The questions were asked to capture the constructs of the integrative model that could not be captured digitally. The constructs of great importance in the integrative framework that were to be captured were the frequency of use, attachment to the mobile phone, and the advancement of mobile phones. In addition, the economic, psychological and socio-cultural aspects of the students were to be captured. The culture was

captured in the demographic segment where items such as race could be used as significant indicators of culture. The survey, therefore, captured the attachment, the economic, psychological and socio-cultural influences of the students.

Table 16: Survey Questions in the MVMR Application

Question Number	Construct Captured	Survey Question
Q1.	Attachment.	I often think about my mobile phone when I am using it.
Q2.		Arguments have arisen with others because of my mobile phone use.
Q3.		I interrupt whatever else do when I am contacted on my mobile phone.
Q4.		I have been unable to reduce the number of times I use my mobile phone.
Q5.	Mobile bullying interventions.	I have reported being mobile bullied
Q6.		There are mobile bullying interventions at school or at home
Q7.		These interventions work efficiently
Q8.	Reporting mobile victimisation.	I have reported being mobile bullied to any law enforcement (SAPS)
Q9.		I have reported being mobile bullied to my friends.
Q10.		I have reported being mobile bullied to my parents or family
Q11.		I have reported being mobile bullied to the school
Q12.		I have reported being bullied to Social Media Apps (e.g. Facebook, Twitter, Instagram)
Q13.		I have reported being bullied to Chat Apps (e.g. Hangouts, WhatsApp, BBM)
Q14.		Reporting on social media apps and chat apps is effective
Q15.	Psychological and Emotional influences of reporting mobile victimisation.	Fear influences whether I report mobile bullying.
Q16.		Shock/Surprise influences whether I report mobile bullying.
Q17.		Anger influences whether I report mobile bullying.
Q18.		Sadness influences whether I report mobile bullying.
Q19.		Other emotions influences whether I report mobile bullying.
Q20.	Costs versus benefits of reporting.	The benefits of reporting outweigh the consequences of reporting.

The items in the survey were measured on a 5-point Likert scale (1= Never; 2= Rarely; 3= Sometimes; 4= Often; 5= Always). Once the survey was submitted, the results of the survey were then stored in a database. The researcher also receives an e-mail with the results of the survey. In this email, as indicated by the red boxes, the researcher would get the students' demographic information, their responses to the each survey question (separated by a comma) and information pertaining to the technological advancement of the mobile phone. (Please refer to Figure 42 below for a screenshot of the email received.)

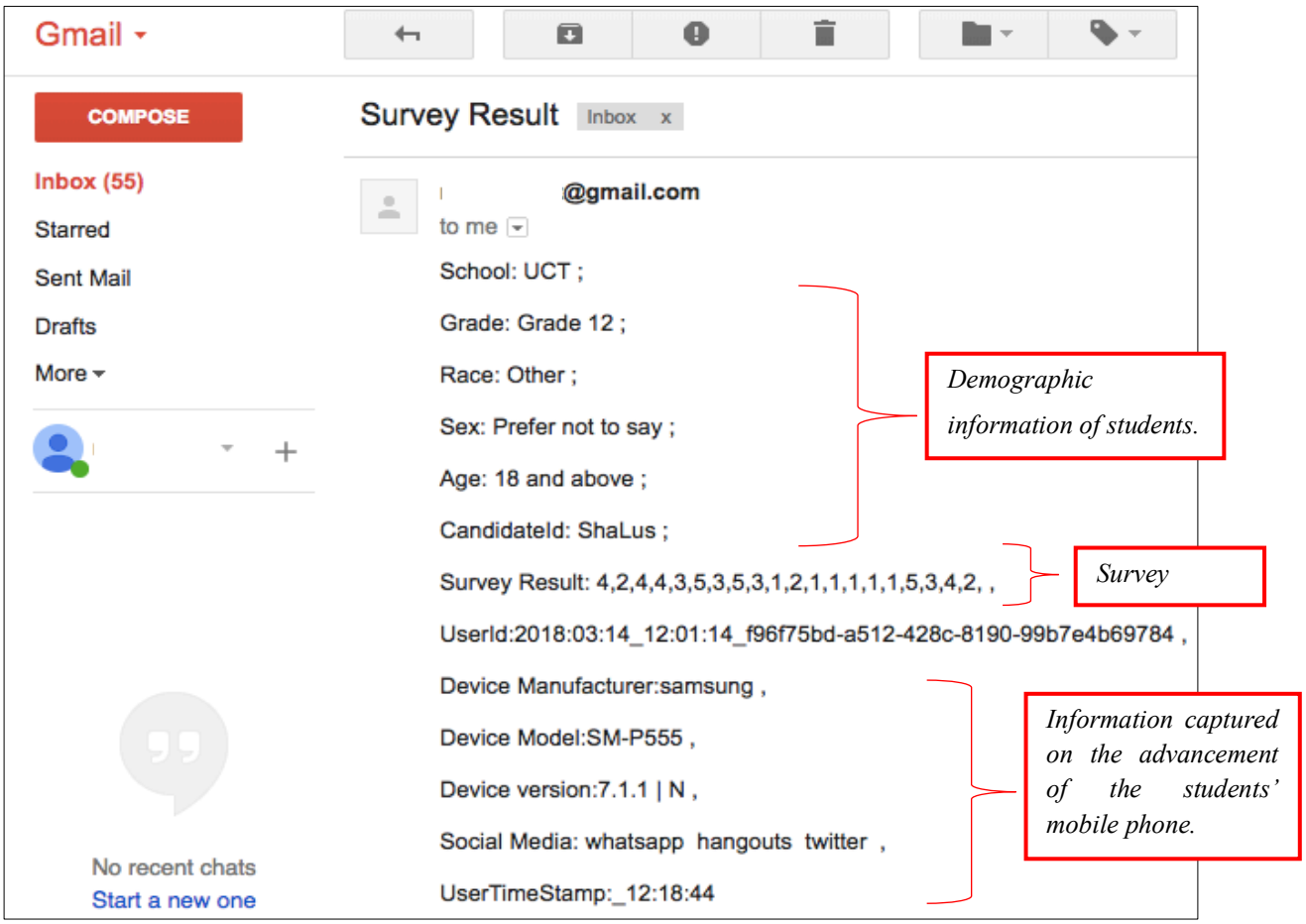


Figure 42: E-mail notification of submitted Survey Results from the MVMR

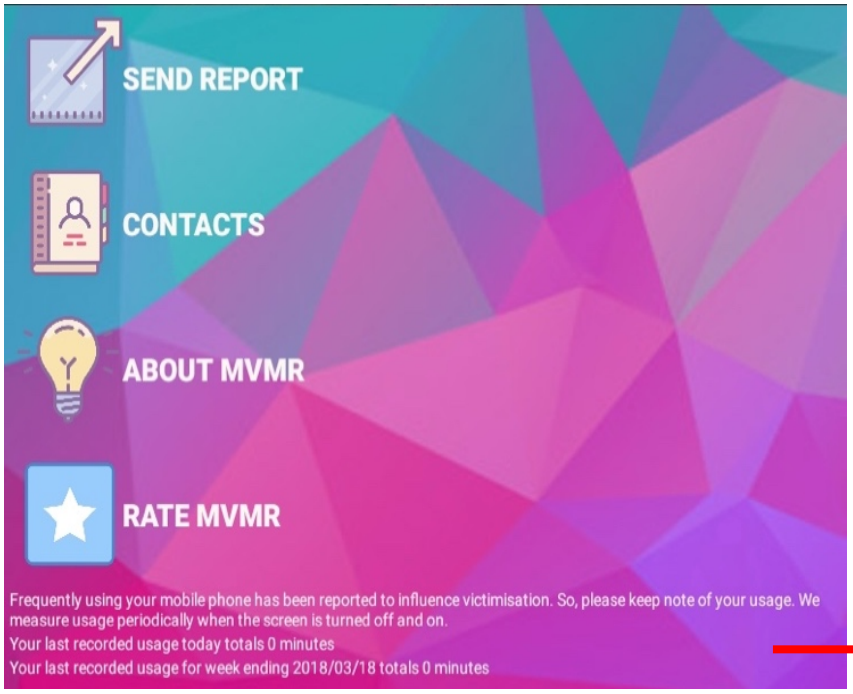
Regarding the frequency of use and the advancement of the mobile phone, the MVMR app measures and captures these digitally. Once installed, the application begins to measure instances of the mobile phone in use and totals the time spent by a student using their phone. As noted in section 7.2.3, the MVMR application has two receivers, one for a "screen on" event and the other for a "screen off" event. Therefore, each time a student's mobile phone is in use,

the time difference between a “screen on” and a “screen off” event is tallied up to capture the frequency of use.

The application also detects the advancement of the students’ mobile phones by identifying the brand and model of the mobile phone as well as the version of Android operating system. It is also able to detect the applications on the mobile phone that may be used to commit mobile bullying, for example Facebook, Twitter, WhatsApp, etc. All these details are recorded and stored in a database and are also shared with the researcher by e-mail when students submit a survey or when they rate the application. This is also illustrated in **Error! Reference source not found.** above.

7.2.5.2 Home Page

After the students submit the survey, they have access to the home page. On this page, there are the "Send Report”, “Contacts”, “About” and “Rate MVMR” pages. In addition to these options, there is text that feeds the frequency of use to the students. Please refer to Figure 43 below for the Home Page.



Message to students to pay attention to their mobile phone usage. Their daily and weekly usage in the form of

Figure 43: MVMR Home Page

The purpose of the frequency of use data being shown to the students is to inform them as well as to create awareness of their usage so that they may exercise control when using their mobile phones. The data given to the students is both their daily usage as well as their weekly usage information. This is of great importance since research has shown that frequency of mobile phone use may influence victimisation. Therefore, creating the awareness of their usage could help in curbing excessive use of mobile phones. This frequency of use information is placed on the Home Page because when the application is opened, the students are directed to the Home Page. This then means that whenever they open the application, they will see their frequency of use and be aware of it. P13 (who had experienced both traditional and mobile bullying and often retaliated to the bullying) stated that "*I would be actually interested to see how much I use my phone*". This way, students who would be interested in knowing the time they spend on their mobile phone is achievable on the MVMR app.

7.2.5.3 The Send Report Page

The Send Report page is where the students may report their victimisation. In it, the students may describe their bullying incidents. (Please refer to Figure 44 below for the description of the Report page.)

Students may describe in as much detail as they would like the incident that happened. They may also include their name or their bully's name.

Students may indicate the application they were specifically victimised on. These are all listed and the student may click on a specific platform.

Students may indicate whether the researcher should inform the school authorities or not.

Students may state the date in which the incident happened.

Students may also upload images (i.e., screenshots of the incident) as evidence or proof of their victimisation as their bullies may edit or delete their comments on many of the social media platforms.

Students may state whether they were the victim, a bystander or would rather not say.

Students may state whether they would like to be contacted via phone or e-mail.

Figure 44: Send Report Page of the MVMR

Once this report is submitted, the researcher receives an e-mail notification. (Please refer to Figure 45 below.) In the e-mail, the responses to the report are given. The data given from this form include the date and description of the victimisation, the platform the victimisation occurred on, whether the student is a victim or bystander, whether or not an image has been uploaded, the contact details of the student and whether the researcher should inform the school. Any entry that is false suggests that the student did not respond to that part of the report.

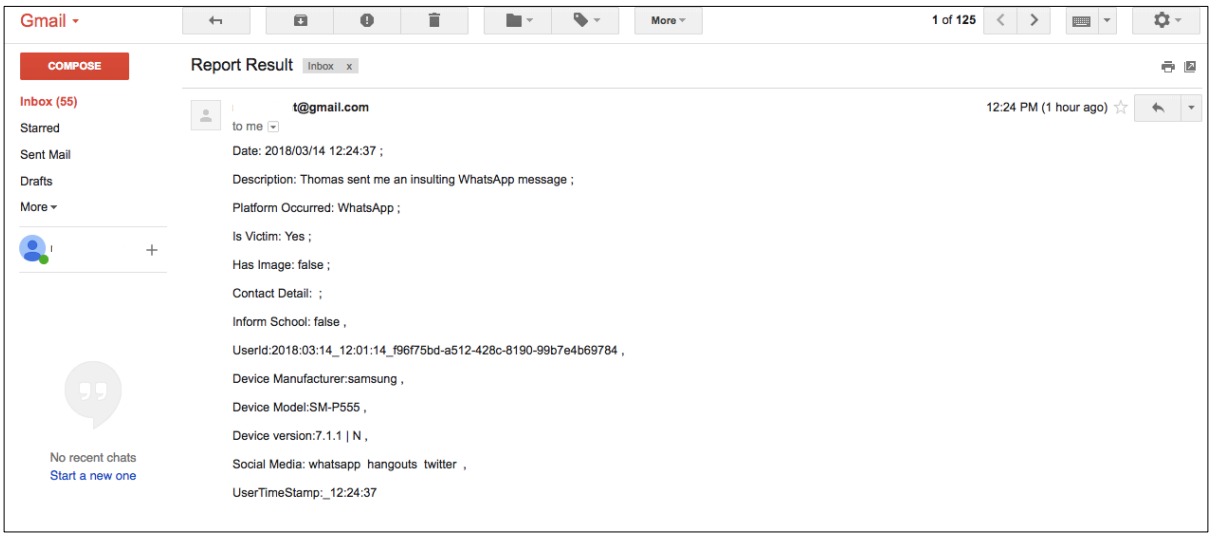


Figure 45: E-mail notification of submitted report

7.2.5.4 The Contacts Page

The Contacts page provides the students with the contacts to the South African Police Services (SAPS) in case of emergencies. The contact details of the researcher are also included in this page so that students may contact her if there are issues or concerns with the application. This is in response to comments by P10, who said "*I would put the counsellor's phone number there … For the school, if there is one. If there isn't, put a counsellor in case, let's say the person would like to speak to a counsellor"*. Resources that may be of use to students, such as websites that discuss cyberbullying, are also included in this page. These resources are informative and may bring awareness to the students with regards to understanding cyberbullying and how to deal with it. (Please refer to Figure 46 below.)

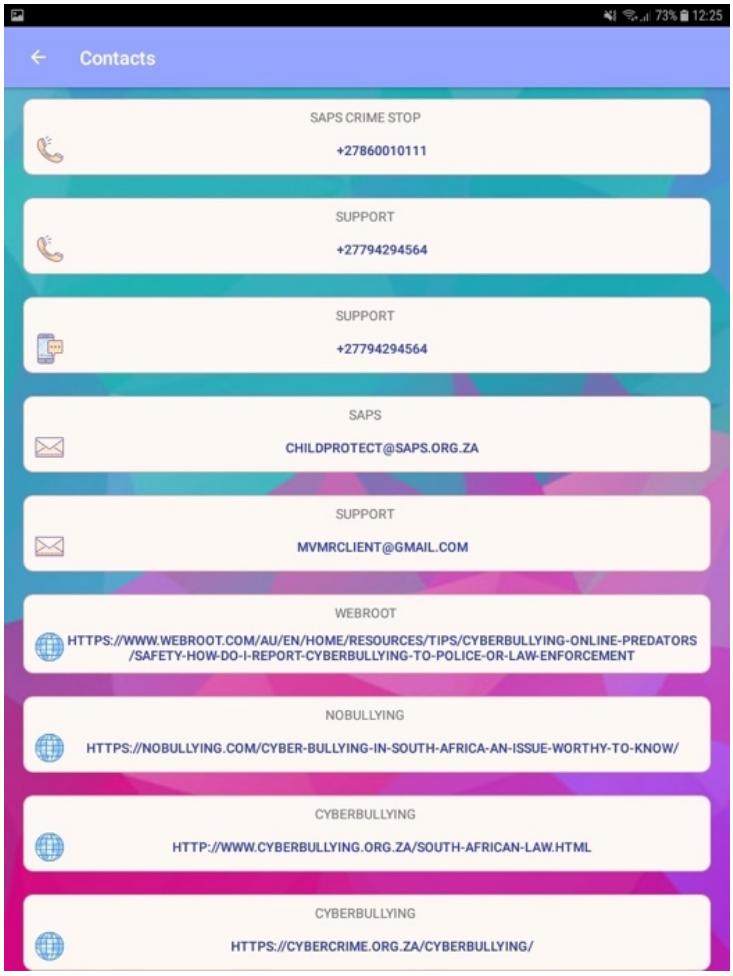


Figure 46: Contacts Page of the MVMR

7.2.5.5 The About Page

The About page gives the definitions of mobile bullying, mobile victimisation and the consequences of these phenomena. This is to create awareness and understanding for the students. The mission and vision of the MVMR app are also detailed in this page.

7.2.5.6 The Rate MVMR Page

The purpose of the Rate MVMR page is to evaluate the application while or after the application has been used by the students. The students may evaluate the application at any point in time, but they were advised to do so after familiarising themselves with the application. The rating system is both quantitative and qualitative in the form of a star system and open-ended questions respectively. (Please refer to Figure 47 below for the Rate MVMR page.)

For the Star rating system, students were asked:

1. *Please rate how the MVMR application looks*
2. *Please rate the quality of the MVMR application*
3. *Please rate the font size and text of the MVMR application*
4. Are you able to access the MVMR application easily?
5. Is the MVMR application available when you need it?
6. Was the How to page of the MVMR application informative or useful?
7. Was the About page of the MVMR application informative or useful?
8. Please rate the Report page of the MVMR application?
9. Does the Report page capture what you feel it should capture?
10. Is uploading an image in the Report Page useful?
11. On the home page of the MVMR application, your mobile phone usage is shown. Please rate the usefulness of this feature.

The star rating system is therefore on a scale of one to five, one-star indicating poor results and five stars indicating good results.

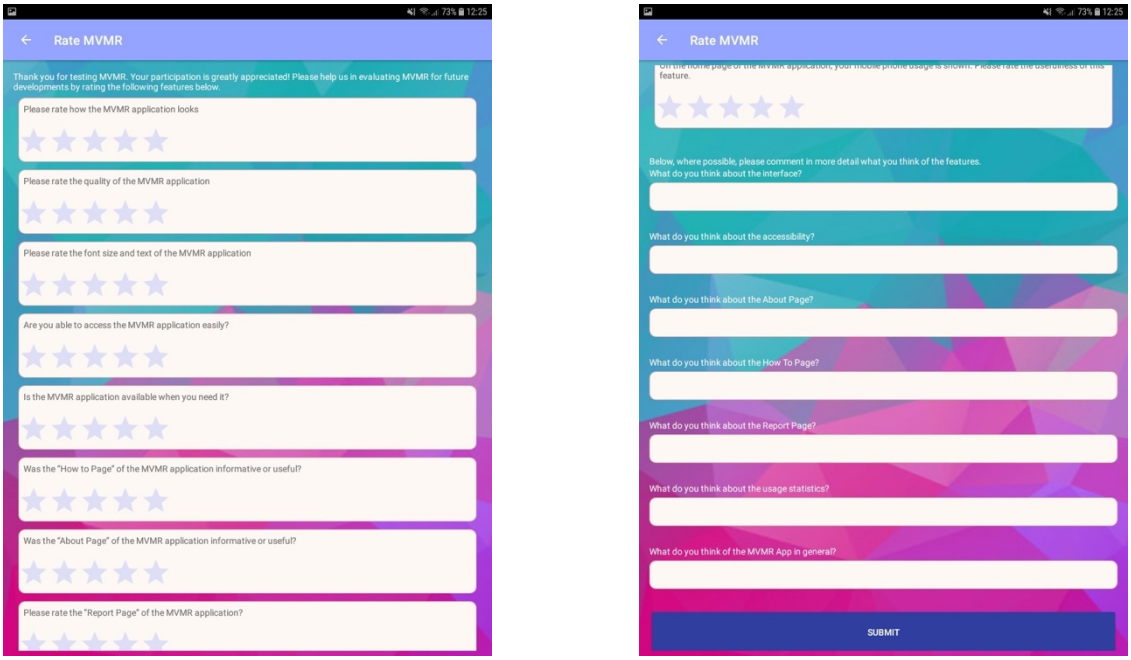


Figure 47: The Rate MVMR Page

For the open-ended questions, the students were asked to be more specific and add their comments or criticisms of the application and its features. Students were asked:

12. What do you think of the interface?

13. What do you think of the accessibility?
14. What do you think of About page?
15. What do you think of the How To page?
16. What do you think about the Report page?
17. What do you think about the usage statistics?
18. What do you think about the MVMR in general?

The purpose of the open-ended questions is to have students be more specific and descriptive in their opinions of the MVMR app. Once students submit this form, the information goes into a database and the researcher receives an e-mail. (Please refer to Figure 48 below for the e-mail received by the researcher when a rating has been submitted.)

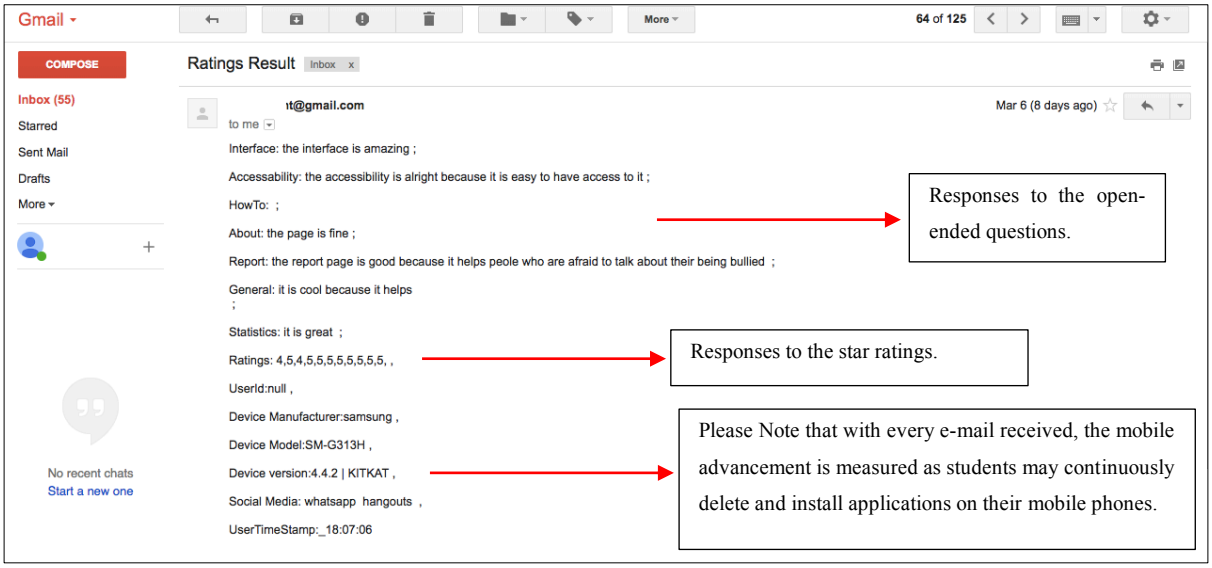


Figure 48: Rating Results from User

Table 17 below shows a summary of the changes made to the MVMR in the second iteration.

Table 17: Summary of changes made to MVMR version 2

Modifications Made
1) Use of Android Studio instead of Appy Pie for more flexibility in designing and developing MVMR application
2) MVMR application is able to collect frequency of mobile phone use and the advancement of the mobile phone digitally.
3) MVMR application is able to collect frequency of mobile phone use and share that information with learners so as to monitor their frequency of use.
4) Storage of data in on Firebase and may be accessed to use when intervening victimisation.

5) *Reduced size of application from 30mb to 3.3mb so that downloading and installing the app is faster and data consumption is lower as well.*		
Addressing Students Comments		
Participant	**Comments**	**Modifications Made**
P2, P4, P9	*"Probably that the words are too small, just the font size"*	*Increased font size of text.*
P3	*"the fact that it is taking long"*	*Instruct assurance of network connectivity.*
P9	*"... I don't think like if I was a victim, I wouldn't download it because I wouldn't know what it would do..."*	
P10	*"Maybe the pictures that say like "stop bullying" and "ugly" and stuff like that, maybe they would put people off because it would seem like they are trying to point out if they are being bullied or something like that."*	*Removed image depicting the words "stop bullying" and "ugly".*
P12	*"...screenshots might be a problem because sometimes they'll [the bullies] attack really personal things like family issues"*	*Inserting screenshots is optional.*
P16	*"[The "About" page] I think it's too long. I feel like if I saw this, I wouldn't read it… It's necessary to define things and not make it vague, but it's also difficult to do that without it becoming too much."*	*Dispersed the text to different pages so that the definitions are at the forefront, i.e., the "How To" page.*
P17	*"not much actually… I was going to say like maybe an interactive tutorial to show how it works but it gives a step by step instruction."*	*Steps of how to use the MVMR application are presented straight away to students that download the application and are simple and short.*

7.3 Evaluation

For the evaluation process in the second iteration, forty (40) students from three schools in Limpopo (School C, D and E) and one school in Johannesburg (School F) were surveyed. Of the four schools, only School D was a private school. The remaining schools were public schools. (Please refer to Table 18 below for the demographic information of the students that took part in the evaluation of the second iteration.)

Table 18: Demographic information of students

School	Number of students	Gender		Average Grade	Average Age
		Male	Female		
School C	8	5	3	Grade 11	17 years
School D	20	9	11	Grade 10	16 years
School E	8	4	4	Grade 12	18 years
School F	4	1	3	Grade 12	18 years
Total Number of students in 2nd iteration	**40**	**19**	**21**		

Students were advised on how to download and install the application. The instructions were given to the students are described below in Appendix 8. The students had to access the mobile application from the Google Play store. Google Play is a platform for Android phones in which people may access applications for their mobile phones. It was a good means by which to ensure that students would have easy and reliable access to the MVMR. Once students accessed the Play store, they had to search for the application "MVMR" and install it on their mobile phones. (Please refer to Figure 49 below.)

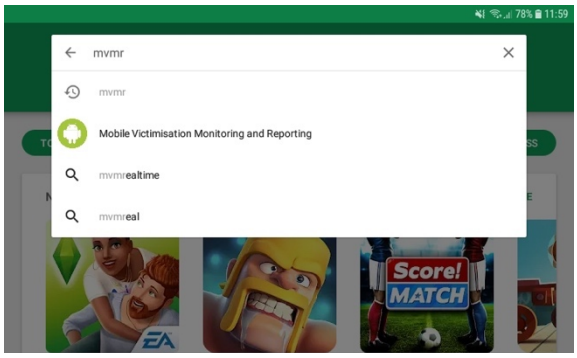


Figure 49: Searching for the MVMR in the Google Play Store

The data from this evaluation were collected on the students' mobile phones on the MVMR app on the Rating page as indicated above. For the second iteration, as in the first iteration, the students found the How To and the About pages useful and informative. The majority of the students found the MVMR app easily accessible. They also liked the interface and the reporting page. (Please refer to Table 19 below for the comments from seven of the 40 students.)

Table 19: Comments from students about MVMR Application

User	Age	Grade	Race	School	Sex	About Page	Accessability of MVMR App	General Impression of MVMR App	HowTo Page	Interface	Report Page	Frequency of use stats
E2	18 and above	Grade 11	African	C	Male	useful	victims	being help because of bullying	report	helpful	being helped	victimised
E5	17	Grade 12	White	D	Female	It's soooo colourful and useful	Super easy to access :)	Brilliant ! Super usefull , easy to access , and keeps your name safe	Great!!	Gooood :D	Brilliant , you can say exactly what happend , when and where it happend and how you feel	Very useful
E7	16	Grade 10	White	D	Female	great	great	great	great	fantastic...i really hope it wil help	awesome	great
E8	15	Grade 9	African	D	Female			MVMR is a great idea and I think that it will help us as school children and to show that nobody should be bullied and bullying is a crime and give people the confidence report such uncivilised barbaric behaviour, Props to the creator of this app		The interface of this app is amazing		
E10	17	Grade 12	African	E	Male	it is helpful	very very easy	mvmr is very effective and helpful when it comes to reporting mobile bullying shout out to the inventor very very nice work and thanks	it is simple and clear	it is good	it is clear and straight forward	it does not use too much data
E12						where you will be reading the information and understand very well	the quality of being able to be reached or entered	will help many people whom have been bullied	to format the page numbering for different section or to follow the steps	a user,consisting of the set dials, knobs operative system commands	to be able for them to see or hear about your cyberbullying	it's a nice usage statistics thou
E14	18 and above	Grade 12	African	E	Female	i will those who are afraid to speak out face to face						

Unfortunately, not many students responded to the open-ended questions. As stated in Chapter 4 (the Research Methodology chapter), this was expected because one of the major disadvantages of open-ended questions is that they take longer to complete than closed-ended questions, especially for respondents that are not articulate (Williams, 2003). This was the reason closed-ended questions were included in the evaluation of the MVMR app since they are quicker to answer and they require less effort in being coded for analysis as the responses would already be scaled. This proved necessary as, while only seven students responded to the open-ended questions, all the students who took part in this iteration responded to the closed-ended question with the star rating system. These closed-ended questions may be used in capturing the opinions of respondents and must not be confused with scales, "which are a coherent set of questions or items that are regarded as indicators of a construct or concept" (Corbetta, as cited by Saunders et al., 2009: 378). The questions for this system are listed is section 7.2.5.6 above.

Given that many users download mobile apps from app stores such as Google Play (one of the largest app stores) and rate their experience of using the apps, this study emulated the same processes of rating and acceptance that these stores do (Ruiz, Nagappan, Adams, Berger, Dienst & Hassan, 2015). For example, Google App stores employ ratings on a scale of 1 to 5 stars (Ruiz et al., 2015). Most app store ratings use a static rating system such as this to help customers differentiate the apps that have high or low satisfaction levels among users (Ruiz et al., 2015). Studies in other types of online markets such as online stores have also analysed how such ratings influence a customer's decision to acquire a product. Recent research shows that the ratings correlate strongly with download counts, a key measure of a mobile app's success (Ruiz et al., 2015). While these systems have been useful, some believe there is still need for a careful rethinking of this system (Ruiz et al., 2015). However, considering the historical usefulness of this system, the researcher adapted it to assess the level of acceptance and satisfaction of the aspects of the MVMR app that the students would be directly exposed to, that is, the interface, the students' reception of the quality of the MVMR app and the reporting page and whether it captured all the necessary information the students felt was needed. The following pie-charts conveyed the levels of acceptance and satisfaction of the students, with five stars exhibiting the highest and one star the lowest levels of acceptance and approval.

The average rating for the MVMR application is shown in Figure 50 below. The average rating value considers the rating on the How To page, About page, Report page, the interface of the application and the general impression students had of the application.

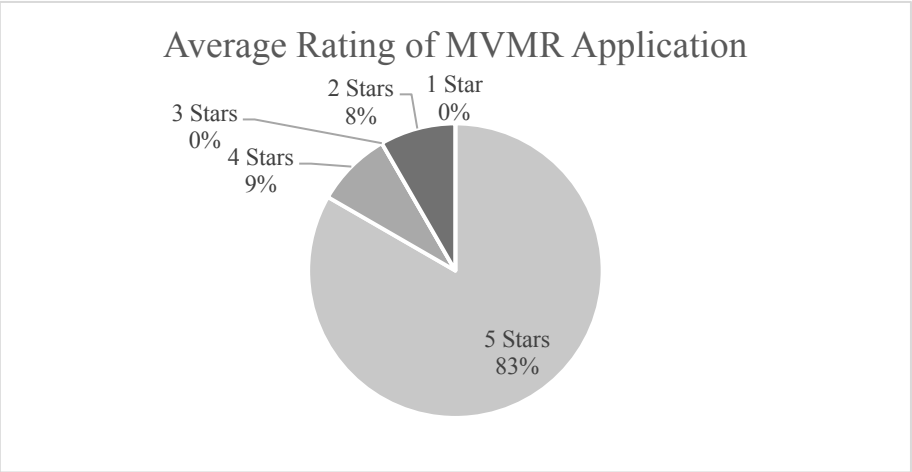


Figure 50: Average rating of MVMR Application

Of the 40 students, 83% gave the MVMR app an average of five stars, indicating that they felt that the MVMR app was overall good; 9% of the students gave an average rating of four stars, and 8% of the students gave the application an average rating of two stars. Overall, 92% of the students gave the MVMR application high ratings (four and five stars). This is corroborated by students E2, E5, E7, E8, E10 and E12 who stated that the MVMR app was "*helpful for bullying*", "*Brilliant! Super useful, easy to access and keeps you safe*", "*Great*", "*MVMR is a great idea and I think that it will help us as school children and to show that nobody should be bullied and bullying is a crime and give people the confidence report such uncivilised barbaric behaviour, Props to the creator of this app*", "*MVRM is very effective and helpful when it comes to reporting mobile bullying. Shout out to the inventor. Very, very nice work and thanks*", "*[MVMR* app*] will help many people whom have been bullied*" respectively in Table 19.

One of the major concerns to this study was the evaluation by high school students of the interface, the reporting page, the reporting itself and the application. This was so that the theme of "*designing for attention*" in the design of the MVMR app was maintained (Bowler, Mattern & Knobel, 2014). The *attention* of the students towards the MVMR app, therefore, required the researcher to pay close attention to the interface, the size the application would take up on one's mobile phone, the data consumption of the mobile application, and the students'

reception of the MVMR app, given that these were the attributes of the artefact with which the students would directly interact with the most. Much of the evaluation of the interface was, therefore, conducted during the first and second iterations of the DSR process. Consequently, the researcher, therefore, integrated the necessary changes suggested by students so that the application caught and held their attention. In order to capture the attention of the students, the MVMR app also provided students with resources that could be used to teach them about cyberbullying and mobile bullying and, the resulting victimisation that might be a result of these phenomena. In so doing, these resources would better inform the students about their victimisation experiences and encourage them to know when and how they had been victimised online or on their phones.

With regards to the interface, 73% of the 40 students gave the MVMR app five stars, 18% gave it four stars, while the remaining 9% gave the application two stars. (Please refer to Figure 51 below for the star ratings.) This meant that 91% of the students gave the MVMR application interface perfect or near-perfect ratings. This is supported by the comments of the students gave about the interface in Table 19 above. For example, students E5, E7 and E8 commented that the interface was *"Good", "Fantastic" and "the interface of this app is amazing"* respectively.

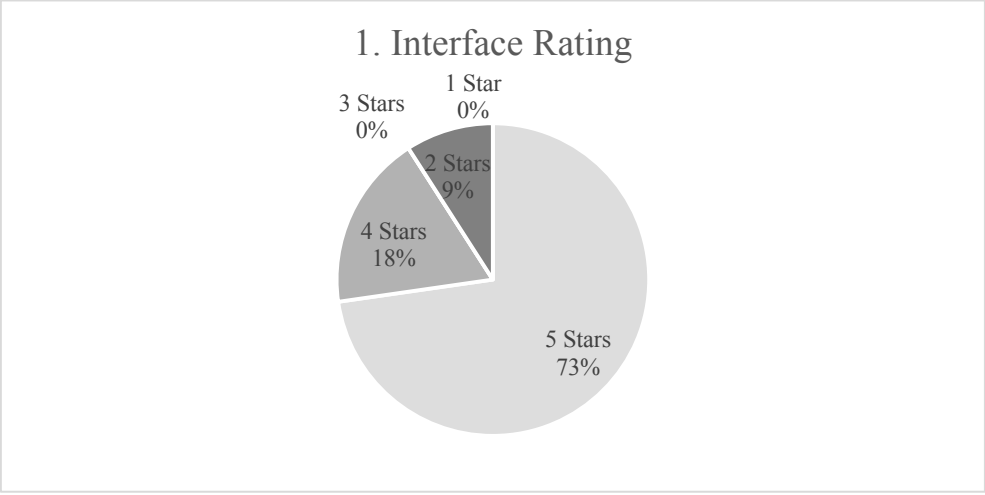


Figure 51: Students' rating of MVMR application interface

With regards to the quality of the MVMR app, the majority of the 40 students that rated the MVMR app's interface with 91% (36 students) giving the application five stars and only 9%

giving the application three stars (Figure 52 below). Using the metrics of online app stores of acceptance rate and, given that the majority of the students that took part in the study rated the application with five stars, these findings showed that students accepted and approved of the MVMR app's interface.

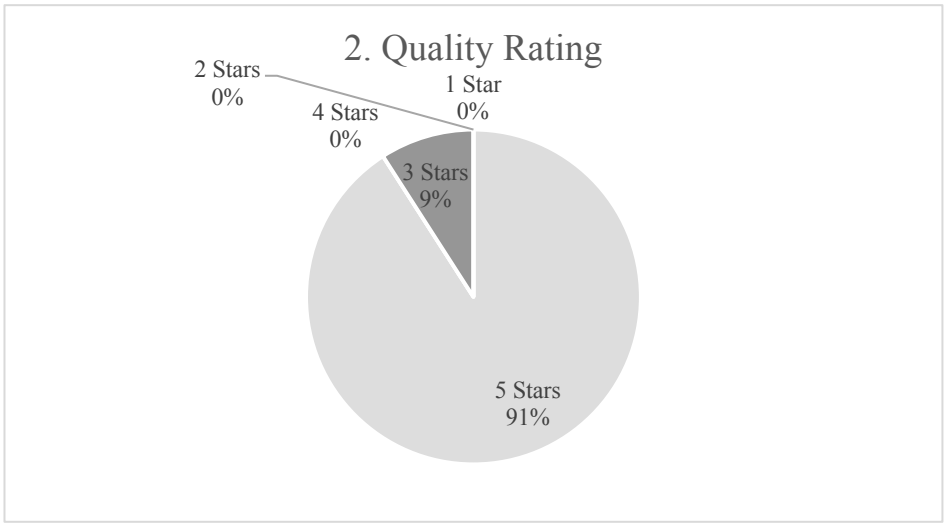


Figure 52: Students' rating of the quality of MVMR application

For the reporting page and the data collected on the reporting page, 83% of the 40 students gave a five-star approval for both the reporting page itself and whether it collected the necessary, relevant and adequate information that the students felt had to be captured and communicated to the administrator of the application (please refer to Figure 53 and Figure 54 below).

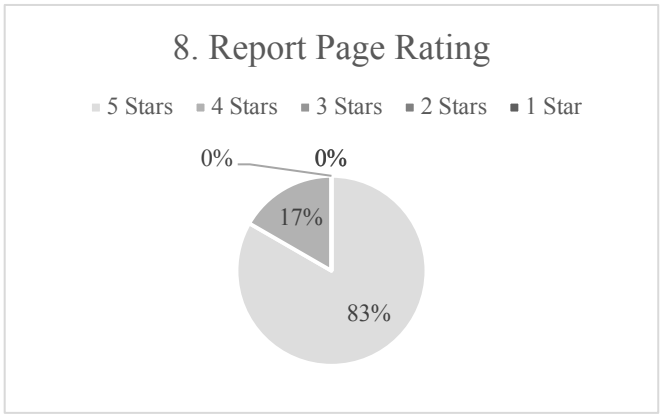


Figure 53: Students' Rating of The Quality of MVMR App

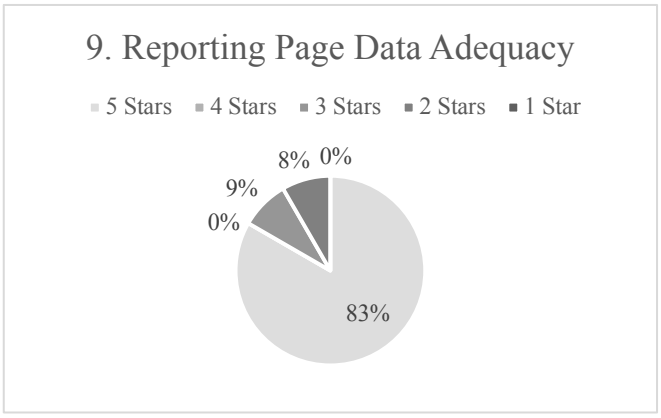


Figure 54: Students' Rating of The Quality of MVMR App

This is supported by students E5, E7, E10 and E12 who stated that, with regards to the reporting page, it was "*Brilliant , you can say exactly what happened, when and where it happened and how you feel*", "*awesome*", "*It is clear and straightforward*", *"[ability] for them to see or hear about cyberbullying*". Both the descriptive statistics and the qualitative data collected from the students support the indication that the majority of the students accepted the reporting page and the data collected on that page.

7.4 Conclusion

This chapter presented in detail the procedures carried out by the researcher in refining the MVMR app in the second iteration of design, development and evaluation. The evaluation of the artefact confirmed that the students found the MVMR app useful and effective. The students also approved of the interface of the MVMR app. Given that the front-end of the MVMR app had met the requirements of the high school students, the researcher went on to design the back-end of the MVMR app. The following chapter, therefore presents the last iteration in the development of the MVMR app.

CHAPTER 8 IMPLEMENTING DESIGN SCIENCE RESEARCH - THIRD ITERATION

"Simplify, simplify, simplify."
(Henry David Thoreau)

This chapter presents the third and last iteration of the adoption of the DSR process model by Vaishnavi and Kuechler (2004). In this chapter, the researcher proposed a prototype for the back-end of the MVMR application. The researcher proposed a dashboard that would display, to the administrator of the MVMR app, all the data collected by the MVMR from a student that submits a report of their victimisation. The chapter will begin with an introduction and follow up with the decision making process of choosing the appropriate data to visualise in a dashboard and the appropriate manner to visualise that data on a dashboard. Given that the proposed dashboard is conceptual, the chapter then ended with the design, evaluation and conclusion of this iteration which focuses on the dashboard. (Please refer to Figure 55 below for the overview of this chapter.)

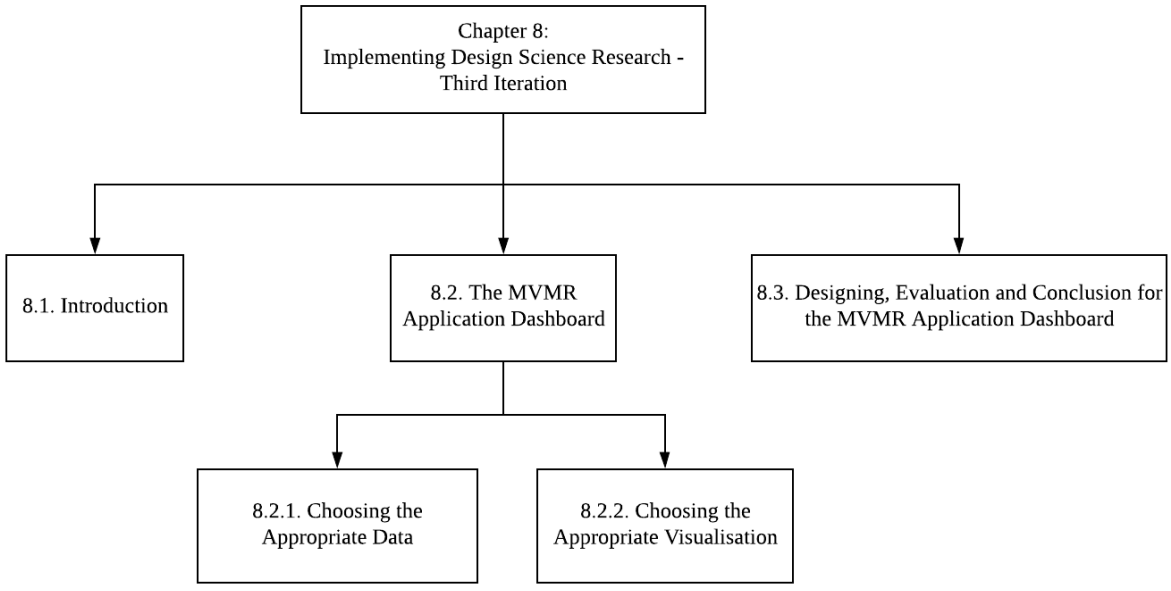


Figure 55: Overview of the Third Iteration

8.1 Introduction

The MVMR application was designed and developed to offer students a platform on which they may report their mobile victimisation. The behaviour of reporting mobile victimisation

acts as the *first step* towards intervening mobile victimisation. Schools and parents need to be aware of students' mobile victimisation before they may develop and implement policies and strategies that may help victims of mobile bullying.

The design and development of the MVMR mobile application has been driven, so far in Chapter 6 and Chapter 7, by what the students would have liked to report and what interface they felt comfortable using. This was so that the design and subsequent development of the MVMR app would be useful, effective and appropriate to the users of the application. However, as stated in Chapter 6, the completion of this task (i.e., developing a digital tool to monitor and report the mobile victimisation of South African high school students) would require both a personal and a theoretical basis. The researcher believes that, at this point, the personal perspective of developing a mobile application for reporting mobile victimisation has been implemented and achieved in the design of the artefact. Thus, after effecting all the recommendations from the evaluations stages of the first iteration in the second iteration and confirming the usefulness and relevance of the MVMR app to high school students, the researcher concluded the evaluation processes of the development of the MVRM app among high school students. This is because the successful development of an artefact is assessed by the contribution of the artefact in solving real-life problems (Hevner & Chatterjee, 2010; Peffers et al., 2007; Vaishnavi & Kuechler, 2012).

Given the findings from the evaluation phases of the MVMR app by high school students in the first and second iterations, the researcher deemed it necessary to conclude all evaluation as the students found the artefact to be useful and relevant. Deciding how many iterations of the DSR process to conduct can prove to be quite challenging (Tremblay, Hevner & Berndt, 2010). The literature states that the iterations should continue until nothing new is learnt (Krueger & Casey, 2000), however, nothing new being learnt is a difficult and somewhat arbitrary task. This is especially challenging in design research. When conducting the DSR process, the designers may discover that there is always room for improvement of an artefact and certainly a fair amount of subjectivity in interpreting when the design of an artefact is indeed complete (Tremblay et al., 2010). There is, however, a point where we choose to sacrifice in order to move forward (Simon, 1995). The researcher decided that the personal perspective of developing a mobile application for reporting mobile victimisation had been achieved in the

design of the artefact at this point. The theoretical perspective, however, had not been implemented.

In Chapter 5, Table 8 (i.e., the table "incorporating mobile bullying reporting principles with the MVMR"), the intentions of the researcher to automate the proposed integrative model were shown and discussed. In achieving these intentions to automate the integrative model, the theory-based data collection and interpretation of the integrative model would fulfil the theoretical perspective of designing and developing the MVMR app. The researcher believes that the theory-based data collected and displayed on the back-end of the MVMR app would be very useful and relevant to whomever receives the reports of mobile victimisation submitted by students on the MVMR app. This is because the data collected, with regards to the integrative model, would be informative about economic, psychological, socio-cultural and technological aspects of the victims of mobile bullying and could perhaps guide the administrator of the MVMR app to develop and/or implement personal and unique means by which to intervene a student's mobile victimisation.

The development of the back-end of the MVMR app was the third and final iteration of the implementation of the DSR process in this study. The inclusion of this third iteration illustrated the research rigour in achieving the research objectives of the current study (Hevner et al., 2004; Markus, Majchrzak & Gasser, 2002). Given that this study was a cross-sectional study and that the researcher was bounded by time, the researcher proceeded to develop and evaluate the back-end of the MVRM app with the researcher's thesis supervisor and colleagues on the Mobile Bullying Project (MBP) that is funded by the South African National Research Foundation (NRF). Members of this project are fully aware of mobile bullying and the subsequent mobile victimisation as phenomena of interest and importance. The reason for using these members to evaluate the back-end of the MVMR app was that the back-end needed to be practical, understandable and usable by the administrators of the MVMR app. Wang and Hannafin (2005: 10) suggest that "during development, the emphasis on quality shifts from validity to practicality and effectiveness, and design researchers may employ expert appraisals, try-outs, micro-evaluations, or field tests (van den Akker, 1999) as warranted by the changing research focus". Therefore, since the focus had changed from designing and developing the most usable, suitable and effective interface for students to report their mobile victimisation, to focusing on the feasibility of the design (for the potential application administrator), and

assessing whether the theoretical goals can be achieved through the intervention, the expert evaluation sufficed. The purposefulness of the MVMR application was thus maintained, ensuring adherence to discipline and scientific research standards and conventions (Shavelson, Phillips, Towne, & Feuer, 2003).

8.2 The MVMR Application Dashboard

The researcher decided that the data collected from the MVMR app about the students' behaviour would be better communicated through a dashboard. The term "dashboard" is used to describe a system that visualises data useful for decision making. Dashboards have the goal of informing while not distracting users from their actual task. Therefore, data in dashboards are "summarised, consolidated and arranged on a single screen so the information needed to achieve one or more objectives can be monitored at a glance' using charts, tables, gauges, and so on" (Few, 2006: 34). In addition, data can be simultaneously visualised in a number of ways, for example as a table, graph and map, with queries in the different panes replicated across them so that clicking on a data cell highlights the same data point on the graph and the area it refers to on the map. Dashboards have also been extended to visualise real-time data, thus enabling the dynamic nature of urban phenomenon, such as traffic flow or air quality or specific events, to be tracked and compared over time and space in the here-and-now (Kitchin, Lauriault & McArdle, 2015).

The attributes of dashboards explained above make it so that dashboards are useful if they support their users to fulfil their goals (Few, 2006). To obtain a useful dashboard one has to know the appropriate data that is to be visualised and the appropriate visualisation of that data. Few (2006) describes the means by which this may be done. The paper by Few (2006) guided the development of the MVMR application dashboard because it has a high number of citations on Google Scholar (1043 citations), validating to a large extent, its appropriateness in guiding the design and development of dashboards.

8.2.1 Choosing the Appropriate Data

The decision about what to measure must be informed by the expected benefit of the measurement. By using the Goal-Question-Measurement (GQM) model, one may document

the measurement goal, which questions needed to be answered to reach that goal and which data needed to be collected to answer the questions. The GQM model is defined on three levels:

1. At the conceptual level, the *goal* is defined i.e., what one wants to study and why one wants to study it. What is studied is the "*object of study*,", while why something is studied identifies the reason, the different aspects taken into consideration, the considered points of view, and the environment.
2. At the operational level, the *questions* are defined and they ask (a) what parts of the object of study are relevant, and (b) what properties of such parts are used to characterise the assessment or achievement of a related goal. These properties are often called the *"focus of the study"*. Overall, the questions specify aspects of the object of study to be observed in order to understand whether the goal is achieved or not. Questions, therefore, establish a link between the object of study and the focus.
3. At the quantitative level, the *measures* are defined as the data to be collected to answer the questions in an objective (quantitative) way.

It is important not to confuse the focus with the point of view. The focus is the part of the object of study that is studied and is an objective view on the object of study. The point of view describes the individual who is measuring and represents the subjective view of the measurement goal. The GQM model is a hierarchy of goals, questions, and measurements (see Figure 56 below). This hierarchy details what is measured and how the results have to be interpreted.

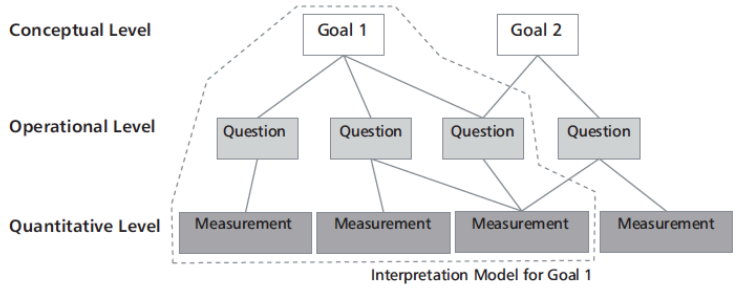


Figure 56: A Goal-Question-Measurement Model (Few, 2006)

Due to the definition of measurement goals being critical to the successful application of the GQM approach, the GQM approach was developed with a goal template to assist in precise

measurement goals. The goal template requires the dashboard's designer to state the purpose of the measurement (what it is measuring and why), the perspective (what specifically is observed, the focus, and from which point of view the observation is made), and the environment (in which context the measurement takes place). This helps us to understand which data is needed to fulfil the measurement goal and to understand how to interpret the collected data. Once the goal or goals have been defined, the questions that characterise the goal in a quantifiable way are defined and the measurement that describe the data that will be used to answer the questions are defined. GQM questions may characterise the object of study with respect to the overall goal, characterise relevant attributes of the object of study with respect to the focus and relevant characteristics of the object of study with respect to the focus. After defining the questions, we have to define which measurements we are going to collect to answer them. The choice of measurements to answer the developed questions depends on different factors, such as the amount and quality of data that is already available, the cost-benefit ratio of performing a specific measurement, the level of precision needed, and so forth. Figure 57 represents the application of the GQM model for developing the MVMR application dashboard.

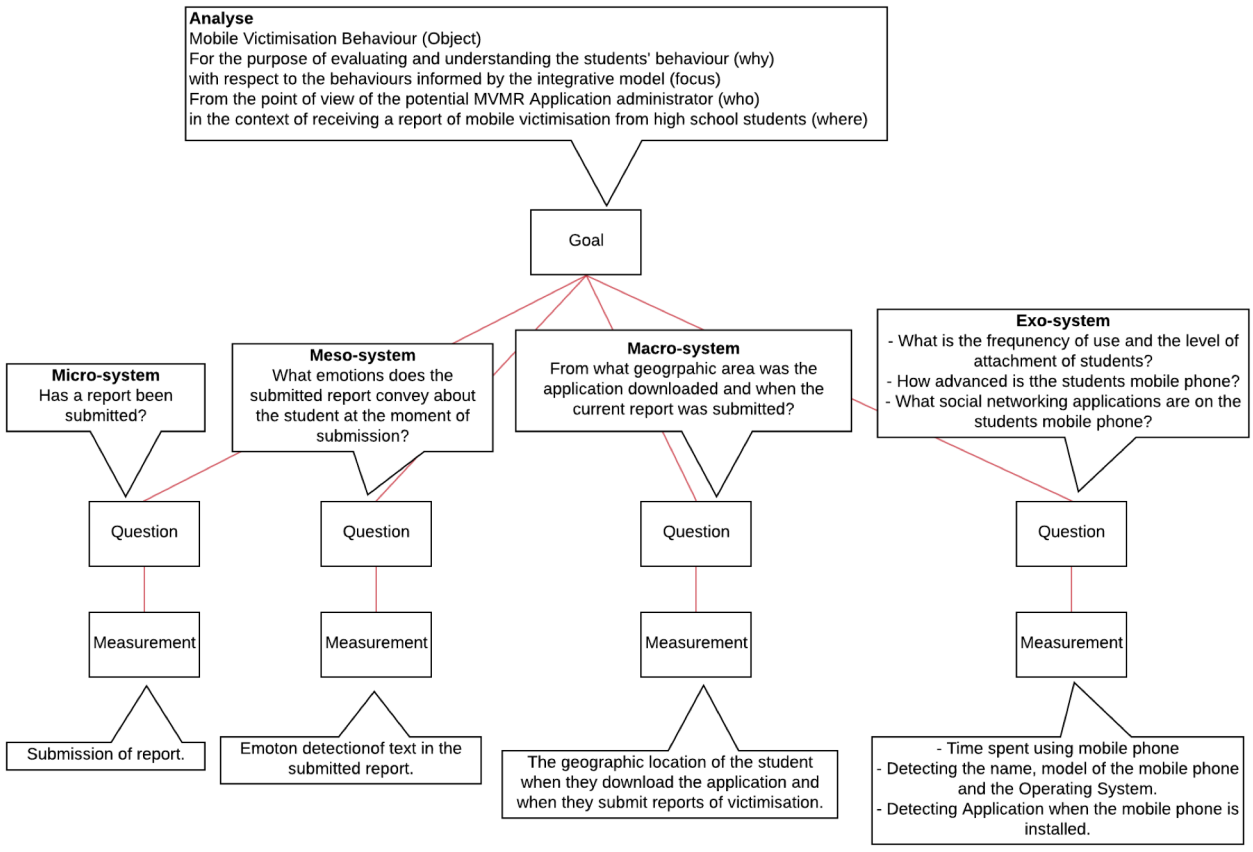


Figure 57: A GQM Model for evaluating students' mobile phone and mobile victimisation behaviour

8.2.2 Choosing the Appropriate Visualisation

Now that the GQM model for the MVMR application has been established, the researcher had to decide on the appropriate visualisation. There is no one right or wrong way to design a dashboard. What matters is the requirements the dashboard has to fulfil. Dashboard are designed to either "pull" and "push". When designed to pull, the user wants to get a specific piece of information from the dashboard. In this case, aspects of technology acceptance are important, such as the dashboard's perceived usefulness and perceived ease of use. In addition, a dashboard that is designed to support the pull scenario should offer more possibilities to explore the data, to filter and to search, to investigate the reasons that caused the data, and so on. In the push scenario, the dashboard has to be designed to push information that captures the user's attention and informs him. One of the advantages of such a dashboard is that it pushes the information to the user thereby informing him in unexpected, unforeseen situations about problems, anomalies, and so on.

For this study, a dashboard was ***conceptualised*** to fit the push scenario of designing dashboards. This was because the purpose of the MVMR app dashboard had to be designed to push information about the students' behaviour in order to capture it and interpret it to the potential administrator of the MVMR app, the user's (the application administrator) attention and informs him of those behaviours. In addition, a design that pulls may assist in informing the user in unexpected, unforeseen situations about problems, anomalies, and so on, and subsequently give the user of the MVMR app dashboard information about the victim of mobile bullying, thereby accommodating the individual economic, socio-cultural, psychological and technological of different students when developing interventions.

8.3 Design and Evaluation for the MVMR Application Dashboard

To set up a dashboard that is used in a push scenario, the following must be considered:

- The user should be able to see the dashboard without any effort. The information will be pushed to the users without their active participation.
- The user should not need to interact with visualisations to understand the data. The charts have to be designed so that an interaction is only necessary when the user switches into "pull" mode.
- Arrange the data to minimise the time needed to consult the dashboard. Always place the same information in the same spot. Allow the user to develop habits.

- Guide the attention of the user to important information. There are different mechanisms one can use to draw the attention of the user, but make sure not to overuse them.

Displaying dashboard elements in a visually appealing way can increase the user's interest in looking at the dashboard.

Taking these points into consideration, the researcher then conceptualised the MVMR app dashboard and had it evaluated by the supervisor of the current thesis and the colleagues of the MBP of the NRF. With regards to the dashboard, it would be available online and on mobile phones. The dashboard would be accessible on a personal computer, but most preferably on a mobile phone app given the urgency of some reports. Figure 58 below presents the initial page of the MVMR app dashboard.

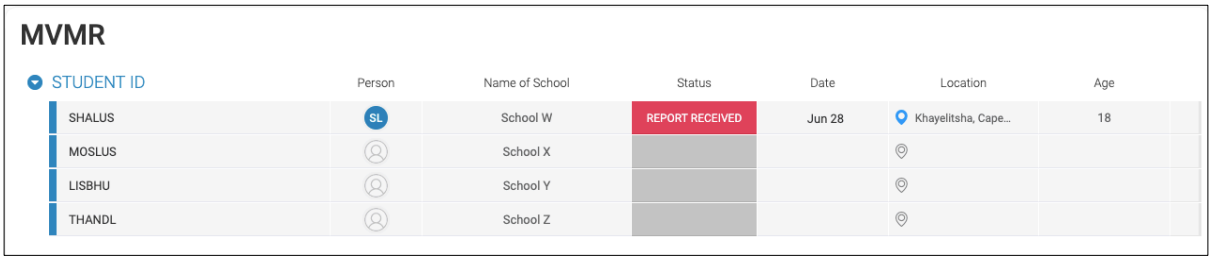


Figure 58: MVMR Application Dashboard Initial Page

The initial page lists all the students that have downloaded and installed the MVMR application on their mobile phones. The Student IDs are shown, as well as the names of the schools they attend, the date the report was submitted, the location from where the report was submitted, the age of the student and most importantly, the status. Besides the Student IDs and the school names of the students, the remaining columns are only input only once a report is received from a student. This is so that the anonymity and privacy of the students are maintained. In order to maintain anonymity, students enter student IDs as instructed in Chapter 7, that is, the first three letters of their first and the first three letters of their last names. For example, a high school student named Shallen Lusinga would enter the Student ID SHALUS. The status column of the initial page shows whether a report has been submitted by a student. For example, in Figure 58, student SHALUS' status is red and indicates and states that a report has been received. Ideally, this would drive the potential administrator to select student SHALUS' profile and drill down to the report submitted by and, data on student SHALUS on the MVMR

app dashboard (Figure 59 below). The dashboard displays the data regarding the proposed integrative model collected by the MVMR app.

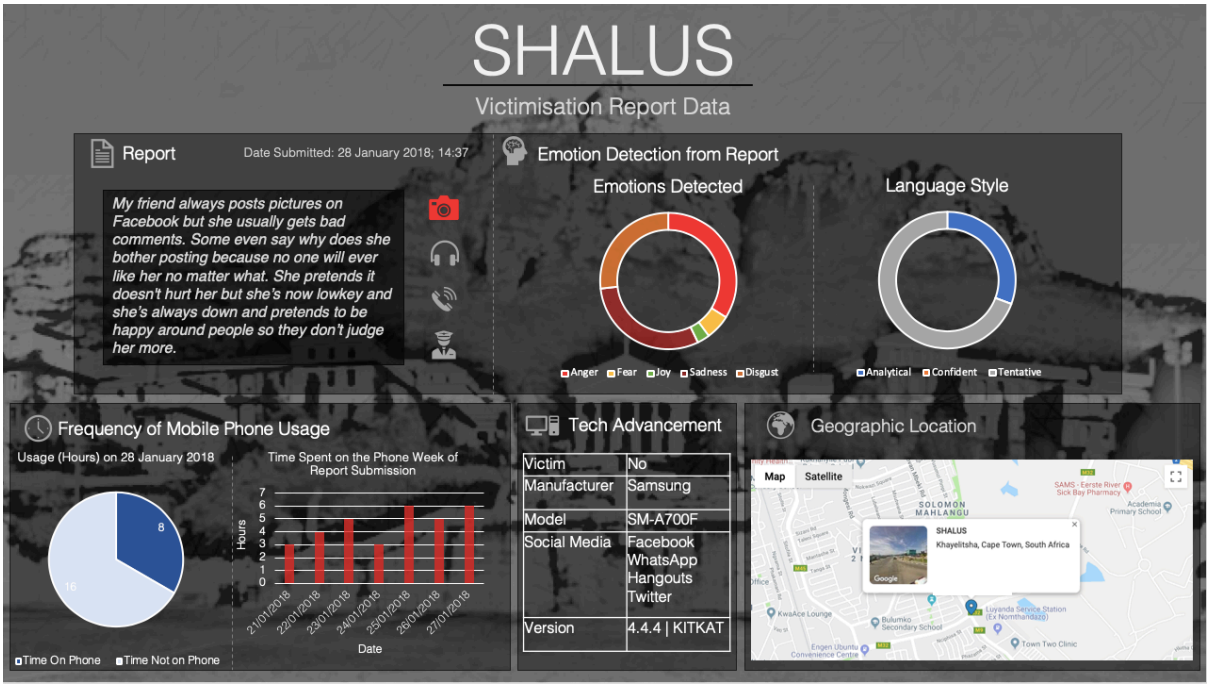


Figure 59: MVMR Application Dashboard

Once the administrator of the MVMR app drills down to student SHALUS' report, the dashboard of the report submitted and the data collected by the MVMR app is visualised using charts. As stated above, the visualisation of data such as that shown in Figure 59 is useful for decision making as these charts inform the users without distracting them from their actual task. In addition, visualisations on dashboards allows the user to glance at the information on the charts, tables and maps (Few, 2006: 34) so as to make decisions regarding the data presented with urgency. Given the ubiquitous nature of mobile victimisation, displaying this data in this manner is the most appropriate manner in which the data is communicated to the administrator.

Each section of the dashboard is represented by the following icons which convey the following data:

First and foremost, the dashboard visualises the report that was submitted by student SHALUS. On the right of the report are four icons. If highlighted in red, these icons, from top to bottom, represent a *photo* or *video* that has been submitted with the student report,

headphones representing a sound recording that has been submitted with the student report, a *phone* indicating whether the student wants to be contacted by the administrator and lastly an *authority figure* indicating whether the student wants to report the victimisation to the school/parents/higher authorities. For student SHALUS, the photo or camera icon is highlighted in red indicating that student SHALUS uploaded a photo or video of the mobile victimisation along with the report. The administrator may then click on the red icon to see what the image submitted image contains.

The two doughnut charts at the top right of the dashboard represent the emotions and language styles detected from the report submitted. For student SHALUS, the emotions that are strongly conveyed by the submitted report are those of fear, sadness and disgust. The language style of the report is one that is analytical and tentative.

At the bottom left of the dashboard, the frequency of mobile phone is shown through a pie chart and a bar graph. As shown on the pie chart, student SHALUS had spent eight hours on the phone the day the report was submitted. The bar-chart also shows the average amount of time student SHALUS had spent on the phone the days leading up to reporting the victimisation.

The dashboard also showed the technological advancement of the student's mobile phone advancement. Student SHALUS has a very advanced mobile phone with the social media platforms Facebook, WhatsApp, Hangouts and Twitter.

At the bottom right of the dashboard, the icon shows the geographical location of the student while the report was submitted. As seen from the map on the dashboard, student SHALUS submitted the report from a location in Khayelitsha in Cape Town.

The intention of the dashboard was to relay to the administrator, as quickly and as simply as possible, information about the students who submit reports of their victimisation using the MVMR app. The researcher's thesis supervisor and colleagues of the MBP then evaluated and approved of the dashboard and its ability to convey the details of a student who submits a report. This, in an effort to encourage the potential administrator of the MVMR app to use the displayed information to inform him or her how to assist a student who is a victim of mobile

bullying in an appropriate and accommodating manner. The submission of the report, itself, would convey the distress of the student. The emotion detected from the report would inform the administrator the psychological state of the student at the time they wrote the report. The frequency of use could inform the extent to which the student is online on their phone and the possible effects this may have on the student. The technological advancement of the student's phone may inform the platforms that the student may be active in and subsequently be victimised on. The geographic location may also speak to the resources the students have near or around them. All this information being indicative to the administrator, the qualities that may inform how to intervene a students' mobile victimisation.

8.4 Conclusion for the MVMR Application and Dashboard

As noted earlier at the end of Section 5.2, the development of the MVMR app kept to the design themes of Bowler et al. (2014) that address students' recommendations for designing affordances on social media sites or mobile applications.

In designing for *reflection*, the MVMR application provides victims with details on how frequently they have used their mobile phones on the day they open the application and also the average amount of time they have spent on their phones for the last two weeks. In doing so, this gives the students an opportunity to pause, and consider the possible ramifications of spending too much time on their mobile phones. In designing for *consequence*, the victims of mobile bullying that submit reports may choose whether to enter the bully's name or to identify their bully so that the bully may be subjected to the consequences of their bullying behaviour. In doing so, the victims that report are afforded the opportunity to have the bully directly confronted by an adult, most likely the administrator of the MVMR. This option of submitting the name of the bully also accounts for designing the artefact for *empowerment*, as this option redresses the imbalance of power between the bully and the victim, thereby giving the victim an allowance to confidently report the bully and their victimisation with the assistance of an adult figure.

In designing the MVMR app for *empathy,* the intention was that the MVMR app monitors the economic, psychological, socio-cultural and technological aspects of the student who has submitted a report of their victimisation. These factors are actualised in the third iteration,

where a dashboard for the MVMR application is designed to display these factors. Among the data shown on the dashboard are results of an emotions detection feature of the text in the report the student submitted. This is so that the pain and sadness a student feels after a victimisation event and when they submit a report is concrete, allowing the administrator to see how victims suffer and whether the victimisation being reported should be addressed urgently.

In addition to considering the themes of designing cyberbullying interventions mentioned above, the MVMR app also gives students the confidence to report their mobile victimisation as the reporting may be done anonymously since research has shown that victims tend not to report because of the consequences they may suffer from the perpetrators of their victimisation in both the traditional and cyber environments. On the MVMR app, students also have the option to request whether they want to be contacted by the administrator of the MVMR app. Given that African culture often encourages children or youth to learn how to defend themselves, the anonymity provided by the MVMR app, at least, provides a platform for seeking help without adult figures interfering with the reporting behaviour. In so doing, the design of the MVMR considered that the application should be designed in a manner in which the *fear* of reporting is minimised, as well as the suffering of the consequences that may result from bullies and even parents/friends/community.

In addition, in order to attract *attention* to the MVMR app, the researcher paid close attention to the interface, and students' reception of the MVMR app interface given that the interface was the part of the artefact that the students would interact with the most. Much of the evaluation of the interface was conducted during the first and second iterations of the DSR process. The researcher, therefore, integrated the necessary changes suggested by students so that the application caught and kept their attention. Furthermore, in order to capture the attention of the students, the MVMR app provided students with resources that could be used to teach them about cyberbullying and mobile bullying and, the resulting victimisation that may be a result of the phenomena. In so doing, these resources would better inform the students about their victimisation experiences and encourage them to know when and how they have been victimised online or on their phones.

The MVMR app also allows students to upload documentation or media files such as screenshots of the mobile victimisation or audio files (for example, voice notes) when they submit a report. This accounted for designing for *control and suppression*, in that, if a bully knows that they may be reported on the MVMR app for mobile bullying, the files uploaded with a report may be used as evidence of that bullying incident. Therefore, this may suppress bullying activity and encourage victims to report more often if they had to.

Since the themes were applied, the DSR process of developing a mobile application for students to report their mobile had been completed. The following chapter presents the conclusion of the current thesis.

CHAPTER 9 CONCLUSION

This chapter concludes this thesis by summarising the findings obtained for the research questions and answering whether the research objectives were met. The research contributions and limitations will also be discussed. Some considerations for the development of interventions for mobile victimisation are also presented. (Please refer to Figure 60 below for the chapter overview.)

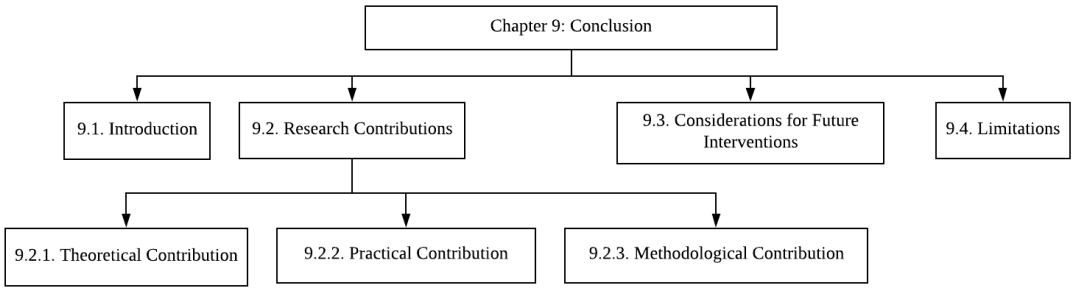


Figure 60: Overview of the Conclusion Chapter

9.1 Introduction

The primary objective of this thesis was to investigate how a digital tool may be developed for South African high school students in order to monitor and report mobile victimisation. The many definitions of cyberbullying have concealed the different technologies that may be used for the perpetration of cyberbullying and the differing consequences that these different technologies may have when students use them to conduct cyberbullying. Research has, however, shown an increase in cyberbullying conducted through mobile phones. This study, therefore, isolated the bullying of high school students through mobile phones, given that, statistically, the majority of cyberbullying is conducted on mobile phones.

Through conducting the literature review, the researcher found that reporting is considered to be one of the effective ways of combating cyberbullying and victimisation. Students often do not report their mobile victimisation and this often leads to little or no intervention. Therefore, the first step to intervening mobile victimisation is reporting mobile victimisation as it marks the identification of the problem and encourages efforts to be put in place by schools, parents

or the government to help or assist students with their victimisation. In order to develop the digital tool, this study, therefore, first sought out to discover the factors that affect students' reporting behaviour so that these factors could be incorporated in the development of the digital tool. The researcher then identified the economic, psychological and sociological models that influence the decision-making process of a victim in reporting their victimisation. Since this study is centred on the victimisation of students in a technological environment, technological models or theories were also considered. The researcher's Mobile Victimisation Typology (MVT) was also considered as one of the technological models highlighting the factors that may influence the reporting behaviour of mobile victimisation by students.

In the first iteration of the Design Science Research (DSR) process, while cross-cultural differences in reporting were expected and assumed, the interviews with the high school students showed that cultural and social factors appeared to be the most common influencers of victimisation reporting in South African schools of all cultures. The study revealed that students prefer to resolve issues themselves and only report to adults when they fail. This contradicted the earlier claim that ethnic demands on young Africans, such as unquestioning obedience and respect for elders and teachers, make them fail to disclose victimisation for fear of being perceived to be disrespectful (Ayodele & Aderinto, 2016). African cultural practices are, however, intended to prepare the youth for responsible roles and to condition them to deal with challenges with limited intervention by elders (Emeakaroha, 2002; Olawoye et al., 2004). Obedience to the elders by the youth is not necessarily based on fear but on the fact that they (the youth) consider the elders to be custodians of wisdom, their social guides, teachers, promoters of good behaviour and judges (Olawoye et al., 2004). It follows that the youth would find it appropriate to think through the issues first before engaging or reporting to the elders.

Another interesting finding was regarding the actual role that adult figures play when students report their mobile victimisation. Of particular interest is that students preferred not to report their victimisation directly to their parents and that if they had to report, they would rather report to the teachers at school that they trusted. According to Smith and Myron-Wilson (1998), this may be because bullying behaviour originates in parenting and schooling environments. Studies have also linked violent behaviour and harsh discipline in parents with bullying behaviour, and overprotectiveness in parents with victimisation. The same may be said for schools. As reported in the findings of this study, students like student P6 (who had experienced

both cyber and mobile bullying from friends) felt that the school had light punishment for bullying behaviour and she said did not trust the school to deal appropriately with her bullying incident. This showed that the schools are also sometimes overprotective of the bully. Another example of where adult figures may fail students when they report, is that of student P1 who reported threats by schoolmate over voice notes on WhatsApp, but was met with the threat of suspension and rejection from other schools she would apply to after suspension should she find herself in that position again.

These findings confirmed the complexity of the factors influencing students decision to (or not to) report aggression. In so doing, the findings showed that students do not report their victimisation because of economic, psychological, cultural-sociological and technological factors, as predicted by the integrative theoretical framework. This established that the proposed integrative framework is not only valuable in explaining the broad socio-cultural context of victimisation reporting but also in reporting behaviours at the individual level. The framework can, therefore, be used to guide further examination of the problem of under-reporting cyber victimisation and inform the development of appropriate interventions in schools and communities. This is not to say that existing interventions do not work. They do, however, have shortcomings.

According to Smith (2016), several major intervention programmes such as the Olweus Bullying Prevention Program, KiVa, Steps to Respect, and Friendly Schools showed some success with traditional bullying. However, more progress still had to be made in strengthening theoretical underpinnings to interventions, and in tackling cyberbullying. For example, criticism has been made regarding the Olweus Bullying Prevention Program. Temko (2019) found that this program was lacking because it was developed in a similar manner in which bullying behaviour has been understood. That is, school bullying has been assumed to be an individualistic phenomenon and the socio-structural factors that create and maintain it have been ignored. With this being the case, the manner of understanding the phenomena of bullying, the resulting victimisation and the development of interventions geared towards these two aforementioned phenomena have been lacking. Temko (2019), therefore, argued that attempts at reducing bullying should focus on both the individualistic and socio-structural determinants that affect it.

Bronfenbrenner's ecological model serves as an overarching umbrella that takes into consideration the different individualistic, social, physical, institutional and community aspects of bullying that affect young people; recognises that youth exists in systems that directly, indirectly and dynamically affect their development can examine and address bullying behaviour, and has been adapted in bullying literature (Pintado, 2006; Lee, 2011; Espelage, 2012, 2014; Swearer & Hymel, 2015). The researcher consequently developed an integrative model in which the aforementioned reporting models were used to represent the micro-, meso-, macro- and exo-systems as demonstrated by Bronfenbrenner. These factors from the integrative framework then became useful in the development of the digital tool so that the tool could obtain data related to the socio-ecological monitor these factors to inform those who receive the reports in planning and implementing unique and tailored intervention. This way, the individualistic and socio-structural determinants that affect mobile victimisation are taken into consideration when intervening.

Since the objectives of this study aligned with pragmatism as a philosophy, the researcher adopted Design Science Research (DSR) as the research approach to develop the digital tool. The implementation of DSR as a process model for developing artefacts was impactful because, besides the claims that IS research often pays attention to just the theory and ignores the development of artefacts, using DSR as a strategy allows for the development of "new and innovative artefacts" that underlie IS research. This process model did so by assisting the researcher to assess and determine the need for the development of a mobile application. In so doing, the process model forced the research to view and tackle the entire research process from many practical and theoretical points of view. In this way, there was an amalgamation of practical and theoretical processes.

Furthermore, given the responses from the students in the first iteration, the administrator of the MVMR application would have to be someone that the students trust. Findings from the interviews conducted in the first iteration revealed that students from private schools often have authority figures that are employed by the schools purely to accommodate the emotional and psychological wellbeing of the students (counsellors for the students). Public schools, however, tend to have teachers already employed by the schools to teach certain subject act as the figures that deal with the emotional and psychological effects that challenge students. What is certain is that the students tend to trust the school employees more than they do their parents, friends

or government institutions such as the police or social workers. In view of this, the researcher set to design the MVMR app dashboard so that it could be used by an administrator, possibly someone from the school that students trust.

The MVMR app was unanimously accepted as a relevant tool for the reporting process by high school students. Students described the MVMR app as relevant, impressive, insightful, and a creative means by which they may report their mobile victimisation. The importance of the MVMR app was emphasised because the application provided a detailed report of the students' victimisation and reported directly to someone they trust. The MVMR app was also acknowledged to offer students a sufficient level of detailed definition of terms, resources and emergency contact numbers, thereby simplifying the process of reporting.

9.2 Research Contributions

This study has theoretical, practical, and methodological contributions to Information Systems, mobile victimisation and in intervening mobile victimisation. The contributions of this study are discussed as follows:

9.2.1 Theoretical Contributions

Through adapting Bronfenbrenner's ecological model as a guide in developing an integrative theoretical framework for studying factors influencing under-reporting, this study extended and tailored the model to understand the behaviour of reporting mobile victimisation. Bronfenbrenner's ecological model often serves in bullying research as an overarching umbrella within which the complex factors and interactions that influence bullying behaviour can be examined and addressed (Pintado, 2006; Lee, 2011; Espelage, 2012, 2014; Swearer & Hymel, 2015). The model considers the different individualistic, social, physical, institutional and community aspects of bullying that affects young people (Pintado, 2006; Espelage, 2012) and recognises that youth exists in systems. In adapting this model and tailoring the reporting models that exist in the different systems of young people, instead of taking an individualistic approach, the integrative theoretical model considers the larger, more distant systems of the social-ecological model that could impact the work done in schools to avail students with reporting and intervention mechanisms for mobile victimisation. This framework was then

confirmed through the interview process conducted among South African high school students in the first iteration of the Design Science Research (DSR).

Given that research from other disciplines suggests that digital interventions (DIs) can effectively address health and psychological challenges, this study offers students information, education and a practical means by which they may identify, monitor and report their mobile victimisation. This was done so by developing a mobile application, whose design and development was informed by the aforementioned integrative model. In so doing, given that literature in IS research has shown that there is a lot of discourse in IS research about the disconnection between the contributions made by research in theory and in practice and that IS research should have the concurrent goals of making theoretical contributions as well as having practical solutions for the problems practitioners face (Sein et al., 2011), this research provides an answer to this call. Nunamaker et al. (1991), Sein et al. (2011) and Vaishnavi and Kuechler (2004) claim that there is a need to shift the attention of IS research from just the theory to the development of "new and innovative artefacts" that underlie IS research. The researcher believes that this thesis has given a means by which combining theory with the development of a practical solutions may be considered. In doing so, this thesis may contribute to mobile victimisation research in a new, theoretical, practical and innovative manner.

9.2.2 Methodological Contributions

The major methodological contribution of this study lies in the advancement of knowledge on the use of Design Science Research (DSR) to study mobile victimisation, its reporting and in the development of digital interventions for addressing this aggression. This study asserted that the use of DSR methodology within a pragmatic philosophical stance can guide researchers in developing artefacts that may create or improve digital interventions for mobile bullying.

This study also established the usefulness and strength of mixed methods to enrich understanding of a phenomenon – in this case, artefacts that may address technological aggression. This is because, with mixed methods, the use of more than one method gives strength or support to another. In so doing, these methods give richer accounts and insight into the phenomenon being investigated. As such, the triangulation and corroboration of findings was possible.

9.2.3 Practical Contributions

This thesis and the results it will produce may also be very informative in the development of laws and policies as well as prevention and intervention programmes against mobile bullying. According to Popovac and Leoschut (2012), there is insufficient information on which to base bullying policy decisions in South Africa. This thesis has provided some essential information that may be relevant to policy decisions. For instance, this thesis may be used in targeting prevention and intervention programmes towards the most efficient and relevant direction in terms of resource and impact management. That is, in understanding the socio-ecological systems that influence reporting behaviour, resources may be used in supporting the students less likely to report their victimisation. Since the reporting behaviours of students were revealed, these may be beneficial in detecting and preventing mobile victimisation from potentially occurring in students' lives.

9.3 Considerations for Future Interventions

The South African government and the Department of Basic Education (DBE) are to be commended for the interventions put in place to address school-related gender-based violence (SRGBV) recommendations. There are, however, still major persistent challenges such as high exposure to violence and domestic abuse, poor educational outcomes and others revealed in the 2017 South Africa Police crime report (Mbalula, 2017). These create fear among the youth and consequently prevent victimisation reporting. More effective strategies are needed to address these issues. For instance, while the DBE is playing a powerful role in schools and school communities, Styron et al. (2016) argue that parental or guardian involvement may lead to effective interventions. The findings showed that only when there is severity in the bullying incidences do students report to adults, especially their parents. Parents and guardians of students are, therefore, encouraged to be involved in the efforts of the DBE, not only when the consequences of bullying are severe, but throughout the bullying experiences their children may be facing. Also, since not many digital tools have been developed to address the mobile victimisation problem in South Africa, the researcher encourages the development of interventions in the form of new technologies to fit the uniquely South African context whose past in apartheid strongly influences how people deal with processes in the legal or justice system (Schonteich & Louw, 2001; SA News.gov.za, 2011).These developments must,

therefore, consider and cater to the different cultural contexts in South Africa and to its past in order for them to be useful, effective and efficient.

9.4 Limitations

This study is not without limitations. The findings presented are preliminary and are based on the newly developed theoretical framework and the mobile application based on that framework. The study also had problems with the sample size. Given that cyberbullying and mobile bullying are sensitive topics for students to discuss, especially when they have been victimised in either instances, self-sampling as a strategy caused the study to be limited in the number of participants that took part in the study. This study also analysed data from a sample that had greater numbers of one collectivist ethnic group than others. Future studies should, therefore, test the framework using a large-scale study across schools from various safety zones. Doing so would ensure greater insight into the factors that influence victimisation reporting, especially the cultural influences on reporting of different types of ethnic groups in South Africa. This would also further develop and establish the proposed integrative framework theoretically and confirm its contributions to the studies of mobile victimisation reporting. The duration of time during which the students that took part in the study was also limited. Many schools limited the duration of testing of the MVMR application for the students that took part in the study. This was due to the fear of interference with students' studies and the interruption the study might cause to the schools.

With regards to the development of the MVMR application, the use of an online tool such as Appy Pie was a feasible alternative for mobile development as the platform required low investment, helped the researcher to design and create the prototype of the application step by step with little to no coding skills, and made it easier to disseminate the developed mobile application to students (Gupta et al., 2016). However, the tool was not flexible to the capture the relevant data that represented the factors of the integrative theoretical model that needed to be captured. The researcher had, therefore, to revise the development of the MVMR application using Android Studio before deploying and testing it among users for a longer period of time. While the researcher had programming skills prior to conducting the study, they were limited when it came to mobile application development. Android Studio, however, provided many resources and the wide use and availability of Android Studio made it possible that much

material was available to the researcher online and that the coding was more elaborate and provided flexibility.

Another limitation was the sensitivity of the subject matter and getting schools to allow the researcher to conduct the evaluation of the MVMR application within the schools. One principal, at whose school the researcher had collected data at his school in previous studies, raised concerns with the app collecting details the students would type in about their bullying and victimisation. Given that the school was a private school, the principal felt that there would have been too much of a legal and ethical risk to the school as information would be captured by a third party.

Lastly, the study was conducted through a cross-section timeline. This meant that the study and the subsequent data collected during the study were collected at a particular instance and over a short period of time. As such, changes that might occur over time were not captured. Nonetheless, the findings provided insight that shed light on the current situation of reporting and intervening mobile victimisation. Findings from the study may, therefore, assist in making projections and predictions that can assist in further or future inquiry.

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APPENDICES

Appendix 1: Interview Schedule

1) Have you ever been bullied before?
2) Have you ever been bullied online or on your mobile phone?
3) How often have you been bullied (i.e., received threatening/embarrassing/frightening messages or phones calls) on your mobile phone?
4) What type of mobile phone do you own or have access to?
5) How frequently do you use your mobile phone?
6) What applications do you frequently use on your mobile phone?
7) How do you feel about your mobile phone? – What are your feelings towards your mobile phone?
8) What are the ways in which you have tried to deal with your mobile bullying?
9) How effective have these methods been?
10) Have you tried digital means to combat your mobile victimisation?
    a. Were any of these effective?
    b. What were their strengths/weaknesses?
11) What did you think of the digital tool you have been using on your mobile phone?
12) Was the digital tool useful in monitoring and reporting mobile victimisation?
13) What did you like about the digital tool?
14) What did you not like about the digital tool?
15) How do you suggest the digital tool may be improved so that it is able to monitor and report mobile victimisation?

Appendix 2: Evaluation Questionnaire – Second Iteration

Evaluating the Mobile Victimisation Monitoring and Reporting (MVMR) Mobile Application

1) When did you download and install the digital tool (MVMR) on to your mobile?

……

……

2) Were there any problems when accessing, downloading and installing the application?

……

……

3) Since installing the application, have there been any disruptions in your regular mobile phone usage?

……

……

4) When on your mobile phone, is the data consumption of the MVMR noticeable?

……

……

5) What did you think of the digital tool (MVMR) you have been using on your mobile phone? Please explain.

……

……

6) Was the MVMR useful in monitoring and reporting mobile victimisation? Please explain.

……

……

7) Was the MVMR effective in monitoring and reporting mobile victimisation? Please explain.

……

……

1) What did you like about the MVMR? (*this may include features or how it functions*). Please explain.

……

……

2) What did you not like about the MVMR? (*this may include features or how it functions*). Please explain.

……

……

3) How do you suggest the digital tool (MVMR) may be improved so that it is able to monitor and report mobile victimisation? What are you looking for in a mobile app that reports mobile victimisation? (*this may include features or how it functions).*

……

Thank you for testing the MVMR. Your participation is greatly appreciated. Please help us in evaluating the MVMR for future developments. Please Rate the following Features of the MVMR below by selecting the number of Stars you would give. Also, Please specify in more detail what you think of the features.					
	★	★★	★★★	★★★★	★★★★★
1. The Interface					
a. How it looks					
b. The quality of the App					
c. The font size and Text					
Please be specific with regards to what you think about the interface ……..					
2. The Accessibility					
a. Can you access the App Easily					
b. Is it Available when you need it					
c.					
Please be specific with regards to what you think about the accessibility: ……..					
3. The About Page					
a. Was the About page useful?					
Please be specific with regards to what you think about the About Page: …….					
4. The How To Page					
a. Was the how to page useful or informative?					
Please be specific with regards to what you think about the How To Page: ……..					
5. The Report Page					
a. Does the Report capture what you fell it needs to capture?					
b.					

Please be specific with regards to what you think about the Report Page: …….
Lastly, please comment on what you think of the MVMR App in general: ……

Appendix 3: Consent Letter to Western Cape and Limpopo Departments of Education

University of Cape Town
Department of Information Systems
Leslie Commerce Building
Upper Campus
Private Bag X3 - Rondebosch - 7701
Tel: +27 (0) 21 650 2261 Fax: +27 (0) 21650 2280
Internet: http://www.commerce.uct.ac.za/informationsystems

07 January 2017

Dear Sir/Madam,

I am a full time Doctoral student under the supervision of Professor Michael Kyobe at the University of Cape Town (Department of Information Systems). I would like to invite you to participate in an academic research on understanding mobile victimisation in South Africa High Schools. This research has been approved by the University of Cape Town (UCT)'s Commerce Faculty Ethics in Research Committee.

The aim of this study is to gain understanding and insight on mobile victimisation and means by which to monitor and report mobile victimisation. This will be done by assessing the responses of high school students to a digital tool that is developed for the purpose of monitoring and reporting mobile victimisation.

We request your permission/consent to conduct this research within high schools in the Western Cape. The participation of students in this research is voluntary. Students may withdraw from the research at any time for whatever reason, in accordance with ethical research requirements. All information gathered from the students will be treated confidentially and used only for the purpose of this study. Student names or any identifiable information will not be recorded or published, ensuring anonymity of their responses. The results from this study will then be made known to the school so that students may benefit from them.

The students will be required to evaluate or use and evaluate a digital tool (mobile application). Throughout this period, students using the digital tool will be interviewed with regards to the digital tool and it's usefulness in combating mobile victimisation.

The interviews will take approximately 30-45 minutes to complete. If taken, the questionnaire will take approximately 15 minutes to complete.

Your permission and assistance in conducting this study is greatly appreciated.

Should you have any questions regarding this research, please feel free to contact us on the details specified below.

Sincerely,

Shallen Lusinga
PhD Student
Department of Information Systems
University of Cape Town
Email: LSNSHA002@myuct.ac.za/Phone: 0794294564

Professor Michael Kyobe
Research Supervisor
Department of Information Systems
University of Cape Town
Email: michael.kyobe@uct.ac.za/Phone: 0216502597

Appendix 4: Consent Letter to School Principals

University of Cape Town
Department of Information Systems
Leslie Commerce Building
Upper Campus
Private Bag X3 - Rondebosch - 7701
Tel: +27 (0) 21 650 2261 Fax: +27 (0) 21650 2280
Internet: http://www.commerce.uct.ac.za/informationsystems

12 April 2017

Dear Principal,

Mobile bullying can be defined as a form of electronic online bullying through email, chat rooms, instant messaging and small text messages using mobile phones (Kowalski *et al.* 2007). Mobile victimisation can therefore be the result of this type of bullying. The aim of this study is to gain understanding and insight on mobile victimisation and means by which to monitor and report mobile victimisation. This will be done by assessing the responses of high school students and principlesor staff in high schools to the use of a digital tool that is developed for the purpose of monitoring and reporting mobile victimisation.

Students that willingful agree to take part in this study will be required to evaluate or use and evaluate such a digital tool (mobile application) over a three month period. Throughout this period, students using the digital tool will be interviewed with regards to the digital tool and it's usefulness in combating mobile victimisation. The interviews will take approximately 30-45 minutes to complete. If taken, the questionnaire will take approximately 15 minutes to complete.

We therefore kindly request your acceptance to partake in this study. If you are willing to participate in this study, kindly sign below.

Should you have any questions regarding this research, please feel free to contact us on the details specified below.

Sincerely,

Shallen Lusinga
PhD Student
Department of Information Systems
University of Cape Town
Email: LSNSHA002@myuct.ac.za/Phone: 0794294564

Principal's/Staff's Signature: _____ Date: _____

Appendix 5: Consent Letter to Leaners' Parents and/or Guardians

University of Cape Town
Department of Information Systems
Leslie Commerce Building
Upper Campus
Private Bag X3 - Rondebosch - 7701
Tel: +27 (0) 21 650 2261 Fax: +27 (0) 21650 2280
Internet: http://www.commerce.uct.ac.za/informationsystems

15 May 2017

Dear Parent/Guardian,

I am a full time Doctoral student under the supervision of Professor Michael Kyobe at the University of Cape Town (Department of Information Systems). I would like to invite you to participate in an academic research on understanding mobile victimisation in South Africa High Schools. This research has been approved by the University of Cape Town (UCT)'s Commerce Faculty Ethics in Research Committee.

The aim of this study is to gain understanding and insight on mobile victimisation and means by which to monitor and report mobile victimisation. This will be done by assessing the responses of high school students to the use of a digital tool that is developed for the purpose of monitoring and reporting mobile victimisation.

Within this form, we request your permission/consent for your child to participate in this study. The participation of your child in this research is voluntary. Students may withdraw from the research at any time for whatever reason, in accordance with ethical research requirements. All information gathered from the students will be treated confidentially and used only for the purpose of this study. Student names or any identifiable information will not be recorded or published, ensuring anonymity of their responses. The results from this study will then be made known to the school so that students may benefit from them.

What is the Problem?

Mobile victimisation is one form of cyberaggression that is increasing and affecting many young people today in the developing world. While studies on cyberbullying and cybervictimisation exist, the focus on mobile victimisation is limited. In addition, findings reported in earlier studies have been mainly from developed countries and are inconclusive. There is also limited theoretical work to enhance conceptualisation and general understanding of mobile victimisation. Understanding this phenomenon in the developing countries is particularly critical as mobile phone usage and crime are among the highest in the world, legislation against misuse is not well developed and there is general lack of awareness of the national and international implications of cyberaggression in the developing nations. In addition to these challenges, of the interventions made by schools and the Department of Education in South Africa, few have been effective in minimising victimisation in some schools. The lack of intervention has led to schools becoming unsafe and hostile environments for learners in which school drop-out rates have increased and access to education has reduced. While evidence exists that suggests that there are many interventions that counteract mobile victimisation, these have not worked effectively and none exist that meet all the requirements needed to curb cybervictimisation in general.

What is the solution?

Research from other disciplines/studies, however, suggests that digital interventions (DIs) can effectively address health and psychological challenges. Besides DIs being extremely cost-effective, DIs complement practitioner delivered interventions, increase access to healthcare interventions and are able to reach large numbers of people. Not many digital or mobile tools have been developed to

address the mobile victimisation problem and it is suggested that to combat cybervictimisation, explicit interventions in the form of new technical developments can be taken advantage of. With the mobile phone currently becoming the dominant means of carrying out bullying, this study attempts to develop a digitally based tool that may be used as an intervention method. The tool will be useful in the monitoring and reporting of mobile victimisation of high school students in South Africa. While doing so, this study will also fill the gap in the understanding of the mobile victimisation of learners in South African high schools.

Within this study, the students will be required to evaluate or use and evaluate a digital tool (mobile application) over a three week period. Throughout this period, students using the digital tool will be interviewed with regards to the digital tool and it's usefulness in combating mobile victimisation.

The interviews will take approximately 30-45 minutes to complete. If taken, the questionnaire will take approximately 15 minutes to complete.

We therefore kindly request permission from you for your child to participate in this study. If you are willing to allow your child to participate in this study, kindly sign the consent form below.

Should you have any questions regarding this research, please feel free to contact us on the details specified below.

Sincerely,

Shallen Lusinga
PhD Student
Department of Information Systems
University of Cape Town
Email: LSNSHA002@myuct.ac.za/Phone: 0794294564

Professor Michael Kyobe
Research Supervisor
Department of Information Systems
University of Cape Town
Email: michael.kyobe@uct.ac.za/Phone: 0216502597

As the guardian/parent of _____ , I hereby consent Shallen Lusinga to conduct a survey on mobile bullying and victimisation in which he/she may participate.

I am aware that participation is voluntary and that I may choose to withdraw my child from this study at any time, should I choose to do so.

I also give Shallen Lusinga permission for the results of this study to be used in the write up of the study.

Name: _____

Signature: _____ Date: _____

Appendix 6: UCT Ethics Application Form

UCT Ethics in Research — Powered by Submittable

Project title: **Towards a Digital Tool for Monitoring and Reporting Mobile Victimisation among South African High School Students**

11/30/2016

id. 6800489

by **Shallen Lusinga** in **Commerce Faculty Submission**

LSNSHA002@myuct.ac.za

Original submission

11/30/2016

UCT Student / Staff Number	**LSNSHA002**
Degree Being Studied (For Students Only)	**Doctorate in Information Systems**
Cellphone Number / UCT Extention	**0794294564**
UCT Email Address	**LSNSHA002@myuct.ac.za**
Alternative Email Address	**lusinga8@gmail.com**
Principal Researcher/s:	**LSNSHA002@myuct.ac.za**
Status of Applicant	**PhD Student**
Supervisor Name (For Students Only) :	**Michael Kyobe**
Supervisor email address	**Michael.Kyobe@uct.ac.za**
Department:	**Department of Information Systems**
Co-researcher(s) Names:	n/a
Co-researcher(s) Email Addresses:	n/a
Review Track	**Normal**

Brief description of the research project	**Mobile victimisation is one form of cyberaggression that is increasing and affecting many young people today in the developing world. While studies on cyberbullying and cybervictimisation exist, the focus on mobile victimisation is limited. In addition, findings reported in earlier studies have been mainly from developed countries and are inconclusive. There is also limited theoretical work to enhance conceptualisation and general understanding of mobile victimisation. Understanding this phenomenon in the developing countries is particularly critical as mobile phone usage and crime are among the highest in the world, legislation against misuse is not well developed and there is general lack of awareness of the national and international implications of cyberaggression in the developing nations. In addition to these challenges, of the interventions made by schools and the Department of Education in South Africa, few have been effective in minimising victimisation in some schools. The lack of intervention has led to schools becoming unsafe and hostile environments for learners in which school drop-out rates have increased and access to education has reduced. While evidence exists that suggests that there are many interventions that counteract mobile victimisation, these have not worked effectively and none exist that meet all the requirements needed to curb cybervictimisation in general. Research from other disciplines/studies, however, suggests that digital interventions (DIs) can effectively address health and psychological challenges. This method of intervention may be done remotely utilising technological media such as the Internet, mobile applications, and text messaging services. DIs are believed to be more beneficial than (i) paper based interventions and (ii) practice based interventions. They argue that besides DIs being extremely cost-effective, DIs complement practitioner delivered interventions, increase access to healthcare interventions and are able to reach large numbers of people. Not many digital or mobile tools have been developed to address the mobile victimisation problem and it is suggested that to combat cybervictimisation, explicit interventions in the form of new technical developments can be taken advantage of. With the mobile phone currently becoming the dominant means of carrying out bullying, this study attempts to develop a digitally based tool that may be used as an intervention method. The tool will be useful in the monitoring and reporting of mobile victimisation of high school students in South Africa. While doing so, this study will also fill the gap in the understanding of the mobile victimisation of learners in South African high schools.**
Data collection: (please select)	**Interviews** **Questionnaire**

File Upload

COM_Ethics_Signatories_2016.pdf

Interview_Questions.docx

Mobile_Victimisation_Survey.docx

Parents_Guardians_letter.pdf

Principals_letter.docx

Shallen_-_PhD_Research_Proposal.docx

Student_assent_letter.pdf

Supervisor_letter_to_the_WCED.pdf

Western_Cape_Education_Department_letter.pdf

Have you attached a research proposal with research methodology?	**Yes**
2.1 Please indicate below the affiliations of participants from the list below :	**Students / Learners**
2.2 Please describe how you plan to protect the participants	**No personal information will be required from the participants. In addition, if by chance students add personal information, this information will not be shared, recorded or used in the write-up of this study. Furthermore, any traceable records will be disposed of.** **In addition, if during the interview or survey, students are uncomfortable or not willing to continue, the interview or survey will be ended. Furthermore, if the respondents become emotional during the surveys or interviews, arrangements will be made to provide assistance to the respondents (supervisor has committed to this).**
2.3 Does the research discriminate against participation by individuals, or differentiate between participants, on the grounds of gender, race or ethnic group, age range, religion, income, handicap, illness or any similar classification?	**No**
2.4 Does the research require the participation of socially or physically vulnerable people (children, aged, disabled, etc.) or legally restricted groups?	**Yes**

2.5 Will you be able to secure the informed consent of all participants in the research? (In the case of children, will you be able to obtain the consent of their guardians or parents?)	**Yes**
2.6 Will any confidential data be collected or will identifiable records of individuals be kept?	**No**
2.7 In reporting on this research is there any possibility that you will not be able to keep the identities of the individuals involved anonymous?	**No**
2.8 Are there any foreseeable risks of physical, psychological or social harm to participants that might occur in the course of the research?	**No**
2.9 Does the research include making payments or giving gifts to any participants?	**No**
2.10 Race / Ethnicity - Are you asking a question about race/ethnicity in your questionnaire?	**No**

2.13 Gender - Are you asking a question about gender in your questionnaire?	**Yes**
2.14 If you answered Yes to 2.13 - Have you included the option: “Prefer not to answer” as part of your gender question?	**Yes**
* If you have selected "No" in 2.14, please explain why	n/a
3.1 Does your research involve the provision of services to communities?	**No**
* If your answer is YES, please provide a brief description below:	n/a
3.2 Is the community expected to make decisions for, during or based on the research?	**No**
*If your answer is YES, please provide a brief description below:	n/a
3.3 At the end of the research will any economic or social process be terminated or left unsupported, or equipment or facilities used in the research be recovered from the participants or community?	**Yes***

*If your answer is YES, please provide a brief description below	**The proposed digital tool (mobile application) will be removed from participants phones.**
3.4 Will any service be provided at a level below the generally accepted standards?	**No**
*If your answer is YES, please provide a brief description	n/a
4.1 If your research is being conducted within a specific organisation, please state how organisational permission has been/will be obtained:	**The research is being conducted in high schools and so permission will be required from the Western Cape Department of Education , the principals of schools and the parents or guardians of the students. This will be done through requests/consent forms which I have attached.**
4.2 Have you attached the letter from the organisation granting permission? (please select)	**No but it will be obtained before commencing the research**
4.2.1 If you have selected "Yes" in the question above please upload a the letter granting permission.	n/a
4.3 Are you making use of UCT students as respondents for your research?	**No**
4.4 Was approval granted?	**No**
4.4.1 If you have selected "Yes" in the question above please upload a copy of the approval letter.	n/a

4.5 Are you making use of UCT staff as respondents for your research?	**No**
4.6 If yes, have you contacted Executive Director: Human Resources for permission ?	**No**
4.7 Was approval granted?	**No**
5.1 What type of consent will be obtained from study participants?	**Written Consent** **Anonymous survey questionnaire (covering letter required and no consent form needed))**
5.2 How and where will consent/permission be recorded?	**The consent form will be signed by the Western Cape Department of Cape Town, the principles and the parents or guardians of the students. The consent forms have a response option and these will be collected.**
6.1 Is there any existing or potential conflict of interest between a research sponsor, academic supervisor, other researchers or participants?	**No**
6.2 Will information that reveals the identity of participants be supplied to a research sponsor, other than with the permission of the individuals?	**No**
6.3 Does the proposed research potentially conflict with the research of any other individual or group within the University?	**No**

6.4 Are you aware of any other conflict of interest that you would like to declare ?	**No**
If you have answered YES to any of these questions, please describe how you plan to address these issues (Questions 6.1 - 6.4)	n/a
7.1 Does the proposed research pose any physical, psychological, social, legal, economic, or other risks to study participants you can foresee, both immediate and long range? (please select)	**No**
7.2 Describe in detail the nature and extent of the risk and provide the rationale for the necessity of such risks	n/a
7.3 Outline any alternative approaches that were or will be considered and why alternatives may not be feasible in the study	n/a
7.4. Outline whether and why you feel that the value of information to be gained outweighs the risks	n/a

I certify that I have read the the Commerce Faculty Ethics in Research policy (http://www.commerce.uct.ac.za/Pages/ComFac-Downloads)	**true**
Supervisor has seen the application	**true**
Signature **COM_Ethics_Signatories_2016.pdf**	
A full copy of a research proposal or a literature review with methodology is attached	**true**
Interview schedules / cover letters / questionnaires / forms and other materials used	**true**
Organisational consent letter / UCT student or staff approval letter	**false**
1. The circular UCT Logo - Please see http://www.uct.ac.za/images/uct.ac.za/about/intro/logo/logocircless.gif	**true**
2. A sentence explaining the aim of the research	**true**
3. Sentences of a similar nature to below must be included in the cover letter or consent form:	**true**
4. Have you scanned in your signature for the last section of the form?	**true**

Appendix 7: Students' experiences with bullying and reporting bullying

School	Participant	Type of bullying and/or Medium used for bullying	Platform Bullied	Grade bullying occurred in	Incidents of victimisation of learners	Bully	How the students dealt with the bullying incidences
School A	P1	Mobile Phone	WhatsApp - Voice notes	Grade 8	Threatened over the phone using voice notes on WhatsApp	A friend	Incident was communicated to the vice principal, social worker, principal
	P2	Mobile Phone	Not specified	n/a	Person was being rude and name calling.	n/a	Blocked bully; reported to school
	P3	Traditional - Verbal and emotional	At school	Grade 8	n/a	n/a	Reported to school
		Has heard of people being mobile and cyber bullied	Not specified	n/a	n/a	n/a	n/a
	P4	Traditional - Physical and emotional	At school	Grade 6	Bullied over the way she looked.	n/a	Kept quiet and smiled at the bullies; never told anyone
	P5	Verbal and Cyber	WhatsApp	n/a	Insulting and threatening texts	Anonymous	Retaliated and blocked the bully
		Mobile - verbal	WhatsApp	n/a	Threatened and insulted	Friend	Blocked the bully
	P6	Cyber/Mobile	Facebook	Grade 8	Friends were gossiping about her and she started getting inboxes	Friends	n/a
		n/a	Not specified	n/a	Received insulting messages	Ex-boyfriend	n/a
	P7	Physical	In class	n/a	Friends were making fun of her in Afrikaans, a language she does not understand.	Friends	Left it alone; smiled and laughed with them; still friends
School B	P8	Traditional - physical and, cyber	In class	n/a	Gossiping; making nasty comments	Class mates	Kept quiet
		Mobile	WhatsApp/Group chat	n/a	Someone posted a picture of her online crying with captions on it	n/a	She immediately told her to stop
	P9	Traditional and, cyber	Qoomeh	Grade 9	Name calling; insulted; threatened	Anonymous	Commented back
	P10	Traditional - Verbal	In class	n/a	Felt threatened	n/a	Didn't do anything
	P11	Tradditional - Emotional and, cyber	WhatsApp - Voice notes	Grade 6	Verbal; gossiping and insulting texts	Someone from the school/not a close friend	Ignored it, blocked the person and pretended it did not happen
		n/a	WhatsApp - Voice notes	Grade 10	Verbal; gossiping and insulting texts	Friends	Blocked the person and doesn't talk to the friend anymore
	P12	Mobile	WhatsApp, Facebook, Instagram, Snapchat	Grade 10	Friends started picking on him	Friends and ex-girlfriend	Blocked the person but they always get a new number and message him
	P13	Traditional - Verbal and, Mobile	WhatsApp, Instagram	n/a	Insults for beliefs and thoughts	Anonymous	Retaliated by coming back with something a little more rude
	P14	Traditional - Verbal/Face to face	Face to face	Grade 3- Grade 5	Made fun of for his speech impediment	n/a	n/a
		Mobile	WhatsApp	Grade 10	Heard of a girl being mobile bullied. Guys took a picture of her and posted it in the WhatsApp group	A group of guys at the school	The girl confronted the boys and asked them to take down the picture. This became a big scene in the class.
	P15	Traditional and mobile	Notes	Primary school	Friend wrote notes threatening her for her lunch	Friend	She gave her her lunch because she was scared.
		Mobile	Messages - BBM	Grade 7	Sent threatening and insulting messages	A grade 9 learner	Mother found out and it stopped
		Traditional and mobile	Verbal and on the phone	Grade 10	A boy was spreading rumors, saying insulting things verbally and on the phone.	A grade11 boy	Talked to parents and school counsellor
	P16	Mobile but not certain	Over the phone	n/a	People were gossiping about her	n/a	n/a
		Heard of cyber bullying incident	Over the phone	Grade 11s	They created a group chat to insult and gossip about other students	Grade 11s	n/a
	P17	Traditional	Not specified	Primary school	n/a	n/a	n/a
		Cyber/Mobile	Instagram	n/a	P17 witnessed a bisexual being insulted online	People online	n/a

Appendix 8: The instructions were given to the students

DOWNLOADING AND INSTALLING MVMR (Mobile Victimisation Monitoring and Reporting)

Thank you once again for taking time to participate in this study. It is greatly appreciated.

- You may download the mobile application I have developed at Google Play.
- The website for Google Play is play.google.com.
- The name of the app and the term you should search for is **MVMR** standing for "Mobile Victimisation Monitoring and Reporting".
- Once you have found the MVMR application on Google Play, click install.
    - The application is 3.31Mb.
    - The application is available for Android phones only.
- For those students that are using *Huawei phones*, you have to protect the MVMR app under their settings: Go to settings > Protected apps > Turn that option on for MVMR.

Once you have downloaded and installed the MVMR app on your phones, I ask that you answer a quick survey so that we may get a better understanding of mobile bullying and its effects on reporting.

From the moment you install the MVMR, you may use it to send reports if you are cyberbullied on your mobile phone. I will then receive the report and depending on your instruction, will forward the report to the school or contact you myself if you input your contact details.

You will have the application on your phones for 6 weeks so that we may receive reports on any cyberbullying you may experience. And also to test the application.

IMPORTANT: Please do not uninstall the application until you are instructed to.

After the six weeks, I will visit the school so that we may evaluate the application with you and get to understand your perspectives on reporting on the application