Identifying Female Mobile Bully-Victim Characteristics in Selected High Schools in South Africa: Towards an Anti-Bullying Mobile Application

by

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DEDICATION

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ABSTRACT

Within the majority of learners' years in high school, bullying is one common experience that pervades those years of transitioning to adulthood. The bullying phenomenon has been studied over a few decades and we have basically come to understand that bullying is any situation where a perpetrator, over a period, continually behaves aggressively towards another individual who cannot defend themselves; here an imbalance of power is accentuated.

This has been studied in recent years with the increasing reports of fatalities among high school learners who have resorted to suicide and self-harm as a solution. In the current digital age, the extent of bullying is faster and reaches further, and as such, more dynamics seem to be involved in the mix. The role of technology in improving the way we live and do things has also extended to the way crimes and injustice are being meted out in society. Youths and adolescents, particularly high school learners have been noted to have a phenomenal adoption of technology. They are also noted to increasingly acquire the most updated mobile technology devices and are therefore a fit sample for examining mobile bullying. In addition, more studies are finding out distinct classifications such as bully, victim and bully-victims, with the bully-victim studies just beginning to gain attention. As with the more familiar traditional bullying, fundamental psychological, social and economic factors largely predict the exhibiting of bully-victim characteristics. Some studies have found that the consequences are, however, more severe within the group but not without some inconsistencies in findings; hence the need to investigate and begin to proffer the right interventions or solutions.

This current study set out to investigate characteristics of female mobile bully-victim behaviours amidst claims that they are a minority and so no special attention need be given to them. A pilot study, conducted by this researcher, examining the bully-victim subgroup from previous cyberbullying research studies (Kabiawu & Kyobe, 2016), found the group exists and is fast gaining more popularity in research. Further examination of literature found the discourse around age factor in prevalence, with gender variances, interventions, and country differences, among others. Many of the past studies on gender variance enquiries were conflicting, interventions were largely not technology-oriented, and studies were mostly from outside the continent of Africa. This stirred up the interest in studying female mobile bully-victims in South African high school students and the exploration of a general (i.e. non-gender-specific) technical intervention.

The study followed a pragmatic philosophy and mixed method in collecting and analyzing the data. The study was carried out in Cape Town, South Africa; eight schools agreed to participate in the survey, and 2632 responses were collected from a range of schools (consisting both public and independent schools). Of these, 911 were females and 199 bully-victims, placing the group in a minority position. This maintained the keen interest in understanding the issues that face them rather than overlooking the subgroup as some studies would argue. Additionally, the study

entailed the development of an IT artefact in the form of a mobile application, called **"*The BullsEye!*"** through a Design Science process. The aim of the artefact was to proffer a technical intervention and observe the usefulness of the artefact in dealing with general bullying as well as for addressing, mitigating and providing support for bullying.

The study collected information quantitatively to explore the differences in age, school grade, type of school, family type, ethnicity and perceptions of interventions from students. This process was also used to recruit interested students in designing the mobile app intervention to address the secondary aspect of the research.

The study predicted that at different ages and school grades, female mobile bully-victim behaviours would be different. It also proposed that these behaviours exhibited by bully-victims would differ when the school type, ethnicity and family from which students come, are compared. When interventions by teachers, family and friends were compared, the study predicted that the female bully-victim behaviours exhibited would not be same, depending on the perception of the level of intervention the students received. These hypotheses were tested empirically using quantitative methods to check the analysis of the variance of the mean scores of the collected data.

The results of the analysis of variance showed findings that resulted in some partial and some strong acceptance of the hypotheses. As expected, there were age and grade differences observed among the behaviours of the female bully-victims surveyed. The younger in age and grade these students were, the more of the behaviours were found to be exhibited by them. Students from conventional families with two parents were expected to exhibit fewer female bully-victim characteristics, but this was not necessarily the finding in the study and inconsistent with most previous studies. The prediction on ethnicity was also partially accepted due to mixed indications according to findings. Establishing the respondents' ethnicity showed a group of students who did not wish to reveal their ethnicity but were rife in bully-victim behaviour via phone calls, email and SMS's. This raised a question of whether their societal status affected their behaviour. The type of school was also found not to accurately predict female bully-victim behaviours in this study as expected or in accordance to majority of existing literature. There was, however, evidence of a distinct social media mechanism of bullying/victimization peculiar to an Independent school in relation to other schools. The prediction on interventions, while being partially supported, provided a useful insight into strengthening the need to appreciate and continually invest in the quality of interventions provided to address mobile bullying.

Generally, the findings revealed that female mobile bully victims had significantly higher experience of being victims (i.e. had been bullied) than those who were not. This may be due to failings in the provision for reporting issues or the way reports are being handled, which is another useful insight into interventions. The artefact designed as an intervention in this study also showed high acceptance of the app. This can be attributed to the fact that the design process followed a methodology that is grounded in practice and in the body of knowledge. This was embellished by

emerging methodologies of involving the intended users, though schoolchildren, in the evolution of the artefact design.

The implication of these findings is that there may be current frameworks addressing female mobile bully-victim behaviour at school and family levels; however, focus of interventions should be on teaching the right culture with regards to mobile phone use. This gives credence to the second objective of this study, which was to design a digital intervention. The artefact was designed to empower victims and bystanders, the purpose of which seemed to have been achieved with a high rate of approval for the app. The knowledge gained from this phase, despite the limitations, points that visual appeal is important when designing for high school students. It also showed that students are interested in learning in an environment free of adult presence or supervision. However, many more strategies and principles can be applied to intervene from different perspectives to create a more wholistic solution. This knowledge is useful for future works that seek to include their input in design process.

The understanding of these characteristic mechanisms is important in proffering relevant interventions as the distinct female bully-victim group is newly gaining attention. This is useful in theory development, especially feminist theories on violence as well as where and how to target interventions. This impacts practice in terms of knowledge of how female mobile bully-victims operate and how one can begin to empower them to protect themselves and reflect on their online and mobile phone behaviour. Therefore, for Information Systems practice, this study provides a worthwhile contribution, especially in answering questions such as, what information systems and interventions should be developed and how to maximize such systems for their intended learning purposes. From the lessons learned in this study, the research also contributes by proposing considerations for future and further research.

Keywords: *Female bully-victims; Female Mobile bully-victims; Mobile Bullying; Cyberbullying; Mobile app; Technical Intervention; Pragmatism; Design Science; South Africa; High School students*

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CHAPTER 1: INTRODUCTION

1.1 Research Motivation

This Design Science Research study is born out of multiple interests. The field of Information Systems has been referred to as one that is new and as such progressively being grounded regarding methods and philosophies. Communication of design research studies sometimes proves difficult because the methods are originally from the Engineering field, which has a different audience from the Information Systems audience, who require much more detail in the research process.

Another important consideration in Information Systems Research is addressing real-life problems that are of value to society. This factor was considered by the National Research Foundation of South Africa, who then set out to find a solution to resolve the issue of cyberbullying. This study is partly funded by the organization to assist the Researcher to produce an insight into the social issue and proffer plausible interventions.

This study addresses the necessity to produce a standard academic study that sits well in the field of Information Systems research. The study tackles with rigour, a persistent and relevant issue within society, thus bridging research and practice.

1.2 Research Background

1.2.1 Mobile Bullying

Bullying is a commonly occurring phenomenon among young people, and this is especially true among high school students (Khuzwayo et al., 2018; Chamberlain & Britain, 2010). With the increasing ubiquity of technology, cyberbullying has dramatically become more prominent (Zych et al., 2017; Gan et al., 2014). South Africa has a particularly high rate of mobile adoption with over a hundred percent increase rate and many youths owning more than one phone, including smartphones (DBE, 2012). Mobile phone penetration is at an all-time high (GSMA, 2016) and high school learners continue to gain access to the emerging technologies associated with the mobile digital age (UNICEF, 2012; James, 2015).

Mobile bullying is a form of cyberbullying distinctively executed with any of the wide range of mobile technologies available today. With the increasing awareness of this phenomenon worldwide (Burton, 2016), it has become necessary to examine the trends and responses from other countries, institutions, and agencies to harmonize initiatives and apply them to the same issue in South Africa. Unfortunately, the available information of the trends in the country are inconclusive and unreliable (Burton, 2016) and as such the extent of the effectiveness of interventions, where they exist, are difficult to measure and extend.

Today, it is evident that technology has changed the way many things are done, and with the different kinds of devices available, there are more affordances for the use of technology (Camacho et al., 2018; Pearce & Rice, 2013). Owing to this, researchers have

the perception that more still needs to be uncovered when it comes to the full knowledge if how technology is used by different people (Donner et al., 2011). This follows with regards to aggression via the mobile phone and the lead up of events that result in this aggression (Nicol & Fleming, 2010) as was also found by Kabiawu & Kyobe (2016). Given that aggression via mobile phones is the leading means of cyberbullying, the understanding of the types and differences of this and other types of bullying is essential (Badenhorst, 2011; Mahon, 2014).

Adolescents are engaging in cyberbullying and victimization increasingly using mobile technology. There are claims that boys are typically the usual suspects of bullying while girls are the likely victims. Research even alludes that female aggression is no longer rife and in fact reducing. Males & Meda-Chesney (2010). Outrightly states that the hype about female cyberbullying is phony and is only false alarm on the part of those heralding the claim. This is however contradictory as other claims backed up by research testify that females as well as males can be entangled in the web of cyberbullying (Bayraktar et al., 2015). Another study found girls more engaged in cyberbullying than boys (Buelga, Martinez-Ferrer & Cava,2017). Necessity therefore arises in clarifying these inconsistent findings about cyberbullying and focus on the females will help in situating the topic.

Young people are also known to swing between being bully and victim, for example exhibiting one character at home and another in school (Goldbach et al., 2018; Runions et al., 2018; Li, 2008; Ma, 2001; Nail et al., 2014; Tokunaga, 2010). These are the bully-victims. Significantly, bully-victim studies are less common than pure bully and pure victim studies conducted in developing countries. (Kyobe, 2016). When this study uses the word "bully-victim", it is used in reference to the students who have experienced bully on both ends of the spectrum as victims and as bullies as well.

While several studies from first-world countries such as Australia, the United States, the United Kingdom, and Finland, exist, there are far fewer studies from Africa, including South Africa (Joyce-Gibbons et al., 2018; Menesini & Salmivalli, 2017; Shapka et al., 2017). Zych et al. (2015) found their cross-national study on bullying and cyberbullying, that there are differences in the prevalence and dynamics of bullying as there are varying languages and cultures. Although there has been an increase in context-specific studies in the past decade, there are still several inconclusive aspects (interventions, gender, definitions, age ranges, etc.) of bullying and mobile bullying. One such aspect is gender, with discrepancies in the findings of whether boys are more involved in mobile bullying than girls (Stubbs-Richardson et al., 2018; Lehman & Dumais, 2017).

These studies have shown different research approaches and metrics in arriving at their conclusions. For example, the age bracket of their respondents varied from 10 – 24 years, and while some studies grouped respondents by age brackets, some analysed their data using single-age classes. These approaches pointed to the need to harmonize studies conducted within South Africa to get an informed direction on where to focus future works.

Following this, a preliminary study was conducted by the researcher using over 2600 responses collected from previous cyberbullying studies from high school students in South Africa. For many aspects, similar findings were observed. However, there seemed to be very little mention of two dimensions of the data: female bully-victims and interventions in mobile bullying. Thus, this formed the basis for the focus of this study. More studies have begun to delve into bully-victim investigations (Jackson & Vaughn, 2018; Kabiawu & Kyobe, 2015; Runions et al., 2018; Espelage et al., 2018; Smith & Thompson, 2017), but very few (Pavlich et al., 2017; Edmondson & Zeman, 2009; Ireland, 2001; Craig, 1998) was covered specifically female bully-victims in South Africa. Within the same context of South Africa as with other countries, interventions largely do not go beyond the legal requirement for schools to put an anti-bullying policy in place. Other interventions were found to have varying effects when compared with different evaluation criteria (Menesini & Salmivalli, 2017), again with little insight into technical interventions. Thus, these have formed the basis for the focus of this study.

Holding these facts as a background, this study will examine female bully-victim behaviour in high schools in South Africa. It will be useful to determine the similarities of these facts gathered from studies outside Africa to those within the South African context. The theories and methods previously used will also be considered for applicability to the context of the study.

1.2.2 Developing an Intervention

Theory development and testing are common approaches to academic research. At face value, if this study aims at comparing the similarities of the more commonly researched bully and victim characteristics with bully-victims, theory testing may seem appropriate and sufficient to achieve the goal. However, beyond the theory-testing aspect of this study, the researcher aims at a contribution of artefact development regarding an intervention for the social phenomenon. The reasoning behind this study, therefore, goes beyond understanding the phenomenon to problem-solving.

This approach entails using one of the most commonly used tools in cyberbullying to intervene the issue, by designing an artefact in an attempt to minimize the effect on victims, bullies and other parties involved — possibly the artefact can be used to teach behaviours that can correct some of these bully-victim behaviours.

Due to the subtle nature of cyberbullying and how technology enables masking of activities, several attempts at intervening in cyberbullying have been difficult (Ashktorab & Vitak, 2016). There are still minimal technical interventions in combating cyberbullying, but frameworks and guidelines are increasingly evolving in literature which can help their design (Bowler et al., 2015). This study will be engaging some of these existing guidelines in the design of an anti-mobile bullying solution.

According to research (Lang, 2014; Lenhart, 2015), students are moving away from platforms that are open to adults. This shows the need to devise means to reach out to intervene in mobile bullying with approaches that are different from the conventional whole school-based approaches that utilize a teacher-supervised curriculum. Also, students are domain experts when it comes to mobile bullying, hence their involvement in designing the intervention was crucial. To recruit these students as designers in the artefact design process, the questionnaire included a section where students were asked to indicate their willingness to participate in the design process. The empirical exercise also shed some light that emphasised the point that interventions are sought by the students. This guided the design process in considering features that could appeal to the students.

1.3 Research Objectives and Questions

In a bid to understand female bully-victim characteristics and attempt a general mobile-bullying solution, a two-phase, concurrent mixed methods research was conducted. The preliminary statistical survey followed up with a subset of the respondents to gain some inputs for the further development of the prototype app. The quantitative research phase questioned the surrounding relationship between the individual's environment — immediate and extended — their exposure to and habits with technology, and their exhibition of mobile-bullying behaviours. The second phase used some of these students, randomly selected, to test the artefact for usefulness in tackling mobile-bullying situations.

The first research question of this study is:

Research Question 1: What are the characteristics of female mobile bully-victim behaviour (FMBVB) in high schools in South Africa?

Based on the above, the research goal is to understand the characteristics of female mobile bully-victims in high schools in South Africa, and the factors influencing this behaviour. In particular, this entails examining the influence of factors such as grade, age groups, family and ethnic background, school environment, parent and peer control on female mobile bully-victim behaviour.

The second research question of this study is:

Research Question 2: How can a technical intervention be designed to help in addressing female mobile bully-victim behaviour of high school students in South Africa?

The objective here is to develop an anti-bullying mobile application as a technical intervention for the problem. This entails:

- Designing and developing a mobile app as an anti-bullying intervention for high school students in South Africa.
- Designing features into the mobile app to help report cyberbullying in a school.

- Designing the app with information features to support victims of bullying with what to do when in bullying situations
- Designing the app with features through the use of the app for learning more about fighting bullying.

1.4 Contributions of Research

With incommensurability facing much design-oriented academic research in Information Systems, this study aims to produce an output that simultaneously contributes methodologically, theoretically and practically.

Theoretically, this study contributes by strengthening the premises about constructs that make up mobile bullying. This was achieved by advancing existing theories in mobile and cyberbullying studies which generally address bullies and victims as separate entities but rarely investigate the applicability to the unique subgroup of bully-victims. In this approach, socio-ecological factors such as age, grade, ethnicity, and family background were integrated into the conceptual model that guided the investigation. The findings suggest that the constructs that are employed in mobile bullying studies that explain characteristics of bullies and victims are applicable to the bully-victims as well. The findings also go further to explain characteristics that can lead towards a more robust mobile bullying intervention. This is achieved by reflecting on the design process that brought about the final artefact from this study. This is further explained in the practical contribution of the study. Another theoretical contribution is the context of the study being in South Africa. This is pertinent because in the examination of socio-ecological factors, contexts differ, and the influence of culture and society are reflected as a strength of the findings — making available more bases to compare similar studies from other countries.

In using the Mixed Methods approach to study this phenomenon, the study contributes methodically in the advancement of this approach. The most common appropriation of Mixed Methods is the use of Quantitative and Qualitative instruments; however, this study mixes Quantitative and Design Science methods. The Quantitative aspect helped in understanding the characteristics being investigated and also served as a tool in sourcing willing and appropriate cohorts that would aid the design of the proposed intervention. This follows that the intended users were involved in the process that brought about the final solution, which is a prescription for successful solution endeavours. Alongside is the contribution to the body of Design Science knowledge and application in Information Systems studies by creating, applying and testing the tool designed. The findings were also useful in prescriptions for future participatory research processes in designing artefacts, especially for high school students.

Practically to the stakeholders (students, parents, schools and policy makers) that may be affected by and influence bullying, this study has findings that make valuable contributions. It was revealed that interventions are sought however more deliberate effort needs to go into the resources that are available to equip interveners.

1.5 Structure of Thesis

The first chapter of this thesis is the Introduction. It begins with a motivation for the research, briefly stating the intentions and direction of the study. The overview of the research phenomenon is introduced, followed by an outline of the methodological approach of the study. The main and sub-research questions and objectives of the study follow, after which the general contributions of the study are mentioned.

Chapter 2 of this thesis covers the review of related literature. This covers earlier works on cyberbullying ranging from the classifications to the interventions previously proposed and the outcomes of these interventions. From this, we show the gaps identified from literature and home in on the aspects of these gaps this study intends to address. Following this is the theoretical framework for the study. This covers theoretical approaches previously used in cyberbullying studies. Furthermore, other available theoretical applications are discussed. The study then sets out its theoretical approach, justifying the choice, which culminates in the development of a conceptual framework for this study.

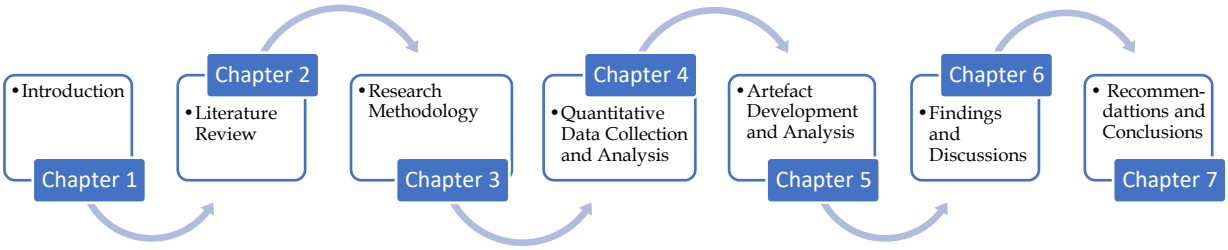


Figure 1.1 — Thesis Structure

Chapter 3 explains the research design and methodology adopted in this study. The first part of the study is descriptive, hence the rationale for doing a quantitative study is explained. The sampling and selection criteria are discussed as well as ethical considerations observed in the study. The data analysis techniques and how these link to the practice-oriented (second) part of the study is explained.

Chapter 4 details the Quantitative data analysis and validity and reliability tests conducted.

In Chapter 5, the Artefact Design and Evaluation is covered in detail. A more thorough explanation of Design Science is presented, encompassing the philosophical underpinnings of Design Science and the applicability of the approach to the practice-oriented part of the study. Furthermore, the design process, detailing the technical environment, model creation and execution, is explained. The process of presenting and evaluating the artefact concludes this section.

Chapter 6 presents the findings of both the Quantitative and the Design Science parts of the study. For the Quantitative study, this section explains how many of the initially set out goals the research process was able to achieve. For the Design Science part, the improvement of the artefact through the evaluation process is discussed as well as a summary of the outcomes.

Chapter 7 contains the conclusions drawn from the findings regarding cyberbullying and female bully-victims. Suggestions for improvements in the research process, objectives and outcomes are discussed in this concluding part of the thesis. Research reviews and publications from this study are outlined in the last part of this chapter.

The Appendices includes more detailed information on certain aspects highlighted throughout the body of the thesis.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Several different and conflicting reports pervade research on mobile bullying. Different terms are used in referring to the concept, including cyberbullying. This inconsistency is also replicated in the estimation of the incidence and rates of prevalence within the body of literature.

There are also several disciplines interested and actively involved in the studies such as Criminology, Social Science, Humanities, Child Health, Public Health, Education, Psychology as well as Information Technology (IT)/Systems (IS). While this literature review will cover these disciplines, an Information Systems perspective is taken with the aim of advancing theory and exhibiting the multiplicity of relevance within the IS research context.

This section aims to examine the trends in the mobile bullying research, identify the gaps in literature as well as provoking discourse around some of the most popular methods in the studies. The study also aims at the potential of unravelling a new framework for explaining cyberbullying, particularly in the South African context.

2.2 Mobile Bullying and Cyberbullying

Bullying has been increasingly researched in the past twenty years among several key disciplines, including Medicine, Psychology, Law and education. This prevalence of bullying as research topic is necessitated by resultant effects ranging from academic performance decline, school absenteeism, mental instability and sometimes fatalities among young children and adolescents committing suicide, all resulting from bullying incidents and many within the school setting (Chikaodi et al., 2017; Diaz Herráiz & Gutiérrez, 2017; Bondü et al., 2016; Van Geel et al., 2014; Roland, 2002). As seen in many definitions, when an individual is consistently and deliberately intimidated or harassed, this aggressive behaviour is generally referred to as bullying (Steyn & Singh, 2018; Fink et al., 2015; Rodkin et al, 2015; Slonje et al., 2013; Swearer et al, 2014; Ziv et al., 2013). This intimidation can leave the individual physically or emotionally hurt and thus lead to many psychological conditions, as earlier mentioned. With a growing population of such affected individuals, society is beginning to be faced with a social problem.

Electronic communication has become an integral part of our lives as the past few years have progressed with the constant increase of our reliance on technology for social interactions. This wave has brought many advancements to ways of living; however, with it also come the negativities such as cyberbullying. Cyberbullying is any aggression done using electronic media including the Internet, mobile technology and computers (Menesini & Salmivalli, 2017; Brunstein et al., 2010). It is an act of aggression which results from the misuse of technologies and the Internet. Some studies have combined the different types of cyberbullying, making the effects hard

to distinguish (Van Geel et al., 2014); however; many others have been able to identify these types distinctly. Sending abusive text messages and emails to the victim directly over the Internet, as observed by Wolak et al. (2007), might hurt differently compared to the indirect aggression, such as the spreading of rumours.

Mobile bullying is precisely the method of cyberbullying carried out via email, chat rooms, instant messaging and small text messages on the mobile phone (Namane & Kyobe, 2017; Kowalski et al., 2008). Olweus (1993) described the behaviour of bullying as occurring when an individual is repeatedly exposed to negative actions of another individual, resulting in the power imbalance between the victim and the perpetrator. Within the online environment, the power imbalance is exhibited in less obvious characteristics such as proficiency with technology, anonymity (El Asam & Samara, 2016), perhaps as well as the sophistication of devices and level of access to data. Direct aggression refers to acts of cruelty including but not limited to sending unpleasant and impolite text or voice messages while indirect aggression can include smear campaigns or social exclusion (Ryoo et al., 2018; Bauman, 2010). It is a relatively novel type of bullying with unique characteristics such as anonymity, ubiquity, and because of a much wider audience, the effects seem to be more damaging to the victim. Anonymity refers to the identity of the bully being unknown, sometimes by design of the perpetrator where they mask their identity or the identity as unknown just to the victim (Harrison, 2018). Ubiquity exists in the current always-connected world and the spread of any rumours or talk about a person can reach the greater part of the world population of over 7 billion people with about 12 billion devices in a matter of minutes (Rao et al., 2018).

The problems in giving definitions to cyberbullying have offered the leeway of adopting a range of cyberbullying definitions. However, this also has resulted in the limited assessment of the natures of specific types of cyberbullying and coming to conclusions on the impacts of same technological effects. According to Pyżalski (2011), acts of electronic aggression substantially differ when one considers the social and psychological mechanisms used and their consequences. Acts of electronic aggression entail using technology to disrupt other users of similar devices. For example, impersonation is a form of cyberbullying which leverages anonymity to commit an offence (Menesini et al., 2012). It could take the form of using a fake identity or using someone else's identity without their consent, defamation, framing, harassment, exclusion and cyberstalking.

Comparing traditional bullying and cyberbullying, Pyżalski (2011) found that there were significant differences between them regarding the psychological and social mechanism as well as their consequences. Direct aggression such as hate mail and offensive text messages affect an individual differently from other subtle forms of aggression such as spreading rumours or social exclusion in the playground (Baldry et al., 2017; Slonje et al., 2017; Wolak et al., 2007). General understanding, therefore, of the use of technology is still limited (Zych et al., 2018; Donner et al., 2011) and how it influences cyberbullying still needs further investigation (Craig et al. 2017; Nicol & Fleming, 2010; Badenhorst, 2011).

One such example is the difference in patterns of technology usage across people of different educational backgrounds, age, and income. A few studies have examined the influences of school and home background also, in the socio-ecological theory. Younger children below nine years of age tend to derive entertainment from it while older children's use ranges from knowledge-seeking to social influence to pornography. Much of these are characterized by excessive use and negative vices (Smith & Livingstone, 2017; Robinson et al., 2015). Although cyberbullying mechanisms of the Internet and mobile phones have overlapping users, their populations are not proportional (Thornton, 2018; Rice & Katz, 2003), neither are the uses, devices, and activities similar (Pearce & Rice, 2013). Respondents in a study expressed a greater feeling of loneliness when bullied over the Internet than via the mobile phone (Ortega et al., 2009). It is confirmed that youths adopt technology at a higher rate than adults, even though more adults aged over 65 years are increasingly adopting technology usage in their everyday life (Perren, 2015). Gender differences also exist in different aspects. In a study by GSMA Development Fund (2010), Middle Eastern, South Asian and African women were found to be less prone to own a mobile phone than their male counterparts, which hindered their access to information and increased a feeling of insecurity in them.

Various literature works and theories have been developed to examine bullying and its effects. These are examined in subsequent sections of this chapter, together with their applicability in a South African high school context to help eradicate bullying in the schools. The most effective strategies are collaborative and involve all members within the environments to help foster a positive culture among people to allow positive development and growth. This is discussed in the social information processing theory.

The emergence of mobile bullying is known to have stemmed from the rapid ICT development and the massive Internet device penetration by school-aged children and teenagers (DiFranzo et al., 2018; Cassidy et al., 2013). The rise in the use of technology as communication means through laptops, tablets, and phones has led to a digital divide being created between the older and the younger generations (Zika, 2019; Pearce et al., 2011). Locations, methods, and means of bullying incidents are regarded as new to the older generation, and in most instances, the parents are not aware of the dangers of technology to their children. The technological evolution makes it even harder to track users with virtual private network (VPN) software being developed to replicate the Internet protocol address of a user to show that they are in a different country than they are actually in. This increases the complexity of being able to identify an offender since their Internet address can be modified to reflect a different location (Dehue et al., 2008).

In recent years, there has been a growth in the number of social networking sites such as Twitter and Facebook, in addition to emails and chat rooms. Moreover, new games and apps are being pushed out to mobile devices at a rate that adults can barely cope with. For instance, Snapchat is an app for messaging photos that allow individuals to

send videos or text messages to each other after which the viewing is automatically deleted. However, in most instances this is not the case since a person can save the videos or pictures and use them again later to harass someone. Studies (Kyobe et al., 2016; Sticca & Perren, 2013) pointed out that one of the distinguishing factors of mobile bullying is the anonymous nature of the crime, which can be done in front of many people at the same time and still allow the crime perpetrator not to be identified. Snapchat has a feature to help curb anonymity when taking screenshots where the receiver is notified of the users who take screenshots of content. Therefore, through this capability it is easy to track the person who might attempt to be a cyberbully.

Cyberbullying, especially for Internet users, can also occur from content and product marketers. Most websites often give users pop-ups and adverts of items that were in their search history. This shows that the websites and web apps have capabilities of collecting user data. For example, Facebook has been reported to show users adverts of products they have recently searched for. This is an indicator that the site has tools that are used to dig into users' computers to collect data. The risk of this is that other malicious websites can collect data this way and use it for malicious purposes such as blackmailing or stealing user identities and credentials. These efforts are difficult to mitigate, and it is difficult to determine how much information is collected, the regulations governing the process of collection of the data and what is done with the data collected whether needed or not needed.

This critical element of mobile bullying can be detrimental to the victim and still encourage the bullying since there is a higher likelihood that the perpetrator will evade punishment. Interestingly, Snakenborg et al. (2011) indicated that the victims in most cases are aware of the bully. Mishna et al. (2009) also indicated that the students believed that there are myriad of possibilities created by the Internet for everybody to be a bully and that the students who in real life were timid to bully directly might use the Internet as their bullying platform.

Sticca and Perren (2013) also pointed out another distinguishing factor in mobile bullying, which is the large space it offers. Some of these are covered in the socio-ecological theory of the structures in place in an individual's environment that can promote bullying. There are no boundaries, limits or constraints in time so that the victim can be targeted at any place or time, including their bedroom or home. This also implies that mobile bullying has more witnesses, which has the potential of continuously spreading the incident of bullying to reach audiences globally in a short period. Similarly, Campbell et al. (2013) pointed out another element of mobile bullying is that the bully does not see the victim instantly and the effect their action has on them. Therefore, the intention of the mobile bully is sometimes difficult to comprehend, and that also includes the extent to which they meant to cause the harm. This brings about psychological issues, as will be discussed in the following section.

2.3 Psychological Impact of Mobile Bullying

Over the last decade, investigations of the impact of mobile bullying on victims, bullies and victims/bully have emerged, and there are comprehensive and clear sets of studies that outline the adverse lifelong effects for women, young people and even children. Indeed, the emotional and psychological aftereffects of mobile bullying embody the biggest problem for the victims (Jang et al., 2014; Dredge et al., 2014). Exposure to mobile bullying incidents has been associated to suicidal ideation, depressive symptomatology, loneliness, anxiety and low self-esteem (Stapinski et al., 2014; Schneider et al., 2012; Gámez-Guadix et al., 2013). An Australian study conducted by Price and Dalgleish (2010) found that 3% of Australian youths aged between 10 to 25 years had suicidal thoughts after an incident of cyberbullying, and 2% of them engaged in behaviours that are self-harming. Similarly, other studies have associated suicide to direct mobile bullying incident consequences (Bauman et al., 2013). However, other authors have considered the complex nature of suicidal behaviour and as noted by Kowalski and Limber (2013), getting involved in bullying accounts for about 4 - 7% of the suicidality difference.

Mobile bullying can also have physical effects on their victims such as sleeping problems, abdominal pain, headache, substance abuse and weight loss or gain (Jang et al., 2014; Gámez-Guadix et al., 2013). Moreover, there have also been reports of school difficulties such as not feeling safe at school, low academic achievement, truancy and school aggression (Mishna et al., 2012; Cassidy et al., 2013). Some studies also document that youths who were harassed online displayed more school aggression signs and were more prone to bring weapons such as guns to school (Mishna et al., 2012). The nature of materials, type and the extent to which the planning of victimization was carried out also influence the psychological impact it has on the mobile bully-victim. Some researchers reported that the incidences that involve video clips or pictures were considered worse by the victims. For instance, in a study done by Menesini et al. (2011), the findings indicate that posting of pictures considered to be embarrassing was the worst form of mobile bullying for the adolescents in Italy.

According to Wong et al. (2014), the experience of being a mobile bully has also been associated with external difficulties and psychological functioning. For instance, a study by Fletcher et al. (2014) observed that mobile bullies had poorer life quality and had more psychological difficulties despite having no such difficulties with social or peer interactions. Wong et al. (2014) indicated that the climate in schools is also believed to be a critical risk factor where the poor sense of belonging to the institution has been associated with mobile bullying. The worst psychological impact has been linked to being a victim or a bully. These individuals participate in online bullying and are also victims of mobile bullying at the same time (Kowalski et al., 2012; Gámez-Guadix et al., 2013).

2.4 Roles in Cyberbullying

According to cognitive theory, cyberbullying roles can be as a result of interaction between an individual and the environment. Social learning can influence behaviour in response to repeated observations of aggressive behaviour by peers and parents. The term 'bullying roles' refers to in the roles played in the bullying process. A role is a part played by various parties. General bullying (including cyberbullying) roles include the bully, victim and bystander.

A bullying research study by Rivara and Le Menestrel (2016) identified several other roles (Fig. 2.1), making a clear distinction between the identified roles. The bully is the individual who plays the lead role and starts the bullying. Henchmen/followers cheer and promote bullying, just a step away from initiating and playing a lead role in the act. Passive bullies openly and passively support the act with their actions, such as laughing or spreading the news. Passive supporters do not show any outward signs but enjoy watching it go on. Disengaged onlookers take no stand against the act; though they do not participate, they wait to see what happens next. Possible defenders of bullying are close to the previous role, disengaged onlookers, they do not participate, and they dislike the act, but they take no precise action against it. Defenders are the final role identified in the study, they act because of their dislike for the act and attempt to help the victimized individual. Bullies are known to be harsh and inconsiderate towards their peers (Jansen et al., 2011).

In bullying, 'only-bullies,' 'only-victims,' 'bully/victims,' or 'not involved' in school and/or online have been identified. Some individuals exhibit the same role (either bully or victim) in school and online — role-continuity — while some exhibit different roles — bully online and victim in school. This is known as role inversion (Baldry et al., 2017).

Since cyberbullying is a social phenomenon, the following briefly identifies the players within it. This enables a better understanding of the dynamics and the discourse further on in this dissertation.

2.4.1 Bully

The bully is the individual who carries out the aggression on another individual. They are also referred to as the aggressor or perpetrator. Bullies are known to be harsh and inconsiderate towards their peers (Jansen et al., 2011). In traditional or physical bullying, the bully may have a once-off contact with the other individual; however. in mobile or cyber bullying, the bully follows the victim around via the mobile phone or device in their pocket. The mobile bully enjoys the invincible protection of ubiquity that the cyber environment provides, given the ability to function anonymously and reach a far wider audience than the physical environment. The mobile or cyberbully exerts power and dominance over the victim by easily creating humiliating messages that are permanent (Wong-Lo et al., 2011) as posts on the Internet usually remain there — even if archived, still available on search of keywords.

The bully in traditional bullying is always known by the victim because incidents happen face-to-face. However, mobile or cyber bullying plays out differently with the affordance of anonymity; the bully may or may not be known or identifiable. Bullies have been found to engage in the behaviour because they perceive it as a way to gain and keep status (Caravita & Cillessen, 2012).

In a self-reporting study by Dilmac (2009), it was found that there is fewer admission of being a bully than being a victim. Bullies have also been found to exhibit the character of preferring to play violent and mature-rated video games (Dittrick et al., 2013).

2.4.2 Victim

The victim is the receiving party of aggression from another individual or group. They are usually withdrawn and display low self-esteem. The likelihood of an individual to be victimized was examined on emotional intelligence (Schokman et al., 2014; Kokkinos & Kipritsi, 2012) and found to low in many of the victimized individuals. Victimization experiences have also been classified, namely direct and indirect victimization. Like bullying, direct victimization occurs physically and face-to-face, while indirect victimization is relational aggression on the recipient's part (Boyes et al., 2014).

A study (Li, 2007) found that one in three students are victims. Several studies (Dilmac, 2009; Wolak et al., 2007; Ybarra et al., 2007) have produced findings that are similar, where more students report being victimized than students report themselves as bullies. Studies have been conducted to understand the characteristics of victims, and though findings are not always consistent, there are some common characteristics that are connected to victims of bullying. Personality traits such as introversion, neurotic behaviour, unconscientiousness, disagreeableness and high levels of empathy are common among victims. These findings were found to be relative when studied across individual and environmental factors such as age and gender. (Sekol et al., 2016). Victims were also considered as unpopular among the children in the school (De Bruyn et al., 2010; Van den Berg & Cillessen, 2013).

2.4.3 Audience or Assistants or Bystanders

Several parties in bullying may not necessarily join in the aggressive acts towards the victim but provide feedback or serve as an audience to the bully (Salmivalli, 1991). There is the assistant or reinforcer who peripherally participates by cheering the bully on or just providing the satisfaction of an audience for the bully's show of power. There are those that distance themselves without taking any sides but are nonetheless involved, and they fall in the 'outsider' group. They are involved by silently approving the bullying to continue and not taking any action to stop it. Some individuals (the defenders) take a stand to combat bullying by taking actions to stop the act, and they even go as far as standing up for the victim or comforting them.

Assistants and reinforcers are caught in the web of bullying and exhibit characteristics similar to bullies. Findings show inconsistency in the level of acceptance they have from peers (Pouwels et al., 2018) this may be because these individuals already have medium popularity and are only trying to gain more popularity by siding with the bully. Defenders are very much liked by their peers (Duffy et al., 2017; Pöyhönen et al., 2010), but ironically are unpopular because they become the next victim as punishment from the bully for reporting incidents or defending victims (Meter & Card, 2015). This poses an additional threat in cases where there is no framework or protection by authorities for reporting incidents.

2.4.4 Bully-Victim

A bully-victim is an individual who is bullied and as well bullies other individuals (Oh & Hazler, 2009). People who swing between the bully and victim roles (Schwartz et al., 2018) fall into indirect compensation mode where they take their frustration in one area to another (Li, 2008) or exhibit one character at home (for instance victim) and another in school (I.e. bully) (Ma, 2001). Research suggests that a resultant effect of being bullied leads to the same individual victimizing another, and at this stage they are termed bully-victims. Findings also point that among bullies, victims, and bully-victims, the latter are worst off regarding their psychological adjustment and problems compared to other groups (Schwartz et al., 2018; Nansel et al., 2001). They are at the highest risk of emotional and behavioural problems due to the double-negative effect of being a bully and being victimized (Goldbach et al., 2018; Marini et al., 2006).

A general classification of some bully-victim characteristics has also been made. Proactive and reactive aggression is found to be common among this group (Runions et al., 2018; Peeters et al., 2010). When aggression towards a victim is for aims such power and peer status for the bully, this is called proactive aggression and is strengthened when peers are present to encourage it. Reactive aggression, on the other hand, is aggressive behaviour in response to a threat or anticipated provocation. This aggression is usually spontaneous in relieving the stress or anxiety expressed by bully-victims.

The prevalence of bully-victims is reported to be relatively low (Schwartz et al., 2018; Sekol et al., 2010); however, they have been found to be more socially unacceptable than pure bullies. They exhibit characteristics such as impulsion, hyperactivity, and hot-headedness (Runions et al., 2018; Stein et al., 2007). Being unpopular or disliked exposes them to victimization (Pouwels et al., 2017; Unnever, 2005), leading to them experiencing depression, anxiety and intense emotional imbalance. These traits are prone to extend from the finding that they are usually from an abusive or coercive family background, which is exhibited mostly at the youngest stage of their social life (Unnever, 2005).

Bully-victims have negative impressions about themselves, and this reflects in much of their social interactions (Cook et al., 2010). They are not accepted and socially excluded among their mates, prey to bad influences from the wrong friends. They

generally have issues with social problem-solving and struggle with their grades in school. An evaluation by teachers and peers of bully-victims rated them low and reported them to be the most difficult to work within school settings (Kowalski et al., 2008). Other studies have reported a higher rate of depression, somatization, and psychiatric referrals among this group of students (Ybarra & Mitchelle, 2004). They carry this baggage of problems into adulthood and are over six times more prone to smoke regularly, have serious illnesses or psychiatric disorders (Wolke, 2013).

There are, however, similarities between bully-victims and bullies which include constant feelings of anxiety, depression, loneliness, social dissatisfaction and anger (Edmonson & Zeman, 2009; Ma, 2001). They also exhibit characteristics similar to victims such as a feeling of inadequacy among peers and inability to make friends (Andreou et al., 2013).

In summary, bullying can be depicted in a continuum as in Figure 2.1 below. There are several roles in the 'bullying circle' where each role is determined by a student's tendency to act or the student's attitude to the bully or the victim (Rivara & Le Menestrel, 2016). All these are a function of several factors including the individual's background, morals and experiences over time. From past research, student profiles have been created to depict the tendencies to take up each of the roles (Peets et al; 2015). These profiles are, however, dynamic in the current ever-changing Internet, always-online environment.

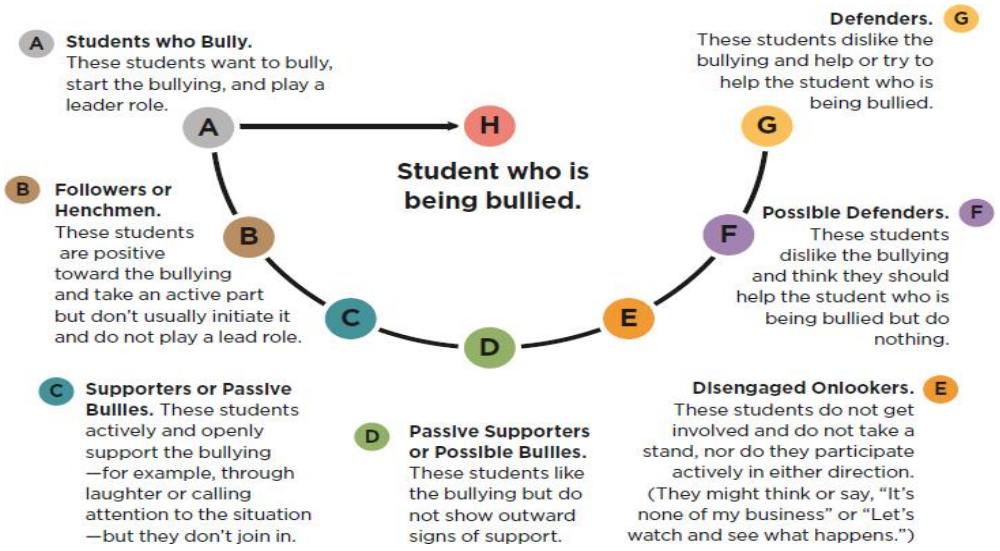


Figure 2. 1— Analysis of Student Types of Bullying (Rivara & Le Menestrel, 2016)

2.5 Socio-Ecological Themes in Cyberbullying

With so many cyberbullying studies, there is no standard way of classifying themes. Researchers have elicited themes with respect to their paradigms and scope of study (Clark, 2018; Hughes & Laffier, 2016; Smith et al, 2016). In order to build better understanding of the characteristics of bully-victims, and to enable better comparisons

of the behaviours of different categories of bullies and victims, the researcher found it necessary to examine those common themes that have been presented in bullying literature. The researcher, therefore, narrowed the themes to socio-ecological factors which are those mostly researched (Thomas, Connor & Scott, 2018). Over the years, studies on cyberbullying have dealt with issues relating to prevalence, gender, age, school, technology and other aspects. According to Bauman and Yoon, (2014), these themes have guided most of the existing knowledge of the phenomenon; however, many of the findings are conflicting (Akyeampong & Adzahlie-Mensah, 2018; Cassidy et al., 2013; Kowalski et al., 2014).

Most studies mentioned have focused on bullies or victims as individual groups and how they link to socio-ecological factors (Maynard et al., 2016; Strohmeier et al., 2015). Only a few are just beginning to touch on the distinct bully-victims (Runions et al., 2018; Sanglang et al., 2016) or particularly the females among them. Research is thus still far from saturated on the topic and advances on previous findings are the best approach to reaching a unifying understanding and thus creating better chances of workable interventions.

This section examines the previous findings on multiple socio-ecological levels such as individual (gender, age, ethnicity) school (types and grades), family as well as the interventions across these levels.

2.5.1 School

School environment is an avenue for learners to mimic what they see in everyday life and society (Hlope et al, 2017) and bully-victims are known to learn aggressive behaviours from school (Allen, Anderson& Bushman, 2018). In the process of seeking popularity in school individuals may bully and also attract victimisation from other students. However, school policies are not well defined enough to adequately handle the issues (Shariff & Gouin, 2005). A study by Spears et al (2018) reported that about 70% of the time, after reporting bullying to school authorities, the harassment continued. Schools that produce measures that control the occurrence of bullying in females such as having strict rules for any reported cases of bullying and punitive measures (Wang et al., 2018) may help. However, Ferguson et al., (2007) disagree, saying that school intervention programmes are ineffective. Kyobe & Lusinga (2018) also found that students generally prefer to handle bullying issues themselves than reporting it to school authorities. This shows a polar difference in schools outside the continent and in the continent. In South Africa, there are different types of schools — 93% Public schools and the other 7% Independent — all depicted by different socio-economic statuses of both school location and students. A study on bullying in Independent schools showed a fifth of the students experience some form of victimisation every week (Zuze et al., 2016). Some other studies found that victimisation can be predicted by the individual's socio-economic background (Tippett & Wolke, 2014) while poverty was also attributed to bullying and disruptive behaviour from students (Wadesango et al., 2011). This claim is, however, refuted in the study conducted by Bouffard and Muftic (2006). Factors such as school rules, quality of teaching, teacher and peer relations were found to relate to how well

students were adjusted in school; and this differed significantly among bully-victims and other students (Park, 2013).

2.5.2 Family

Another socio-ecological factor is the family background or structure. Type of family or family structure, especially structures other than the conventional structures (i.e., father — mother parent household) is notably linked with bullying and peer victimization (Kim et al., 2009; Yang et al., 2013). Trends in family type, such as where an open and supportive parent — child relationship exists, a platform whereby students can share their worries with parents is possible (Carlson, 2006; Rosco et al., 2012). This reflects on whether or not a child seeks parental intervention in handling bullying. Scholars suggest that scenarios with this type of family may be helpful in reducing involvement in bullying (Ang, 2015; Lereya et al., 2013). Girls with frequent clashes with parents were noted to bully others due to anxiety and the need to conform to peers' behaviours (Lee et al., 2015). Furthermore, some studies have investigated direct and indirect effect of paternal and maternal parenting on bullying (Vazsonyi et al., 2017; Lester et al., 2017). A study by Fantaguzzi et al. (2018) found, however, that ethnicity impacted whether or not family structure, among other factors, influenced females in bullying and their quality of life. Behaviours associated with victimized individuals persisted in girls whose family structure was 'remarried' (Fortune et al., 2016), suggesting that students from families with two parents could still exhibit bully-victim behaviours. However, no links between negative parenting, supportive parenting and parent — child interactions with bullying were found, according to Rajendran et al. (2016). South Africa, as with many other African countries, has a strong cultural influence in the shaping of individuals. Studies (Kyobe et al., 2016; Lee & Yoo, 2015) have examined the family component from a GDP or socio-economic earning power perspective; however, this study will investigate the characteristic features of the South African families the respondents come from in understanding their bully-victim behaviour.

2.5.3 Individual

2.5.3.1 Age

The connection between age and bullying has been studied over the years. Findings have reported social, psychological, biological and physical developments as the age changes. The physical development theory explains the relationship between age and bullying involvement. According to Ulmer and Steffensmeier (2014), as ages of individuals progresses, it is accompanied with transformation of physical capabilities such as speed, aggression and strength. This leads to commission of the bullying vice. Bullying becomes unsuccessful and dangerous as the strength declines with age, hence cyber bullying increases as age increase (Patchin & Hinduja, 2010). There are controversies with this finding as some researchers have found that age does not impact cyberbullying (Smith et al., 2008). Due to the growing use of Internet

and mobile phones in South Africa, all age groups have been associated with cyberbullying (Popovac & Leoschut, 2012).

Adolescence is the age group where bullying and victimization occur most, but the rate of being victimized decreases with increasing age (Campbell et al., 2017; Carlyle & Steinman, 2007; Wang et al., 2010). The transition period into adulthood accompanies many new friendships and the onset of social status consciousness, and they wrongly will do anything to have these including aggression (Lester et al., 2013). Different observations were found across age groups in bully-victim characteristics, one study highlighting significant differences (Bettencourt & Farrell, 2013) and some others finding limited differences (Ziv, Leibovich, & Shechtman, 2013).

The major discourse concerning age in most studies are with respect to the age where the behaviour peaks (DeSmet et al., 2018; Skrzypiec et al., 2018; Moses & Williford, 2017) as well as solutions tailored for the different age groups. Generally, the peak age discovered from studies was young adolescent individuals, between 14 — 15 years, and most interventions were also targeted to suit this mean age group. More can be understood across other age ranges. and this female mobile bully-victim study attempts to elicit that understanding.

2.5.3.2 Gender

Gender refers to the state of being female, male or others. Males are known to be involved in more physical aggression compared to females hence they are likely to be on receiving end of cyberbullying (Benbenishty, 2011; Björkqvist & Österman, 2018). From the lens of face value, boys may be the natural suspects of bullying while girls may be viewed to be the natural victims. Studies suggest that boys like bullying more than girls. They tend to associate and socialize with aggressive peers; as a result, they end up being victims - their targets, usually fellow boys (Campbell et al., 2017; Espelage et al., 2003). They engage in this behaviour to maintain their social status (Vlachou et al., 2011). Some studies nullify the notion of female cyberbullying altogether as propaganda. This is because they argue that bullying is a natural male behaviour (Males & Meda-Chesney, 2010). These claims are, however, confronted by other research that maintains that female aggression is serious enough to attract intense and urgent attention (Favela, 2010; Görzig, 2016; Shariff & Gouin, 2005). This brings a supposition that bullying could transgress over male and female boundaries even for self-defence and safety reasons (Björkqvist & Österman, 2018; Bradshaw et al., 2008).

To more specific findings on these claims, many studies propose reasons why girls are more capable of cyberbullying than boys. One of these reasons provided is that girls are more emotional than boys, hence they have anger challenges (O'Neil, 2008; Edmonson & Zeman, 2009). However, with the ubiquity and anonymity of cyberbullying, girls are provided with a perfect environment to victimize others as they cannot be seen while displaying those

aggressive behaviours (O'Neil, 2008). In another study, female bullying was attributed to girls witnessing violence and aggression regularly in the home and community. In cyberspace females face more victimization than the males (Cuadrado & Fernández, 2016).

In a unique research finding, girls were found to justify their bullying behaviour as a means of protecting themselves from being victimized (Kaynak, et al., 2015). This follows the girls having a history of witnessing or being part of violence against them or other females, and due to the anonymity of the Internet, engage in cyber-bullying in efforts to defend and protect themselves from similar acts. Cyberbullying victims are also quoted to justify their behaviour as they were making efforts to protect themselves from acts of a similar nature. Some victims wanted vengeance on the perpetrators or others doing similar things. Increase in technology access, broader media coverage and women's empowerment movements are also being misinterpreted and causing a spike in female aggression. But are these trends newly escalating? Perhaps increased legislation and closer monitoring of aggressive behaviour, as well as more platforms of reporting incidents, are responsible for the more recent increased reports of female bullying (Vitak, et al., 2017).

2.5.3.3 Grade

Bully-victims are noted to have more academic issues than pure victims or bullies (Juvonen & Graham, 2014). Children suffering from nervousness at a young age are less likely to be bully-victims at adolescent stage because their anxiety was found to decline as they grew older. However, this was not found to apply to pre-primary children who are aggressive, who were likely to be bully-victims during transition phase from primary to secondary school. They start as minor victimizers who bully others as they grow older (Jansen et al., 2011). The transition from primary to secondary schools exposes young individuals to new challenges, friends and environment which influences their behaviours.

Studies have also argued differently on the performance of bully-victims, with some suggesting that bully-victims are top performers and their grades fall under high grade brackets (Lester et al., 2013). This means that performance is not negatively affected by the behaviour. Other studies argue the behaviour affects the performance of the victims negatively thus they perform poorly in school, hence falling in the 'low grades' bracket. The rate of victimization decreases with increasing age (Campbell et al., 2017; Carlyle & Steinman, 2007; Wang et al., 2010). This inconsistency in implications on their grades is also a focus of this study.

2.5.3.4 Ethnicity

Race is a very sensitive topic even in a widely multi-racial country like South Africa. Statistics South Africa census usually asks that people specify one of five racial population groups: Black (those who speak indigenous South

African languages), Coloured (people of mixed ethnic backgrounds including Indigenous South Africans), Indian/Asian (predominantly descendants from India but also people of Japanese, Korean, Pakistani descent), White (European settlers) and Other/Unspecified (Community Survey, 2016) when describing themselves. There are also whites and other Ethnicity and race have not been largely examined in bullying studies; however, Edwards et al. (2016) found that white youngsters were more likely to experience bullying than children of colour. In contrast, another study found that children from ethnic minority backgrounds are relatively involved in bullying and victimization, especially among the age group 5 — 6year olds (Jansen et al., 2016). This study called for specific interventions for the targeted age/grade students. Multi-racial and ethnic minority children have also been reported to be more likely to be bully-victims than children of other races, according to a study in the United States (Goldbach et al., 2018).

2.6 Theories used in Cyberbullying Studies

There have been many previous studies calling for more theory- informed studies to drive interventions and provide an understanding of the cyberbullying concept. This section discusses a few of available theories. An understanding of this phenomenon will help define the differences between the categories of bullying, interventions on such behaviours, create risk profiles of such students. This can also be useful in examining the old and new laws on bullying and the extent to which they can address all the categories of bullying.

This section aims to explain and understand female mobile bully-victim behaviour from a theoretical perspective. Using the different theories already advanced in cyberbullying studies, this section explains their applicability in understanding female mobile bully-victim behaviour. As such, the researcher attempts to uncover bullying theoretical backgrounds and then proceed to examine how the principles can help achieve the research objectives.

2.6.1 Socio-ecological theory

Introduced by Bronfenbrenner (1977), the social-ecological theory has been popular in bullying and victimization studies. The main objective of this theory is to understand the influence of the different environmental elements that encourage or prevent bullying behaviours. It is also useful as a holistic framework for youth workers (Espelage, 2014).

The theory depicts of five layers with the individual at the centre, and Table 2.2 below offers a description of the levels. Having direct contact with the individual is the microsystem layer, consisting of peers, family, community, and schools. The interactions between the microsystem elements are the mesosystem, i.e., parents relating to schools about their children or group of kids on a community project. There exists a social environment, which affects individuals implicitly, but which do not

have direct contact with each other; this is called the exosystem. The cultural make-up of a society determines the activities and structures within it form the macrosystem. The history or changing circumstances of an individual over their lifetime is the final layer, called the chronosystem.

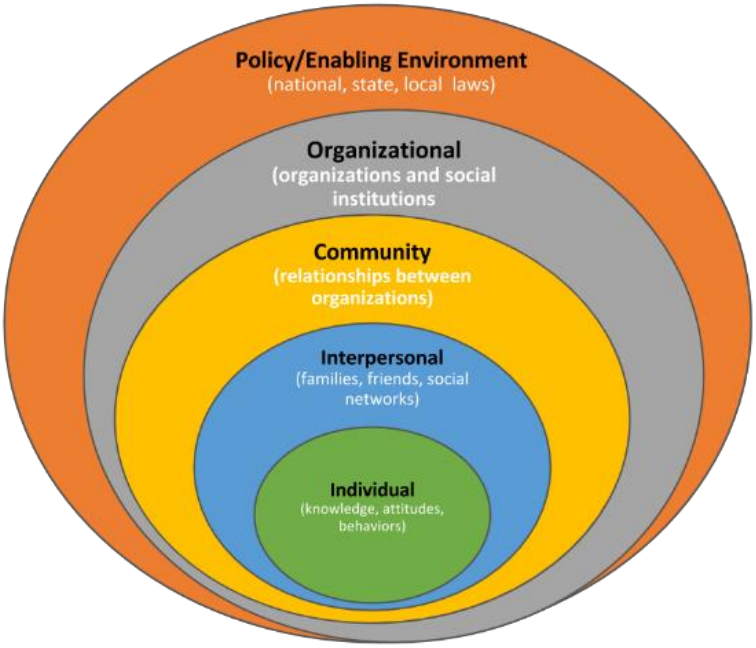


Figure 2. 2— The Social Ecological Model (Bronfenbrenner,1977)

Bronfenbrenner was a sociologist whose theory was designed for and most used in the field of psychology. However, the socio-ecological theory is useful in many other disciplines that aim to understand human behaviour, also in Information Systems (Siddiqi, 2012; Costello & Donnellan, 2012; Costello et al., 2013; Backonja et al., 2014) where people's reaction to (new) systems and technology need to be observed. It has also proved useful in gender differentiation of some of these behaviours (Siddiqi, 2012) and will, therefore, be used in this study that seeks to understand female mobile bully-victim behaviour among South African high school students.

In an initiative for violence prevention, the Centre for Disease Control and Prevention (CDC), (2017), the most effective approach to prevention and controlling of female mobile bullying, uses a combination of various interventions at all the levels of the model. This entails training and education directed at promoting habits and mindsets that are opposed to violence. Such programmes are peer mentorship and parenting skills programmes among others (CDC, 2019).

It follows that parental influences and family dynamics (for example, how parents respond to their children's reports on bullying, educating and monitoring Internet usage) can work together with how schools manage cyberbullying reports. The socio-ecological theory is the main theory that will guide this study to explore female mobile bully-victim behaviour across the different layers of the model. This model

incorporates the complex interplay between the societal, community, relationship and individual factors. It allows for understanding the wide range of factor putting people at risk of mobile bullying or protecting' them from perpetrating or experiencing violence.

Table 2. 1— Socio-ecological Levels Description

LEVEL	DESCRIPTION
Individual	This level identified personal and biological history factors that increase the likelihood of becoming a bully, victim or bully-victim. It also includes Individuals' characteristics influencing change in behaviour, including attitudes, knowledge, self-efficacy, behaviour, gender, development history, religious identity, age, sexual orientation, racial/ethnic identity. Interventions strategies at this level are in most instances designed for promotion of beliefs, attitudes, and behaviours that ultimately prevent mobile bully-victim behaviour, such as life skills and education training (CDC, 2017)
Interpersonal	The second level assesses the interpersonal relationships that may increase the risk for an individual to experience mobile bullying as a perpetrator, victim or bully- victim. An individual's close social circle partners, peers, family members influence the person's behaviour and contribute to their range of experiences. Interventions at this level may include family focused or parenting prevention programmes, peer and mentoring programmes designed to promote healthy relationships and to foster problem-solving skills.
Community	This explores the settings like the neighbourhoods, workplaces, and schools where social relationships take place and seek to identify these settings' characteristics that are linked to becoming perpetrators, victims or bully-victims. The interventions at this level are designed typically to impact the physical and social environment. For instance, improving policies within schools and workplace, reducing isolation
Organizational	Social institutions or organizations (for example. school) with rules and regulations for operations affecting how well or how the services provided promote or inhibit bully-victim behaviour (CDC, 2017).
Policy/Enabling environment	This looks at the broad factors in the society that helps in creating a climate in which bully-victim

	behaviour is inhibited. These factors include global, national, state and local laws and policies inhibit the behaviour or guide the consequences that follow on reporting bully-victim incidents (e.g. in the schools).

Several mobile bullying studies have applied this theory's socio-ecological factors, with useful insights on how it can be used to identify victims and bullies (Tippet & Wolke, 2014, Zuze et al., 2016). However, there are still inconsistencies in the results found in these studies such as in the relationship between age/grade and bullying (Lam et al., 2015; Turner et al., 2014). On gender and bullying, younger girls were found to have strong views on bullying (Johnson et al., 2013) while no differences were found in gender by other studies (Anderson, Holmes, & Ostresh, 1999; Caravita et al., 2014). On ethnicity and bullying, Goldweber, Waasdorp, & Bradshaw, (2013) and Wang et al., (2009) found that black youths were more likely to engage in bullying while Seals & Young (2003) found that youths from other races/ethnicity had greater likelihood for bullying. The bully-victims are only now being particularly examined as in this study.

2.6.2 Uses and Gratifications Theory

This theory, developed by Blumler and Katz (1974), states that individuals consciously and actively choose the media they use, and they do so to satisfy specific needs. The theory takes a human standpoint to viewing media use and maintaining that individuals have the power to decide how much influence media have on them.

The Uses and Gratifications theory has been extensively used in Information Systems studies, even to the point where it is considered to have reconfirmed many technology phenomena (Park et al., 2009); however, it has proved useful in further understanding the demographics (gender, age, etc.) of uses and gratifications, so is applicable to bully-victim behaviours as well.

Bully-victims have many psychological issues including depression, and high mobile phone usage has been found to be associated with depressed people (Thomée et al., 2011) especially females (Lepp, Li, Barkley and Salehi-Esfahani, 2015). This theory explains how and why they actively seek out certain media for the satisfaction of their needs. The theory places emphasis more on the individual rather than the message itself. Lorenz (2017) stated that the theory assumes that the audience are not passive but play an active role to interpret and integrate media into their lives. It assumes that the bully-victim is responsible for choosing the media for meeting their needs for the behaviour. The approach further suggests that bully-victim uses the media in fulfilling their specific gratifications. Similarly, the media compete against other sources of information for the gratification of the viewers.

The use of the Internet also has provided the freedom for people to escape all their worries from the click of a button (Loremz, 2017). Gratifications such as gaining status and identity experimentation have been identified, and many youths seeking these have a high risk of negative and aggressive behaviours (Leung, 2014), including

cyberbullying. The theory has been used in examining personality traits (Tanrikulu & Erdur-Baker, 2019) useful in intervening and understanding bully-victim behaviour.

2.6.3 Social Cognitive Theory

The initial version of this theory is the Social Learning Theory (Miller & Dollard, 1941), which proposes that learning (including that of behaviours) does not occur only by direct instruction, but also by observing other people's behaviours and the consequences. It postulates that for people to learn, they would have observed a behaviour, interpreted the behaviours they have seen, reproduced it and driven to have a sense of incentive from acting according to that behaviour (Bandura, 1977).

The tenets of Social Cognitive Theory (SCT) are based on the above theory that there is the reasoning behind every behaviour and a relationship between this reasoning, a person's environment, and internal stimuli. In other words, if a person observes bullying in their family or school environment and develops a pro-bullying attitude, they will very certainly tend to bully others around them (Espelage & Swearer, 2004). They are less prone to bullying others if they have developed an anti-bullying attitude from witnessing it in their environment (Swearer et al., 2014). The theory also proposes that individuals can influence their behaviours positively through self-efficacy, goal setting, and self-regulation and extend this behaviour to positively influencing their environment (Denler et al., 2013). This again explains how influences of peers, school and family could promote bully-victim where an individual mimics negative behaviour in retaliation to experienced negative experiences. This can also be used to observe if mixed messages are received across different age and school grade ranges as levels of cognition differ at these different levels (Andreou, 2004; Cao & Yang, 2018; Felix & Mahon, 2007) resulting in bully-victim behaviour.

The theory focuses on self-responsibility on the part of the individual in the formation of the appropriate habits. In a way, this theory also places responsibility on family and the community at large to portray the right attitudes. This translates that the family should not display any forms of violence and should they fail in this responsibility, they and the community should not approve of this by their inaction. The theory was used mostly for examining and predicting the stimulators of bullying in young people or which individuals were more prone to be bullies or victims (Barchia & Bussey, 2010; Fox & Boulton, 2011). It is also applicable to understanding bully-victim behaviour and how influences of family impact such behaviours.

2.6.4 Theory of Planned Behaviour

This theory is often used in research phenomena such as mass media and new technology but is also popular in traditional bullying studies. Its usefulness in cyberbullying studies can provide relevant information to practitioners and legislators (Heirman & Walrave, 2012). The theory focused on people's behaviours and the engendering factors for such behaviours, namely attitude, subjective norm and

perceived behavioural control (Ajzen, 1991). A person's perception, favourable or unfavourable, toward a behaviour is their attitude (A); the social pressure to exhibit or not exhibit the behaviour forms the subjective norm (SN) while the difficulty or ease with which behaviour can be exhibited is the perceived behavioural control (PBC).

The Theory of Planned Behaviour can be useful in examining the social influences that surround bully-victim behaviour and what features may be effective in intervening the problem. For instance, Boulton et al. (2017) found that the more positive outcomes of reporting bullying to teachers determined if the student would report a bullying incident in future. Researchers have proved that the theory taps into the implicit attitudes of humans and how they affect socialization, how human social behaviour is driven and unconscious mental processes and their effects. It is useful in explaining how individuals make decisions that culminate in them exhibiting bully-victim behaviour. However, much of previous research has measured only the direct influences of A, SN, and PBC on the behaviour. It does not expound on the causes of these influences to alter them and proffer the right approach to intervening (Pabian & Vandebosch, 2012) in the issues especially with respect to female bully-victim behaviour.

2.6.5 Feminist Theories

Feminism is a world-wide movement around economic, political and social equality of gender. This can shed some light on the linkage between how females become victimized and why they bully others in retaliation. Its beliefs support the criticism of male supremacy and try to change it, thus seeking to empower females. Radical feminism sees females as widely and deeply oppressed, with beliefs that most studies of social issues abandon women's experiences and females need a voice (Lord et al., 2012).

Researchers have discussed feminism in cyberbullying, and this specifically under the term, 'sexualized cyberbullying.' They show how females are influenced to display inappropriateness, which is usually unacceptable in their immediate community or school environment by suggestions dispersed through technology (Kofoed & Ringrose, 2012). The perceived acceptability of these gestures lures females to copy such behaviours; however, this opens them up to being called names and their pictures being spread around with vulgar tags (Ringrose et al., 2013).

Researchers have called for a feminist theory on female violence, debunking the claims that such movements contribute to the rising incidence of female violence worldwide. The absence of such a theory is attributed to the thriving of other theorists' claims that the feminism is the cause of female violence (Carrington, 2013). This lack of confidence in the usefulness of the feminist theory would need to be overcome and the theories advanced in order to begin to appropriate it to female bully-victim studies.

2.6.6 General Strain theory

Postulated and extended from the Classic Strain Theory, Agnew's General Strain Theory (GST) proposes that people exhibit delinquency when they have been exposed to stress in life and their relationships, (Agnew, 1992, 2001). According to his definition, the strain is anything that meets the condition of being unjust, socially unacceptable, reflects power imbalance and occurs in high frequency. Strain could be associated with negative experiences with teachers, peers or in the family (Jochman et al., 2017) and these, in turn, result in bully-victim behaviour.

The GST maintains that people will react differently to strain depending on the distinct socio-economic factors that cause them to retaliate (Lee & Sanchez, 2018) and exhibit bully-victim behaviour. Most of the focus in this theory concerns victims turning to crime, largely ignoring self-harm consequences such as suicide, eating disorders, etc. (Hay et al., 2010). These crimes and behaviours are, however, not a direct result of the strain, but are coping mechanisms developed to deal with it. The theory is useful in predicting characteristics that can induce negative behaviours (Hay & Meldrum, 2010) as well as exploring individuals' behavioural and emotional response to strain and coping mechanisms common for different types of strain (Ngo & Paternoster, 2013), including bully-victim behaviour.

Being largely a theory for designing support for strain, including bullying, the theory identified appropriate ways of managing stress: behavioural, cognitive and emotional. Behavioural ways of coping with bully-victim behaviour may include staying away from harmful inducements and searching out affirmative ones, for example a victimized person can try to stay around someone who will defend them as well as avoid those who may bully them. Cognitive mechanisms will entail explaining and defusing stress in a non-threatening way, for instance rationalizing that they will be alright or there is no problem. Coping emotionally would entail helping the victim by thinking positively rather than trying to change the negative situation. These principles can be applied to bully-victim interventions and also help explain levels of success of interventions by family, school or peers.

The tenets of the GST of Agnew (1992) were largely focused on strains causing individuals to react criminally. Subsequent revisions expanded the views of the theory to state that certain strains are gender, group and age-specific and the coping strategies were also based on these classifications (Broidy & Agnew, 1997; Agnew, 2001; Agnew et al., 2002). The theory therefore supports that bully-victim behaviour can be explored across age, family and school levels for better understanding of the trends and proffering solutions to bully-victim behaviour management; however, it does not necessarily help in understanding the causal factors.

2.6.7 Summary

The theories presented above have been widely used and useful in advancing mobile bullying studies. However, they exposed gaps in the concentration of context outside the African continent given that the socio-ecological characteristics are not necessarily the same in Western societies and Africa. The policies and regulations in these environments also differ, so the findings may not necessarily be generalizable.

As discussed earlier regarding schools, much of the bullying reports were made to schoolteachers (Spears et al., 2018; Wang et al., 2018) and the expectation of intervention by schools was questioned in terms of the legal obligation of schools in the study's demographic location. This level reporting of bullying incidents has been studied for schools in Africa (Kyobe & Lusinga, 2018) and has been found that students do not report such issues to adults or authorities, preferring to handle such by themselves. Previous studies mostly consider grade differences in bullying while some have considered location and social status of the school environment (Burton & Leoschut, 2013; Holt, Turner & Lyn Exum, 2014), there is still more to be known in terms of school dynamics in bullying and more specifically bully-victim behaviour.

The grade performance of bully-victims was found to be high (Lester et al., 2013) while pure victims were associated with lower grades. The rates of bullying were also found to decrease as the students progressed in grade level, with the first two years of secondary school being the most challenging according to the same study. This was from a study among students in Europe; however, this study will examine the trend of bully-victim across school grade in South African schools.

This study has also discussed the family influence on bullying. It was found in the highlights above, that the family structure determined the type of parenting and consequently response to bullying. This was studied in the context of independent bully and victim characteristics. This study examines the family influence on bully-victim behaviour as opposed to previous studies.

Many of the theories have also been used in the field of Behavioural Sciences. This study is unique and valuable in that it explores some of these same socio-ecological factors associated with female mobile bully-victim behaviour within the South African context and in the Information Systems field.

2.7 Interventions in Cyberbullying

Social cognitive theory is important in understanding the complexity of bullying behaviours and the social nature of involvement in the act. According to this theory, intrinsic and extrinsic factors contribute to human biography. The theory suggests that human behaviour results from personal factors informing of affective, cognitive and biological events. It provides the basis for understanding this research. Bullying is a social relationship problem and the interaction between an individual and her or his social environment backs this conceptualization, so examining socio-ecological factors is crucial to intervening. Direct intervention with those who bully helps appreciate individual differences in bullying. The bullies exhibit complex display of cognitive, psychological and social factors that contribute to bullying. To curb bullying these factors have to be addressed. Bullying behaviours are transformed when interventions focus on these constructs.

Research has demonstrated that young victims are less prone to seek help from adults in situations where they face mobile bullying, and they often feel they will lose access

to the Internet or be misunderstood (Delara, 2012). Research on the responses of adults and whether they seek help or support from others does not exist. Instead, studies indicate that both mobile bullying victims and bullies use the Internet as a strategy to deal with their issues, either to avoid or handle stress (Gámez-Guadix et al., 2013). Given that some of the Internet users are isolated socially and that the Internet may likely be their solution or help, a technical or an online intervention would help the victims in dealing with the psychological distress of being mobile bullied. Cyberspace is the best location for offering interventions to people struggling with the aftermath of a mobile bullying incident.

Although much has been done consistently to combat cyberbullying, ranging from classroom-based curriculum intervention strategies as well as empirical and theory-informed prescriptions for prevention. Education has been advocated in many solutions incorporating schools, teachers, students and parents (Hall, 2017; Kowalski et al., 2012; Slonje et al., 2012). The role of parents being sounded as crucial to make them understand their role in informing their children, supporting them when they are being victimized rather than withdrawing technology from them (Skrzpiec et al., 2018; Parris et al., 2012). A crucial part of education involves helping others distinguish between friendly teasing and bullying, what to do and how to retain evidence to effectively address the bully (Kowalski et al., 2012). More can also be done to make all parties (students, teachers and parents) understand the due diligence that is expected in legal terms and otherwise when posting media online (Shariff, 2016; Shariff & Chan, 2013). This is especially crucial in a country like South Africa with an alleged culture of rape, where reports of gender- based violence are often dismissed and women silenced on such matters (Claire, 2017).

Studies have been conducted to determine the critical success factors of anti-bullying inventions. This became necessary due to the same solution. yielding counter results in other environments and reported inconsistencies in the findings of anti-bullying solutions (Storer et al., 2017; Cioppa et al., 2015; Stevens et al., 2001; O'Connell et al., 1999). Generally, intensity in terms amount of time spent (preferably in excess of twenty hours) on the intervention activity or programme as well as the existence of an authority, be it parent, teacher or supervisor showed more promising results in decreasing bullying (Bauman & Yoon, 2014; Barbero et al., 2012). Some of these interventions are briefly discussed in the following section.

2.7.1 Olweus Bullying Prevention Programme

This anti-bullying intervention was developed by Norwegian Olweus and supported by the National Ministry of Education for evaluation among Norwegian schools (Olweus, 1993). The purpose of the programme was to reduce bullying and victimization in the school environment on three different levels: school, classroom, and individual.

On the school level, activities included a teaching session to brainstorm how to improve the interrelations among peers, increase supervision outside the classroom

within the school and discuss with parents about bullying. On classroom level, students actively participated in forming legislation regarding bullying, received information about bullying and met with parents. On an individual level, sessions were held with bullies to reduce their tendencies, counselling victims and information sessions to help the student body shift from being the bullying audience to be effective helpers of victims (Ttofi & Farrington, 2011).

The programme duration of a year and a half commenced with a day conference addressing bullying in the school with students, parents, and staff in attendance. The programme then continued with student self-reporting questionnaires that measured bullying as well as ratings from teachers; the three levels of intervention continued for the rest of the duration. Two post-tests were also conducted after the programme implementation, after which the schools adjusted, to their taste, the level of intensity to continue the programme. The researchers provided support for schools during this post-implementation as a maintenance measure for their intervention (Baldry & Farrington, 2007; Ttofi & Farrington, 2011).

This programme has a record level of success, and many other interventions implement an adaptation of the instruments developed by this programme. It features time intensity, the holistic involvement of authorities, parents, students and school authorities in its implementation, which form the bulk of the critical success factors mentioned earlier for successful programme interventions.

This programme can be implemented in South African high schools to help reduce bullying effects on female students. Students could be enabled to interact more with their teachers to open up about such issues, and these issues would be addressed more effectively instead of the issues being continuously occurring. A guidance and counselling unit could be opened within the schools to encourage students to report the occurrences and to get assistance on how to deal with any instances of bullying they might be faced with.

2.7.2 Greek Anti-Bullying Programme

This intervention is based on Salmivalli's research (Salmivalli, 1999) proposing that changing bullying tendencies should incorporate changing the behaviour of other parties. These parties in bullying, namely bully, victim, reinforcer, assistant, defender, and outsider (see descriptions above in section 2.1.2) are all involved. However, the focus is on the assistants, reinforcers and outsiders, with the aim of equipping them to change to being defenders (Andreou et al., 2007).

The programme has three key tenets: raising awareness, self-reflection, and commitment to new behaviours. The scope of the intervention in the classroom and the duration is four weeks, which begins with an eight-hour curriculum instruction activity. This section is broken down into three parts targeting the key components: three hours for raising awareness, the subsequent two for self-reflection and the final three hours for committing to new behaviours. Part of the activity involves drawing up rules guiding classroom behaviour from which the teachers are trained over five

sessions to educate about the gravity of bullying and improve teachers' self-efficacy in driving the programme.

The findings from this intervention were relatively positive despite the low intensity and absence of parents, supervision and other disciplinary measures. The inclusion of all parties in bullying may be responsible for the level of success and compensate for the missing critical factors described earlier.

This programme could be applied in a South African school situation to help female students be able to deal with bullying. This can curb bullying in general and especially female bullying, where students are encouraged to report occurrences, and when reported, the offenders and other perpetrators are put in the programme where they can analyse their actions and the consequences of their actions to help them reform. This strategy is effective since other passive and active bullies who might not yet have been reported can get intervention to make them change for the better.

2.7.3 TransTheoretical-Based Tailored Anti-Bullying Programme

This intervention is based on the Transtheoretical Model, which also focuses on behavioural change (Evers et al., 2007). Participants had a choice of the level of change they desired and wanted help with in moving away from their bullying behaviour. This help was offered to bullies and audience alike to reduce victimization and equip parties for assisting the victimized.

The intervention consisted of three thirty-minute sessions for three groups of students: a control group, a treatment group, and a third group. The control group had to self-report on a pre-test and post-test instrument. For the treatment group, individualized, Internet-based interactive sessions were conducted, and they were also given a staff guide, family guide and a post-test instrument. For the final group there were also an additional pre-test as well as a self-report pre-test and post-test.

This intervention also reported a significant decrease in the behaviour of the bully, the victim, and audience (Evers et al., 2007) to some extent. Despite the acute lack of intensity, disciplinary actions or supervision, it may have benefited from the short duration in comparison to other programmes. Students' parents were involved, and flexibility was accommodated for families to participate as they wished. These seem to have been advantageous to the programme success.

This tailored model can also be implemented within a South African school setting to curb bullying in general and especially female bullying. The model has seen success in recent implementations and can be implemented within high schools to increase awareness of the need to report, and when reported, the bullies can be taken into a reformation programme to help them avoid victimization and to help them reform and avoid carrying out the associated activities.

2.7.4 The SAVE Anti-Bullying Programme

Originating from Spain, the Sevilla Anti-Violencia Escolar (Seville Anti-Violence in School) (SAVE) is a classroom management programme based on the ecology model to address violence and bullying. Developed and implemented with instructive activities and actions, this intervention focuses on teaching values and thinking about bullies' actions before deciding to act (Ortega et al., 2004).

In this intervention, self-reporting anonymous questionnaires were given to participants to record their bullying or victimization experiences. The intervention period afforded them the chance to be fully involved in decision-making but not giving them full control by teacher moderation. Support was also provided in the form of conflict mediation, quality circles, and peer support. There was a pre-test and a follow-up post-test five years after the intervention. Teachers received full training on how to manage the classroom but were left to implement the training according to their discretion.

This method was whole-school-based, allowing students to participate in anti-bullying at decision-making level, which proved to be beneficial by keeping them in check of their behaviour, knowing the consequences. There was no distinct disciplinary action if the school (students and teachers) decided there was none needed. The duration was not stipulated, but there was follow-up evaluation of the intervention, and they returned positive results. This method, when implemented, can see female-bullying and general bullying come to an end in schools in South Africa. The model involves both students and teachers coming together in an anti-bullying campaign where decisions are made by both teams to ensure bullying is kept to a minimum and bullies have their behaviours kept in check.

2.7.5 The KiVa Programme

The KiVa Programme, originating from Finland and funded by the Academy of Finland and the Ministry of Education and Culture, has its name coined from Kiusaamista Vastaan meaning 'Against Bullying.' It was developed at the University of Turku by a research team consisting two professors, ten Ph.D. students, and teacher trainers.

The focus of the programme was first to take universal action, targeting all students, in the form of addressing the audience of bullying by influencing their behaviour to a bullying situation. Secondly, the focus was to take indicated action, targeting both bullies and victims, ensuring that the bully is confronted for their behaviour as well as ensuring that the victim is heard and supported by school authorities (Salmivalli et al., 2011; Laitinen, 2012). Also, KiVa is unique as it utilizes technology, rolling out through virtual learning environments in the form of a computer game with difficulty levels according to class grade level, as well as a parent guidebook.

Programme development and preliminary evaluation (preceding and lasting three years before effective implementation began in 2009) spanned three years from 2006 before a year-long roll-out in 2009. This was followed by maintenance and support through 2011. The programme yielded massive positive results (Garandeau et al.,

2014) incorporating much of the critical success factors of intensity, supervision, theory informed and parent involvement.

This model is a multi-step process aimed at ending bullying. This model is an alternative that can be adopted in South African schools to help prevent female bullying and bullying in general. The model would be effective reflecting on past implementations that have returned positive results.

2.7.6 Department of Basic Education School Safety Framework

This programme is a part of the interventions of the South African Government's Department of Basic Education in addressing bullying in schools. The framework offers training to principals, education officials, school actors and governing bodies in the school to equip them with the skills to implement the intervention in their schools.

Common issues have been found with safety and security in most schools, bordered by physical infrastructure and administration (DoB, 2017). Bullying was also investigated in collaboration with the Centre for Justice and Crime Prevention (CJCP). Findings showed that, even though bullying incidents occur mostly in the classroom, there are also several incidents occurring outside the classroom.

Table 2. 2— Location of violence in schools (DoB, 2017)

	Threats	Assault	Sexual assault	Robbery	Theft
Classrooms	44.3	51.0	54.2	60.2	91.5
School gate area	1.0	0.6	0.0	0.8	0.0
Playing fields	25.0	24.8	13.2	14.0	4.6
Corridors	11.1	5.0	11.4	7.2	1.1
Toilets	4.1	5.5	12.5	6.8	0.3
Other open grounds	13.5	11.8	6.6	6.4	1.0
Halls	1.0	0.6	0.4	1.1	0.2
Principal's office	0.0	0.6	0.0	3.4	0.6

The focus of the content is to help identify types of bullying and the nature within the school environment, including those who may be most susceptible to being bullies and victims. This programme also educates the participants on the implications of bullying for the bully, victim, and society, explaining the importance of responding and stopping it from thriving. The participants are also equipped with resources that promote a bullying-free school.

The content of the intervention is built around the whole-school approach as well as parent level and the students themselves. There are major criteria for success incorporated in this intervention. However, this study was unable to locate any record of the implementation or evaluation of the intervention. The outcomes are, therefore,

unknown.

This model is an interactive model that can be used in curbing bullying against females in South African high schools by involving parents, teachers, and students. Having an interactive model can help create awareness among all members of what bullying is and the effects it can have and how it can be prevented from occurring. The model would be suitable to implement to help curb bullying related activities.

2.7.7 Online Pestkoppen Stoppen (Stop Online Bullies/Bullies Online)

This is an example of a technical intervention for adolescents and children which is web-based. According to Jacobs et al. (2014), the intervention aims at teaching the victims the effective ways to deal with depression and anxiety linked with cyber victimization. The authors of Pestkoppen Stoppen developed an online programme, with the sole purpose of promoting wellbeing among the mobile bullying victims and to decrease some of the associated external and internal behaviours such as truancy and school problems. This intervention has a design that is interactive and teaches the mobile-bullying victims on how to identify, dispute and replace the thoughts that are irrational with the rational thoughts. The focus of the web-based intervention is to teach the victims on how to cope with their specific psychological content that is problematic such as one's negative thoughts as well as providing information that helps in prevention. Jacobs et al. (2014) further pointed out that the therapeutic grounding of the intervention is based partly on the rational— emotive therapy concepts, which teaches the victims how to notice the link between behaviour, feeling and thought.

Even though Online Pestkoppen Stoppen is an intervention and an approach that is promising to the mobile-bullying problem, it lacks empirical evidence, and at present no effect sizes or randomized control trial are available to show its utility. This method could be implemented to help curb problems such as bullying, truancy, and other school-related problems. From a theoretical perspective, it promises effectiveness in addressing the possible student issues that could be faced and how the model could act as a therapeutic source of relief. The model lacks practical information to vouch for its effectiveness. However, due to the increased use of smartphones and Internet use and the model having a web-based intervention approach, there are chances it could be used as a suitable model to help prevent bullying on female students as well as curbing other school-related issues.

2.7.8 Summary

The findings from past interventions suggests that students seldom seek assistance from authorities in bullying situations. There is also evidence that the Internet is used as a coping mechanism for bullying; however, the formal digital solutions that may allow a balance between focused adult role while allowing some level of self-help as is preferred among students, is lacking. The interventions discussed above have taken the approach of collectively involving everyone in the school with average results. While this study does not suggest an outright overhaul of these school programmes,

the study believes that greater benefits can be achieved from treating individual cases according to the context of the incident. Also, beyond punitive measures, adults and authorities can seize every opportunity to intervene in bullying incidents, teaching the students (bully, victim and witnesses) the value in empathy and tolerating the differences in society (Shariff, 2015).

While the findings above have been results mainly from cyberbullying and traditional bullying research, a lot less is known about female mobile bully-victim behaviour or characteristics. In a country like South Africa and the reputation of violence that goes along with much of its history, the understanding of this phenomenon is very crucial. The country also has unique socio-ecological characteristics that are worth comparing to trends in Western societies on which most of the current studies have been based. Also, it is anticipated that this knowledge is necessary to develop appropriate interventions to address mobile bullying and victimization challenges for female bully-victims.

The aim of this study includes understanding the demographics concerning the female participants of mobile bullying in the South African high school environment. In beginning to achieve this, the previous sections of this chapter have unpacked theories that have been used by previous researchers in studying the phenomenon. From these theories, the research develops a conceptual model to help examine this phenomenon within context. The model will be tested in subsequent chapters to determine its usefulness in the understanding of the topic (Badenhorst, 2011). The study also provides an intervention that encompasses the bully, victim and other parties in a mobile app that teaches empathetic behaviour and skills for handling such bullying incidents.

2.8 Conceptual Framework

This study has proposed a conceptual framework to gain an understanding of female mobile bully-victim behaviour in South African high school students. Given that the socio-ecological factors have been most useful in understanding trends in the bullying phenomenon, this is also applied in this study. The layers and items in the socio-ecological model have interwoven items as depicted in Figure 2.3 below. The particular focus of this study within the model — age, grade, family, ethnicity and interventions (school, teacher, family and peers) are highlighted in the figure.

With the bulk of previous studies being atheoretical (Barlett, 2017) or advancing theories heavily biased towards Social and Behavioural Science (Lianos & McGrath, 2018; Paez, 2018; Savage & Tokunaga, 2017; Savage et al, 2017), this study is crucial in the Information Systems field. The previous approaches are also deficient in advancing female mobile bully-victim characteristics, mainly focusing on bully only or victim only. This study, focusing on South African high school students, who have a huge mobile technology adoption rate (North et al., 2014; Porter et al., 2012), seems worthwhile to unpack this among other factors to achieve the aim of this study. Owing to these theoretical shortcomings encountered in the review of the literature,

this study proposes a conceptual framework to answer the research questions on female mobile bully-victim behaviour.

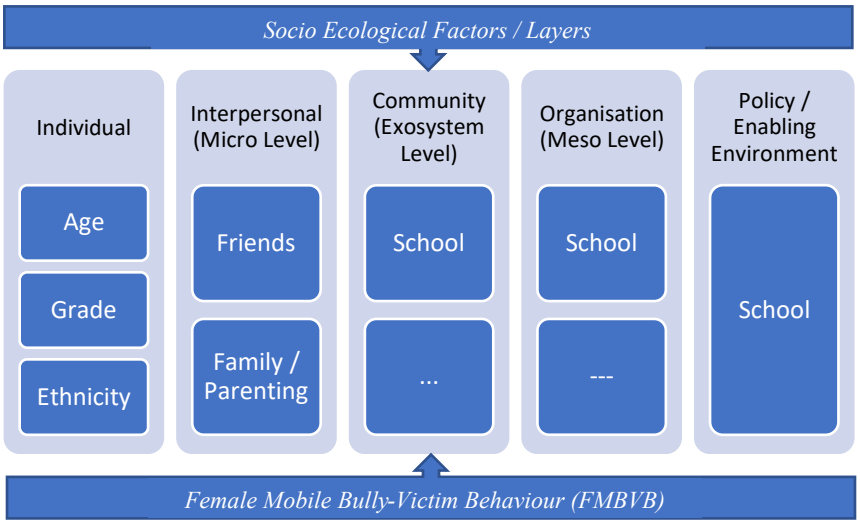


Figure 2. 3— Socio-Ecological Factors affecting Female Mobile Bully-Victim Behaviour

From literature, it has been established that the rise in trends of electronic communication has come along with cyberbullying due to the accommodation of traits such as anonymity (Barlett, 2013; Barlett et al., 2016; Watts et al., 2017) and ubiquity (Koehler & Weber, 2018). Also, because the social and psychological mechanisms of bullying and cyberbullying differ, better understanding is needed of the role of technology in female mobile bully-victim behaviour. Within the discourse about new-age use of technology, usage differs by age but much of it with excessive use. Excess use becomes an issue when access to data and mobile phones is not controlled either in the home or in school. The nature of the family — structure and status in society — and the type of school also impact on behaviours. Sophistication of phones and devices could also play a part in the issue of overuse. The control of the Internet and technology usage can be taught and effected successfully to help the users take responsibility for their actions while online to protect themselves from negative effects such as cyberbullying. This study sees the above as strong indicators for the proposed conceptual framework to assist in achieving the aim of the study.

The conceptual model is presented below and the hypotheses to be explored are presented thereafter. It is important to state here that the model represents interrelationships of different forms or correlations and not necessarily cause-and-effect relationships, consistent with previous studies (Carney et al, 2018; Coccia, 2017; Postigo et al., 2013).

In most previous studies, physical traits are examined; however, habits are not formed in isolation, rather because of experiences in the home, school and other spaces in which the individual engages. These include personal experiences, habits formed by the nature of their environment and how the individual reacts to or interprets certain occurrences — be it reinforcement or deterrent of natural tendencies. An individual may attack others as an interpretation of the way to shield them for a reoccurrence of

a bullying experience (Crick & Dodge, 1994; Calvete & Orue, 2010). It may also seem acceptable to bully because when they were bullied, nobody said or did anything about it. These are explored in the conceptual model for understanding female mobile bully-victim behaviour.

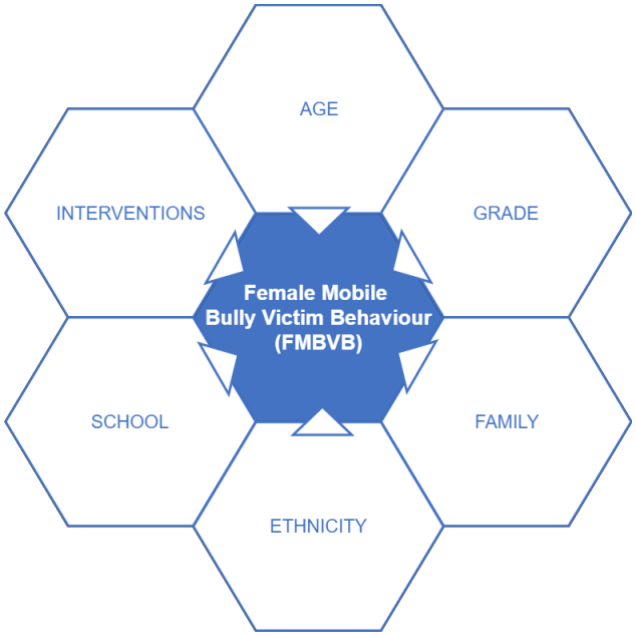


Figure 2. 4 — Conceptual Framework for this Study

2.9 Hypotheses Development

After the extensive review of literature from the preceding sections, gaps identified have led to the hypotheses that can address them and thus answer this study's research questions. From the socio-ecological point of view, the combination of factors in the environment (school, family, peers, etc.) together with personal traits play a huge role in the bullying phenomenon.

In a study with schoolchildren in Iceland (Garmy et al., 2019), it was found that factors such as not living with parents, ethnicity or cultural habits were rife among younger children and they presented with more experiences of being bullied. This study acknowledges that these students are likely to be bully-victims but focused more on their victimisation. Bully-victims have been predicted to come from dysfunctional families and bullying to have no consequences, even when perpetuated in school (Lereya et al., 2013). A study conducted in the United States found minority and multi-ethnicity as an indicator for bully-victim behaviour, together with age and grade differences in the exhibition of the behaviour.

In summary, socio-ecological factors have largely advanced bullying and victimisation perspectives. This study has applied these in understanding female mobile bully-victim behaviour (FMBVB) in South Africa, using the following hypothesis.

Age

There have been many studies that studied the relationship between age and cyberbullying. in their study, Smith et al. (2008) found that there was no correlation between students' ages and their cyber- bullying involvement. Flisher et al. (2006) found that the rate of bullying reduced as the students' ages increased. However, this was not the finding in other studies such as by Patchin and Hinduja (2010) and Ybarra and Mitchell (2004). Given these previous studies' inconclusive stand on the impact of age on cyberbullying, the study hypothesizes that:

$H_0$1: Female Mobile Bully-Victim Behaviours will not differ by Age Group
$H_1$1: Female Mobile Bully-Victim Behaviours will differ by Age Group

School Grade

In a study of the trends in cyberbullying among students, Kessel Schneider et al. (2015) found an increase over time across all grade levels. This was not the case in another study (Lapidot-Lefler & Dolev-Cohen, 2015) which found no difference across the school grades. These opposing findings were used as a basis for this study on bully-victims to hypothesize that:

$H_0$2: Female Mobile Bully-Victim Behaviours will not differ by school grade
$H_1$2: Female Mobile Bully-Victim Behaviours will differ by school grade

Family

There has been proof of poor parental support associated with high rates of cyberbullying among students (Wang et al., 2009; Solecki et al., 2014). Another study by Bevilacqua et al., (2017) found outrightly that students from a family household that was not with two parents were more susceptible to being cyberbullied. This was also supported by Hemphill and Heerde's (2014) finding that cyberbullies are usually from dysfunctional family settings, but this was not the same finding for victims (Bulega et al.,2017). This study therefore hypothesizes that:

$H_0$3: Female Mobile Bully-Victim Behaviours will not differ by family type
$H_1$3: Female Mobile Bully-Victim Behaviours will differ by family type

Ethnicity

Findings on ethnicity vary from studies revealing that mixed-race children are more likely to be cyberbullies than purely British students, to no significant differences in bully-victim behaviour across all ethnic groups surveyed (Bevilacqua et al., 2017). This study examines this on bully-victims, hypothesizing that:

$H_0$4: Female Mobile Bully-Victim Behaviours will not differ by ethnicity
$H_1$4: Female Mobile Bully-Victim Behaviours will differ by ethnicity

School

The impact of school environment or type of school on cyberbullying has been investigated, with several conflicting findings. For instance, a study (Kim et al., 2019) found that in a school that provided interventions, students that felt they belonged in the school were less likely to be victimized; however, this was not same for students with behaviours associated with bullying. In another study (Festl, 2016), schools with technical resources had more perpetrators than schools with social resources. To investigate the impact of school on mobile bully-victims, this study hypothesizes that:

$H_0$5: Female Mobile Bully-Victim Behaviours will not differ by the school type
$H_1$5: Female Mobile Bully-Victim Behaviours will differ across the school type

Interventions

Studies on cyberbullying have largely reported that students do not ask adults for help with dealing with bullying. This is particularly true for victims (Rivers & Smith, 1994) and situations of indirect bullying such as spreading of rumours. Mobile bullying is a perfect platform for different types of indirect bullying where 'things' can be done anonymously. This reduces the chance of being able to point to the perpetrator and may discourage reporting as nobody may be apprehended for the offence. There are also contradictions in this view of the extent to which interventions are sought. In a study by Unnever and Cornell (2004), only 40% of students were found to report while Brown et al, (2005) found that 75% of students do seek adult interventions. Kessel Schneider et al. (2015) found that parents and non-school adults were more likely to be approached for help than a teacher or school adult This study, therefore, tests this hypothesis on bully-victims, stating that:

H06: Female Mobile Bully-Victim Behaviours is not influenced by type of Intervention (teacher, family or peers)
H16: Female Mobile Bully-Victim Behaviours is influenced by type of Intervention (teacher, family or peers)

2.10 Chapter Summary

In the preceding chapters, the background information about bullying and cyberbullying was introduced. The discussion went further into the trends in previous related studies and the findings. Themes extracted from this included gender, grade, ethnicity, age and interventions. These were all examined with reference to the South African context to reveal the gap in literature as well as the use of theory in previous studies. A conceptual model was designed to address some of these gaps and hypotheses developed put forward.

In the following chapter, the study will lay out the plans for the field study, and the research paradigm, epistemology and ontology will be discussed. The details of how the data was collected and analysed will be thoroughly explained.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter aims to provide guidance about all the facets of the research process. It explains the considerations for selecting the research methods used and how they led to help answer the research questions. The chapter addresses rigour and attempts to show the trustworthiness of the findings. Following the framework for research design postulated by Creswell (2003), the philosophical assumptions, the strategy of inquiry (procedure) as well as methods (data collection and analysis) will be detailed in the following sections.

In research design presentation, it is useful to explain the elements of the research approach framework such as, the philosophical assumptions behind the knowledge claim of the method, the general procedures – strategy of enquiry as well as methods --—data collection, analysis and write up processes (Fig 3.1). The approach is also supported by Walshaw (2012); hence, to answer the research questions of this study, the researcher details the process in the following sections, namely research philosophy, research approach, research strategy, research methods.

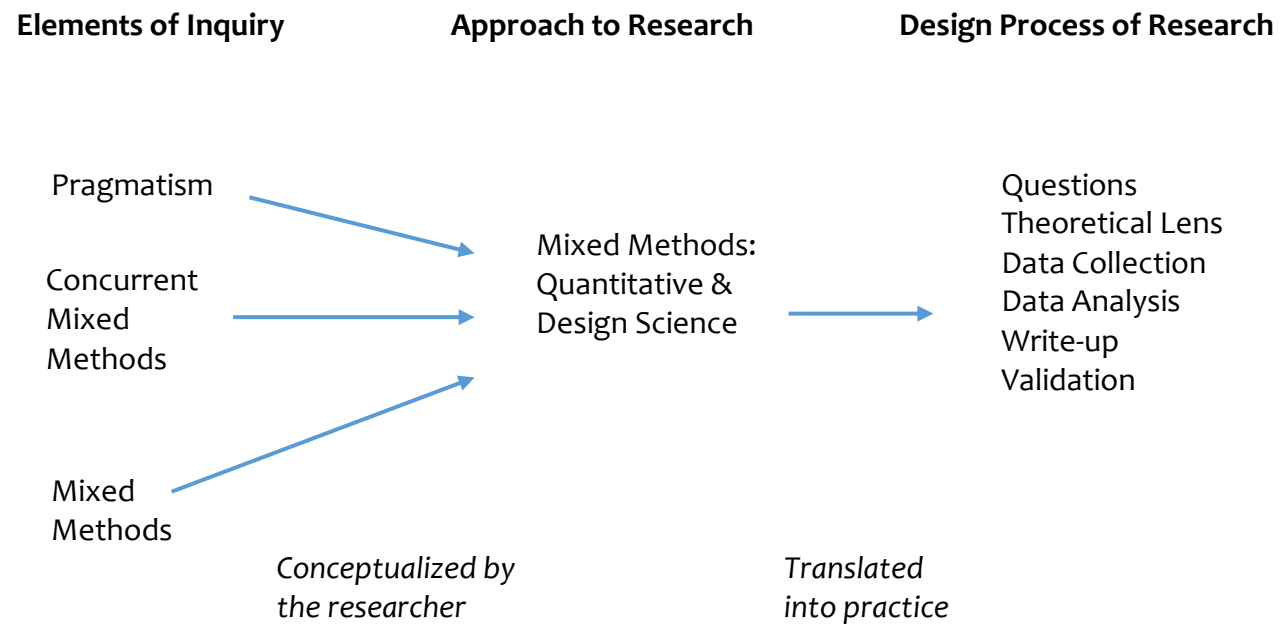


Figure 3. 1 — Knowledge Claims, Strategies of Inquiry and Methods leading to the Approaches and design process of this study (Adapted from Creswell, 2003)

The figure above shows how the knowledge claims, strategies and methods (elements of enquiry) combine in this research. In the following sections, the researcher expands further on the philosophical assumptions, ontology and epistemology of the approach used in this study.

3.2 Research Philosophy

A research philosophy or philosophical worldview is a set of guidelines that govern an action (Taylor et al, 2015; Creswell, 2009). An outlined research philosophy provides a balance between the researcher's viewpoint and other viewpoints that exist. It also sheds more light on the relationship between the researcher's methods and methodology. Finally, it helps the researcher stay focused along the lines of the claim of their worldview. (Grix, 2010). When the research philosophy of a study aligns with the researcher's said paradigm, it helps the audience of the research work understand the application of rigor in the research exercise.

Four main concepts apply when discussing research philosophies (also referred to as knowledge claims): epistemology, ontology, axiology, and paradigm. Epistemology simply defines what it means to know something or how knowledge can be obtained and communicated (Scotland, 2012). Ontology is concerned with what knowledge is; whether it truly exists or defined by the mind. It explains what exists in the physical world that can be researched (Moon & Blackman, 2014) as well as how it is interpreted by a researcher (Ormston et al., 2014). Axiology draws attention to the researcher's influence on the research. There is also the concept of rhetoric which simply means the manner in which research findings are reflected (Ponterotto, 2005). Paradigms are also referred to as philosophical perspectives, and this seeks to understand how knowledge is constructed and how truth is viewed (Scotland, 2012). Five schools of thought namely Post-positivism, Constructivism, Realism, Advocacy, and Pragmatism will be briefly discussed though there are others commonly used, only these four will explained.

Post-Positivism comes from the school's challenge of traditional acceptance of truth (Phillips & Burbules, 2000) from royal or religious decrees. Holding that positivism needs amendment, post-positivism holds the belief is that knowledge can be discovered only probably and not certainly. Positivists believe the object of inquiry is independent of bias from the researcher and thus what we observe is perfectly accurate. Post-Positivists on the other hand believe that knowledge is not absolute, given that evidence from the observation process is subject to error (human and the likes). Hence, they do not prove their hypotheses but rather accept or reject them. The claims in this school of thought differs from positivism in that it purports that knowledge is subjective as the researcher's values and background can influence it. Post-Positivism balances this acknowledged subjectivism by highlighting the possibility of the effects of this bias.

Constructivism or Socially Constructed Reality claims knowledge from suppositions or assumptions. It is also referred to as Interpretive knowledge. This school of thought assumes that knowledge is gained from the environment in which one is situated (Lincoln & Guba, 2000). Thus, knowledge is acquired from the meaning people give to their situations, and this is acquired by putting respondents in a situation where they usually engage with other respondents — social construction. The respondents'

view of the phenomenon is paramount, and the questions are not leading but open-ended to better capture the respondents' cultural and historical background. Although the researcher's background is prone to influence how they interpret their observations, this is acknowledged upfront and take into consideration when making conclusions, thus gaining insight into other people's viewpoint on the phenomenon. Constructivist researchers, unlike Positivists, do not begin with a theory, neither do they attempt to falsify or support it. Instead, they aim to gain insight into the intricate relationships or factors that define meanings within a context. This leads to the acceptance that there are various subjective worldviews (Myers, 2009; Oates, 2006).

Realism embraces the premise that truth is independent of the human mind, considering what the senses present as truth. There are different variants of realism in research today – critical realism, which is lately well used in Information Systems research, direct/naïve realism, etc. — all with the common belief as above with slight differences (Saunders et al., 2009). Ontologically, realism is similar to objectivism, seeking to understand causes and their relationships on the object of inquiry. Epistemologically, reality can be attained through multiple observations or perceptions, all independent of the mind (Maxwell & Mittaplli, 2010). Due to these multiple perceptions, different means are adopted in attaining the truth hence making mixed methods acceptable in this paradigm.

Advocacy researchers hold the view that Post-Positivist views are inadequate and insufficient when addressing social justice issues particularly the marginalized minority groups or classes in society. Likewise, the Constructivists seem shallow to them as they fail to produce action plans to act on to relieve the marginalized minority.

This study will be following the pragmatic school of thought, expanded in following sections. The appropriation in this study are detailed as follows.

3.2.1 Knowledge Claims

Given the pluralistic nature of the study; to understand the characteristics of female mobile bully-victims and designing a general mobile anti-bullying intervention, there was the need to adopt multiple strategies for the study.

One expected outcome of the study was a mobile software application that would be designed and developed within the South African high school learners' context. The next chapter of this study will be dedicated to detailing the full design process. This introduced the appropriation of Design Science as a strategy where knowledge is derived through action (Goldkuhl, 2012) i.e. designing the software application and testing it.

The other outcome expected from this study is an understanding of the characteristics of female mobile bully-victims in the high school environment. Ontologically, the knowledge can be obtained by quantifying measures without the influence of the researcher (Goldkuhl, 2012). Observation and examination of actions, situations, and

consequences can bring us to this understanding, using as many approaches as possible (Creswell, 2003). The feedback from the iterations brings about knowledge on what will work and what will not work about interventions (Goldkuhl, 2012). When the focus is on the problem, pluralistic approaches can better lead to knowledge about the problem. A pragmatic approach seems the most appropriate as it accommodates different worldviews, assumptions, methods including data collection and analysis.

3.2.2 Introduction to Pragmatism

A paradigm is a notion or theory that consists of the basic principles that lie beneath what we understand of the world and the most suitable ways we can explain our understanding (Krauss 2005). In the context of research, paradigms are made mentioned of when explaining views and principles that groups of researchers hold and follow when conducting a study that needs to be inquired on. The essence of this is that the proofs for explanations given about the object of inquiry need to be plausible and verifiable (Weaver & Olson 2006). Positivism is one of the most widely followed paradigms in academic research, followed closely by interpretivism (Creswell, 2012), although other scholars have proposed other paradigms such as critical theory, post-positivism, pragmatic and transformative (Krauss, 2005; Neuman, 2013). The current study will adopt pragmatism as the research paradigm to respond to the research question. The choice of the methodology is based on the understanding that both positivism and interpretivism are mutually exclusive and extreme philosophies for seeking knowledge. While many of the research topics fall under these two paradigms, several reasoned researchers have established that they do need to occasionally move to a new position within these two extremes.

Understanding the extremes of the objective and subjective approaches to research, the pragmatism paradigm does not focus on a specified philosophy; instead it seeks to accurately respond to the 'what' and 'how' of research questions (Creswell, 2003). According to Mertens (2012), researchers advocating for the pragmatic approaches to research reject the widely accepted conception that social research can only access reality about the world by utilizing only one scientific method. In placing the research problem at the centre, according to Creswell (2003), pragmatism utilizes the applicable approaches to comprehend and respond to the problem. Placing the question as the main focus, the methods of collecting and analysing data are selected on the basis that they are the most likely to deliver deeper insights to the research question without having to be loyal to any specific philosophy.

The choice of the pragmatic approach in the current study is founded on the explanation that selecting a specific research approach is not entirely based on the commitment to a philosophy, but whether the chosen approach will suitably respond to the research question as provided by Darlington and Scott (2002). The current study sought to determine and understand the dynamics of female mobile bully-victim behaviour in high schools in South Africa. Further, the study sought to establish how a technical intervention will address these behaviours. These two research objectives

and questions may not be adequately responded to by exclusive utilization of either the quantitative or qualitative approaches. For this reason, the study will employ an approach that will work best in responding to the research questions.

According to Saunders, Lewis and Thornhill (2012), pragmatism as a paradigm considers an approach to be relevant if it supports an action. In the current study, the study will be completed in two phases with the first stage using a survey to collect information regarding the relationships, exposure and habits related to female bullying. In this phase, the survey examined the prevalence of female bully victims in the different age-groups, grades, and the relationships between bullying and student age and grade. Such information is essential in creating a knowledge that will determine the focus of the intervention. The phase also attempted to examine the areas of overlap between bully-victims and pure bullies, bully victims and pure victims to establish whether bully-victims are a distinct group with its idiosyncrasies.

The second phase involved the development and testing of an artefact to determine its efficacy in mitigating female mobile bullying. The artefact contemplated is a mobile application to be used as an anti-bullying intervention for high school students. The application is meant to accomplish three critical components; Help in reporting of bullying in schools, support the victims of bullying on how to respond to bullying and provide general information regarding bullying to increase awareness among the students. The approach will involve the generation of knowledge through action, a critical feature in pragmatic research. Keeping the proposition by Cherryholmes (1992) that pragmatics should stop questioning reality and laws of nature, the current study seeks to go beyond the reality that bullying exists as well as what the causes of the phenomenon is and provide practical solutions to the problem. The designing of a mobile application is a pragmatist approach that will utilize the theoretical knowledge gained from the first phase of the study.

3.2.3 Types of Pragmatism

As indicated in the above discussion, pragmatism is founded on creating knowledge that results in an action. Such an approach is considered as functional pragmatism as it seeks to question why a particular type of knowledge is sought. In this form, the action forms the purpose of the inquiry. Creswell (2003) argues that in knowledge for an action, the latter is useful for the former and can be applied in an action. The knowledge ought to be prescriptive and have the capacity to guide the attention towards a specific phenomenon (Goldkuhl, 2008). In the current study, as was shown above, the survey is intended to collect knowledge about female bullying in high schools in South Africa and the action of the inquiry, which also forms the purpose is the development of a mobile application to deal with the bullying in schools.

Another form of pragmatic approaches is referential pragmatism. Unlike functional pragmatism, referential pragmatism seeks to create knowledge about an action as opposed to knowledge for action (Baskerville, & Myers, 2004; Goldkuhl, 2008). In this approach, the world is described in action-oriented perspectives. The focus of an investigation in referential pragmatism is on the activities, conditions for the actions,

practices, actions, actors, and results of actions. The approach also employs other action-oriented theories including activity theory, affordance theory and social interaction theories. The final form of pragmatism is the methodological theory which focuses on how an action generates knowledge. In this type of research, the action acts as both the source and medium through which knowledge is obtained (Goldkuhl, 2008). Methodological pragmatism holds that the world can be learned and understood through actions, experiences and reflecting on the actions. The methodological pragmatism assumes that trying to change a phenomenon reveals its 'true' nature.

3.2.4 Ontological Assumptions of Pragmatism

Ontology queries the nature of social reality from a philosophical perspective which affects the choice of research topics, construction of research questions and directs the epistemological stance of the research (Iofrida et al., 2018). The study contends that the position of science is to detect the nature of reality and describe how it works. Thus, the ontological position of positivist research is one of realism where there is an external reality that occurs independent of peoples' beliefs or understandings. In contrast, the ontological stance of interpretivist research differs as they view reality to be one of idealism, constructed by individuals therefore making it multiple and subjective (Thomas, 2017). Pragmatism as presented by John Dewey and cited in Morgan, (2014) focuses on breaking these ontological extremes of realism and idealism. Dewey argued that ontological conceptions of the nature of our perception of the world or of the outside world only amount to discussion of two sides of the same coin. As an ontological argument, pragmatism seeks to end the philosophical arguments that have existed regarding the nature of reality and the search for truth. As shown earlier, pragmatism has shown that truth is not based on the dualism that exists in the mind or in the reality that is independent of the mind, but it is what works at a given time. The explanation underscores the researcher's choice of the pragmatism approach since it provides the best understanding of the problem. The researcher determined that it is not palatable to exclusively use positivism or interpretivism approaches to study the female mobile bullying in high schools; instead, a mixture of both approaches will provide the anticipated response.

3.2.5 Epistemological Assumptions of Pragmatism

Epistemology is known to be guided by the ontology (Iofrida et al., 2014). The term is defined as the grounds of knowledge, referring to the relationship between the reality and the researcher. Positivist researchers detach themselves from participants, using statistical research techniques to uncover objective reality to present generalizable findings (Gray, 2014) which reduces the risk of personal bias created by the researcher. Comparatively interpretivist researchers are instrumental in the research process, they gather knowledge from participants' experiences aiming to uncover in-depth and exact results but are consequently criticized due to personal bias (Thomas, 2017). Therefore, it is paramount researchers be explicit about their involvement and how this may affect the research findings, for the study to be deemed rigorous (Gray, 2014). As researchers are unavoidably instrumental in interpretivist research reflexivity is

viewed as integral to reducing critique of personal bias and to enhancing the studies rigor. Thomas (2017) stresses that researchers should not ignore their own biases but instead use reflexivity to allow them to reflect and justify their position/subjectivisms throughout the research process. In qualitative research the goal is to monitor such issues which will enhance the credibility of the results through the trustworthiness of the researcher. Reflexivity is not solely associated with qualitative research and Iofrida et al., (2014) acknowledge that it can be a useful tool to enhance any studies quality through its use of self-awareness and introspection. However, reflexivity can be viewed as a personal self-supervision which could present concerns regarding its truthfulness. Therefore, it is now being expanded to include teams where members can check one another's reactions which should further enhance the credibility and trustworthiness of the findings.

Various studies have sought to place pragmatism within the positivist philosophical realm and others within the interpretivism spectrum. For instance, Niehaves (2007) has attempted to place the pragmatic approach to research in the interpretivism paradigm while Carlsson (2010) places it under the critical realism. However, none of the scholars have provided a vivid epistemological basis for usefulness of design knowledge. The pragmatic paradigm to research design, according to Creswell (2003), sees the researcher link the approach to the nature and purpose of the study. The pragmatists understand that research is multi-purposed and utilizing the tactic of what works allows the researchers to complete research questions that may not be adequately responded to by using qualitative or quantitative methodologies (Maxcy, 2003). This understanding explains the choice of this paradigm for the current study since the research questions described above may not be fully answered by utilizing either of the objective and subjective approaches. Tashakkori and Teddlie (1998) further provide that the pragmatic approach has an intuitive appeal that offers the researchers the permission to explore areas of interest while selecting appropriate methods and using the findings positively an in consistence with the values of the researcher. The researcher has used this understanding to select a mixed methods approach including the use of a survey questionnaire to collect the data regarding female mobile bullying in high schools in South Africa. The researcher also went ahead to seek for the possible solutions to the research problem by designing a mobile application to determine whether it could help mitigate the bullying.

3.2.6 Methodical Assumptions of Pragmatism

Literature has recognized the significance of pragmatic paradigm as the preferred method for conducting mixed methods research (Tashakkori & Teddlie, 1998; Maxcy, 2003; Johnson & Gray, 2010; Creswell & Plano Clark, 2011). Contending that adopting a mixed methods research is essential as it overcomes the disadvantages that accompany a single method research. For instance, Teddlie and Tashakkori (2009) explain that using both a questionnaire and interviews offers the advantage of depth associated with interviews and breadth linked with the questionnaire. A more complete picture regarding a research subject is obtained with a Mixed Methods approach which is essential in for enhancement of theory and practice. The current study in utilizing the Mixed Methods approach conducted a survey alongside

interviews from the high schools' students to determine their experiences about female mobile bullying as well as the extent of the problem. The findings of the research informed the design- (action-) based research that led to the development of a tool to report the bullying and support the victims.

The mixed methods approach using the pragmatism paradigm also helps overcome the drawback of both qualitative and quantitative approaches. For instance, the quantitative approaches face the challenges of not being able to be applied to specific situations especially when the findings are generalized (Maxcy, 2003). Moreover, some researcher models are reductionist in nature and hence omit some crucial constructs that can only be identified through qualitative methods (Gray, 2014). Equally, qualitative research methods do not allow the testing of hypotheses and theories, the researcher may include personal biases in the collection and analysis of results and the difficulty of generalizing the findings to other subjects or areas (Creswell 2003). Using a concurrent mixed methods approach enabled the researcher to use the different methods, independent of each other to understand the object of enquiry (Venkatesh et al., 2013). This was used to add further meaning to the all collected data.

3.3 Research Design and Methods

In the following sections, an account of the research methods for this study is presented. Following the previous layout of pragmatic philosophy, the next sections elaborate on the aspects that have guided this study.

3.3.1 Research Strategy

Information Systems research has different strategies — case study, ethnography, survey/quantitative, design and action research, all of whose approach follow either an Abductive, Inductive or Deductive Reasoning. Inductive reasoning aims at building theory while Deductive focuses on testing already existing theory (Feilzer, 2010). The least common strategy is Abductive (or Retroductive) Reasoning, which puts forward a problem theory and explains the underlying correlation among the facts therein. In abduction, the aim is to solve problems and uncover the relevant underlying causes which is sometimes seen as reasoning backwards – from result to the cause (Wirth, 1998; Feilzer, 2010). In Abductive Reasoning, hypotheses are selected by guesses or instincts that are partly intuitive and partly learnt however, these guesses are not random but plausible and rational (Braga, 2019).

Being a Mixed Method study, multiple strategies will be adopted appropriate for this study on *Identifying Female Mobile Bully-Victim Characteristics in Selected High Schools in South Africa: Towards an Anti-Bullying Mobile Application* because of the research is divided into phases where the first will question, using a survey, the baits, exposure and relationships surrounding female mobile bully-victim behaviour and the second phase will develop and test an app to evaluate how useful it will be as a tool in tackling the problem. Knowledge will be propagated from this action — design and test of the

app. Quantitative and Design Science research methods for the purpose of attaining a more robust understanding.

3.3.2 Quantitative and Design Science Research Methods

The previous sections have already identified the different epistemological bases for design science. The use of pragmatism as a paradigm has also been included as well as the types of pragmatism including functional, referential and methodological have been discussed. Pragmatism has been explained as a school of thought that believes that the practical consequences are essential in aspects of truth and meaning. Goldkuhl (2008) argues that Design Science Research is founded in pragmatism because of its focus on relevance that of making vivid contribution to the application environment.

Pragmatism studies the possibilities of what might be (Lee, Pries-Heje, & Baskerville, 2011). As Morgan (2014) argues, pragmatism values knowledge as a significant component for improving action and existence. As a result, the acquisition of knowledge should go beyond discussing the past in terms of the causes and effects, but also be used constructively to contribute to the improvements and changes (Hevner & Chatterjee, 2010; Von Alan et al., 2004).

In the current study, the use of pragmatism was essential through the collection of data to describe the female mobile bullying, by determining the incidence, and prevalence of the bullying on the socio-ecological level, and the form it takes. The acquired information will then be used to inform the next design iteration of the anti-bullying mobile application. Essentially, the collected information will contribute to the change and improvements. The pragmatist attitude in the current study was to look at what might be by exploring the social problems affecting the society (female bullying) and the technical potential of the solutions (anti-bullying mobile application).

Also, Lee and Nickerson (2010) justify the use of pragmatism as the basis for conducting design research, the consequences of including this attitude includes truthfulness and usefulness as well as the rightness of the concept, plan or design. As a result, pragmatism puts usefulness and moral rightness at the same levels as truthfulness (Carlsson, 2010; Morgan, 2014). Equally, the authors claim that pragmatism also is concerned with both the efficiency and appropriateness of the methods. Pragmatism, when used in information systems design research considers the truth and the utility as one and the same thing. The current study considered the relation between truth (through the collection of data through surveys and interviews, what is essentially the description of cause and effect) and the utility (the anti-bullying mobile application that was used to solve the problem identified through the cause-effect research).

The use of questionnaires in capturing data when there is a large population to observe is common (Fink, 2015; Nardi, 2018). The extent of the population makes it difficult or impossible to directly observe subjects so questions with defined answers

are pre-prepared and given to respondents to complete. Questionnaires are ideal for many reasons such as ease, cost efficiency, speed in collection of data, promotes anonymity but also has disadvantages such as inability to probe respondents, low response rates or the sample being an improper representation of the target population (Safdar et al., 2016).

Evaluation of the artefact in Design Science study accounts for rigour in the research (Venable et al., 2016). This process entails extensive proof of the efficacy, quality and utility of the artefact hence not a mere explanation of the design but the contextual implications of the design and contribution to knowledge. The shortcoming of this approach however is that though literature explains different kinds of evaluations, there is less written about what evaluation methods to use or when to use which ones (Venable et al., 2016). Expectations in communication of Design Science Research is high, posing a challenge as the history of this approach does not date as far back as other popular approaches and this challenge remains till present day (Peffers, et. al. 2018). Cognizance of these factors with the methods chosen, the Researcher carried out the research with care and further details are presented in the following sections.

3.3.3 Appropriation of Methods

3.3.3.1 Population and Sampling

To effectively generalize the findings of the research, care must be taken in selecting participants. This is guided by the research objectives as well as the nature of the study (Saunders et al, 2009).

The research participants were high school students in Western Cape, South Africa. The choice of schools was random, depending on the response to the request invitation to participate in the study (Attached in Appendix). A diverse range of schools were contacted: Mixed-gender schools, single-gender schools (both boys only and girls only), government schools, independent and private schools.

A total of thirty schools were invited to participate. Nine schools accepted (two independent and ten public schools), three declined and the rest either gave no response or asked to schedule a meeting to discuss the study but did not actually give a time for the meeting after several attempts. It is worth noting that majority of private schools declined firmly, stating that there is no case of bullying in their schools they reckoned I would not get any contributory information from their schools.

All participants were informed that the exercise was voluntary, and any information provided was confidential. There was no request for their names or identifiable information within the survey. A total of 2632 responses were received with 911 female responses.

3.3.3.2 Data Collection and Research Instruments

The data collection process for the questionnaire section of the study is detailed in this section. Permission was sought first from the Western Cape Department of Education

as a regulatory requirement when interviewing learners in high school. This was included in the permission from the ethics department in the University of Cape Town. After receiving approval from these two authorities, letters were sent to the high schools' principals. Their contacts were obtained either physically or from the school's website. The letter (see Appendix), explained the purpose of the study and details of the requirements from the students and the questionnaire was also attached.

Some schools decided they wanted to administer the questionnaires themselves in a controlled environment without the presence of the researcher. Other schools wanted a presentation by the researcher and the researcher was given slots throughout the day to speak with the students on the topic being researched as well as administer the questionnaire. There was an online version of the questionnaire set up in Qualtrics and two schools opted for this version.

The responses from the online survey were exported to Excel and the hard-copy print version responses were also captured into Microsoft Excel. The responses were formatted and allocated reference numbers for easy identification.

3.3.3.3 Design of Questionnaire

The questionnaire was designed by adapting some questions from previous related studies (See Table 3.1 below). Most previous works, including the ones adapted, are variations of the most widely used Olweus Bully/Victim Questionnaire (OBVQ) which has been continuously revised hence a well-established tool (Gonçalves, et al., 2016) suitable for this study.

The final questionnaire contained fifty-eight questions of both requiring respondents to write down responses as well as picking answers from a Likert scale. The full questionnaire is presented in the Appendix section.

Table 3. 1— Questionnaire Design

Questionnaire Item	Adapted From
Part I: Q1 - 4	
Part III: Q1 -8, Q10, Q12-19	Li, 2010
Part IV: Q1-4	Li, 2010
Part V: Q1-3	Li, 2010
Part II: Q1 - 8	Li, 2010
Part II: Q9 - 15	Young, 1998; Chou & Hsaio, 2000
Part III: Q1 - 7, Q9, Q11, Q15-19	Li, 2010
Part IV: Q1-4	Li, 2010
Part V: Q1-3	Li, 2010

Most of the questions were close-ended which were measured using a 5-point Likert scale widely used in like studies (1 = Never/Strongly Disagree; 2 = Rarely/Disagree; 3 = Sometimes/Somehow Agree; 4 = Often/Agree; 5 = Always/Strongly Agree).

These were adopted because of evidence of its ability to provide internal consistency and good construct validity (Kim, Sung, & Kim, 2015). A detailed summary of the measures is presented hereafter.

Section A contained general information about the respondent such as demographics including the respondent's age, gender, grade, ethnic background, family structure, daily average hours spent on the Internet, type of phone, phone model and mobile service provider plan.

Section B examined their online behaviour when using their mobile phone in terms of what the respondents had experienced and actions, they had engaged in. All the twenty-four items in this section were measured with a 5-point Likert scale where 1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often; 5 = Always.

Section C examined the respondents' gadgets and their habits while using them. Using again a 1 - 5 Likert scale (1 = Strongly Disagree; 2 = Disagree; 3 = Somehow Agree; 4 = Agree; 5 = Strongly Agree), eleven of the twelve questions were measures and the last, an option of five items.

Section D was the final section and it was a combination of close and open-ended questions. For each of the first four Likert (1 = Strongly Disagree; 2 = Disagree; 3 = Somehow Agree; 4 = Agree; 5 = Strongly Agree) option questions was a corresponding open-ended question. There were also five other such questions and one option select question.

3.3.3.4 Data Analysis

In this study, there were two concurrent phases of data analysis carried out. One data analysis phase was done quantitatively for the quantitative data collected from the survey while the other data analysis was by evaluating the designed artefact for the design science aspect of the study. This approach was necessary to complement the weakness of one method with the strength of the other and gain wider perspective of the subject of enquiry (Creswell et al., 2003). Additionally, the quantitative method addressed and investigated the model which addressed the main research question while the design science focused on addressing the second research question.

As in many Mixed Methods Studies in Information Systems, there usually is a dominant study, typically entailing rigorous data collection and analysis and a less dominant one with significantly less rigour in data collection and analysis (Venkatesh et al., 2013). This applies in this study with the quantitative aspect more rigorous than the Design Science. The design science analysis is detailed in a subsequent chapter.

The quantitative data analysis involved testing the data for reliability especially for constructs that were measured with multiple questionnaire items. When testing relationships between variables statistically, several considerations affect what tests will be appropriate – type of variable (quantitative or categorical) as well as amount of dependent and independent variables. SPSS and MS Excel were utilized in

preparing and analysing the data. The data was cleaned by excluding incomplete responses from the data. The females' responses were separated and using the set of questions that measure bullying and victimisation, the bully-victims were determined. This involved selecting respondents who on the average answered positively on questions on bullying and victimisation and this data set was used in hypothesis testing and analysis.

In carrying out descriptive and inferential tests, SPSS was used. Measures of central tendency were conducted to determine most suitable tests. ANOVA was suitable due to subcategories of bullying and victimisation being examined.

3.3.4 Research Limitations

Although this study has been filled with the excitement of discovery, it has had a fair share of challenges. Creswell (2003) highlights four aspects in a typical Mixed Methods study: theorizing, mixing, weighting and timing. This section briefly describes these aspects in relation to how they played out as limitations in this research.

Timing: Given the multiple methods in a Mixed Methods study, there tends to be a need for good time planning for data collection. The respondents of this study were high school students and special consideration had to be given to the timing of approaching the schools for participation. In some cases, final year students would not be allowed to participate due to the intensity of the preparation for their Matriculation exams, in other cases students in junior classes were not allowed to participate at the discretion of the school administrators. Also, to survey high school students, a formal ethics approval is required from the Department of Education for each contact with the students. The strategy to take care of the two-phase nature of the study was to include the link for the download of the app at the end of questionnaire. This warranted the need for there to be a barest minimum prototype available for download. It was difficult to get the students to use the app repeatedly and so the contact teacher was always the proxy to remind the students. This was not successful as no response was ever received from them for repeated app usage. Much more details would have been desired from the process, but the data collection had taken over two years (February 2016 — May 2018) with the same trend in response so the researcher had to analyse based on the data available.

Weighting: The previous challenge described also had an impact on the weighting of the methods. Ideally, more information would have been desired on the female mobile-bullying characteristics elicitation however, none of the girls-only schools participated. The researcher had to filter out the females from the surveys administered as they were all from mixed gender schools. This resulted in the sample size for the investigation shrinking from over 2000 responses to just under 200. The study could have greatly benefited from insights on the trend in a single- gender, female school; however, the sample was missing from the research population.

Mixing: Again, the impact of the weighting limitation has impacted the mixing of the research data and interpretation. When to mix the data and how to mix (Creswell & Plano Clark, 2007) can lie on a continuum of both at one end, one at each end or anywhere between the two extremes, i.e. connected, embedded or integrated. Connected means a mixing occurs in data analysis of the first phase and the data collection of the second phase. In a scenario of concurrent data collection where themes in the qualitative data are converted to counts, it is referred to as integration. Where neither of the first two is applicable, a secondary form of data can be embedded into the primary larger form of data to support the study claims. The embedded mixing is the fall-back mixing method employed in this study as the primary data collected in the survey could not be directly connected or integrated into each other.

Theorizing: It is usual for theories to direct a study in terms of questions to be asked, type of respondents, data collection and interpretation. Although theories and frameworks have been applied to this inquiry, they are not all encompassing of the phenomenon to be examined. The study seems thin on theoretical foundations with respect to female bully-victim behaviour even though the socio-ecological theory is widely employed in general (physical) bullying. The findings of this study were anticipated to contribute in a greater capacity to the formation of theories on (mobile) technology mechanisms in bullying. However, the researcher is comfortable with the step of simply highlighting the tenets in the phenomenon of female mobile bully-victim behaviour.

Another limitation was in terms of the acceptance of the study from participatory schools. Many school authorities were absolutely against surveying bullying trends among their students. They expressed fear of sensitive bullying information being exposed to the Researcher despite ethical assurances and written statements of confidentiality. The questionnaires were also anonymous, but over 80% of schools contacted refused to participate stating that they do not have bullying in their school or that they cannot allow students to reveal such information to the researcher. This also continued into the app testing phase for the schools that agreed to participate in the survey phase. Incentives had to be offered in form of phone airtime credit to respondents who would download and use the app. One school decided that they would handpick the students who will be allowed to participate in the aspect of the study. Even in this scenario, no response was eventually received from the school.

3.3.5 Research Rigour, Reliability and Validity

Being a Mixed Method study, the research incorporated building and evaluating an artefact as well as obtaining information about the phenomenon of inquiry. Inherent in both methods are strengths and weaknesses even though multiple methods were employed to make up for the inadequacy of one method. The following presents the effects of these shortcoming on the validity and reliability of the study.

When using surveys, the aim is to get a better understanding of a concept (Brace, 2018) while in Design Science, the design of an artefact is mainly for the purpose of solving

a real-life problem. The means of measuring the quality of these will naturally differ due to the difference in the purpose of the methods. Bias was addressed by providing a neutral point in the close-ended questions to select the option 'Sometime/Somehow Agree' so as not to force users to either extremes.

The quality of a survey research is measured by the reliability and validity of results (Brace, 2018) which is usually present in statistical calculations. The reliability of such a study can be measured by how transparent the explanation of procedures and activities carried out by the researcher is presented. Furthermore, some level of consistency is expected between previous like studies by different researchers and this counts for reliability (Hammersley, 1992).

To account for the reliability requirement of a research, this study has addressed this by triangulation of methods as earlier stated in the use of mixed methods. The concept of triangulation has been used in research (Kuechler & Vaishnavi, 2012), though not without debate as to whether it exposes weakness in ontology and epistemology as argued by Blaikie (2000). This study however deems it appropriate to employ as the biases of both Design Science and Quantitative methods have been identified in section 4.3.2 above and addressed as much as possible during the course of the study.

In accounting for validity, this study agrees that it is probably impossible to precisely access the reality of the phenomenon of inquiry (Hammersley, 1992) regardless of how much observed data ethically collected, which can impede the knowledge of truth (Atkinson & Hammersley, 2007). It is acceptable therefore to evaluate validity by assessing how close the presented assumptions of the study line up with the observed data to back up the claims (Hammersley, 1992). Due to the diligence and care taken in the collection of data for this study as well as the analysis and presentation, the researcher confirms that the validity and reliability of this study as well as findings are correct.

In practice, validity, reliability and rigour were achieved by the researcher's presence in all of the schools prior to administration of the questionnaire. Some of the schools allowed the researcher to feature as a guest speaker in the Life Sciences lessons where a talk on mobile bullying was given to the students. The actual artefact evaluations as well ran in iterations for several months after the Researcher was no longer visiting the schools in order to give the respondents/testers ample time to think over bullying situations and utilize the app in responding to the situation.

3.3.6 Generalization

In Information Systems research, care must be taken in presenting research findings to explain the reasoning behind the choice of methods. This can safeguard against false generalizations for instance in a case where technology and a design artefact form part of a study where the scenario and individuals can widely vary (Bertelse, et al., 2018). Though knowledge can be context specific, modest generalizations can be made

if commonalities and differences between contexts are highlighted and acknowledge (Greenwood & Levin, 2007).

When examining the interrelationships between research variables with the intention to classify them or explain these relationships, surveys have always been largely used (Sapsford, 2007). However, to make a statistical generalization from surveys, a researcher must show the precision in stating the significance and confidence levels in each statistical test.

For this study, the above-mentioned principles of generalization apply to the findings especially with respect to the nature of schools. Beyond the context defined about the schools, the researcher recommends more extensive examination of the factors that have been advanced in this study. Again, with respect to the artefact designed, more evaluation and extended features can be added to provide more robust conclusions.

3.3.7 Research Ethics

Maintaining confidentiality and ethics is an important responsibility of the researcher. In this study, the researcher follows a means-end ethics orientation as with most studies using Design Science Research and is well suited for a Pragmatic paradigm. A means-end ethical position focuses on conducting research for the purpose of attaining understanding that is suitable for a predetermined goal with minimal critique of the validity of the goal. (Iivari & Venable, 2009). There is also the critical ethical position that questions analytically any goal in line with a critical paradigm which is idealism (Iivari, 2007). The interpretive ethical stand is retrospective in that it aims at giving meaning to already carried out actions that is, giving a deeper understanding to actions already carried out (Iivari, 2007). The latter two ethical positions are not as fitting to the context of this study hence they are not observed.

The researcher was cautious in treatment of respondents and data as required (Walliman, 2017), presenting all information without distortion or bias as well as protecting identity such that it is not recognizable to public. Respondents were given a clear definition of terms on the information sheet preceding the questionnaire. Where the instrument was administered by the researcher, these terms were emphasized again.

An initial approval was obtained from the Department of Education (See Appendix) since the respondents are minors and school-age children. Further approval was obtained from UCT Information Systems Ethics Committee to ensure that the research was being conducted ethically with consideration for the respondents' rights. A third approval was obtained in form of a consent form (See Appendix) sent to the schools to provide to the parents to inform them that their children would be participation only at their approval and that participation was voluntary.

3.4 Summary

This methodology chapter is a significant section in undertaking any research. The current study utilized a pragmatism paradigm to conduct the study. The discussion in the current chapter has shown the reasons for the choice of the pragmatic methodology in undertaking the study. The study was divided into two phases, one where the cause-effects descriptions of the female mobile-bullying in high schools in South Africa was conducted and in the second phase, the information was used to develop a mobile anti-bullying application to enable the victims to report the bullying and be supported.

CHAPTER 4: QUANTITATIVE DATA COLLECTION AND ANALYSIS

4.1 Introduction

This study employs a Mixed Methods approach in answering the research questions due to the inadequacy of one method to adequately explore the research phenomenon. The value of this approach is in leveraging one method to make up for aspects where the other method was insufficient. In this chapter, the details of the quantitative data collected is analysed and prepared for interpretation in later sections. Treatments and tests on the data will be discussed. This is important in explaining the findings from the data as well as lead this study to a conclusion. The interrelations and influences of the research variables are explained, and statistical tests were appropriated to add rigour to the research process.

4.2 Descriptive Data

Several items were presented in the questionnaire for measurement. These are explained below, and the results presented as well.

4.2.1 Demographics

4.2.1.1 Gender

The question about gender is important for the second research question and the quantitative part of the study which aims at proposing a general i.e. non-gender specific mobile bullying solution. The table below presents the distribution of gender among the research questionnaire respondents.

Table 4. 1— Gender Demographics

Male	Female	Incomplete / Unanswered	Total
1248	911	471	2633

From the whole population of respondents, the females were extracted. This was necessary to begin to specifically answer the research question of understanding characteristics of Female Mobile Bully Victims. From henceforth, all the analyses were conducted on the females only. Also, one record was deleted as the respondent only answered the first five questions and left the rest of the survey unanswered.

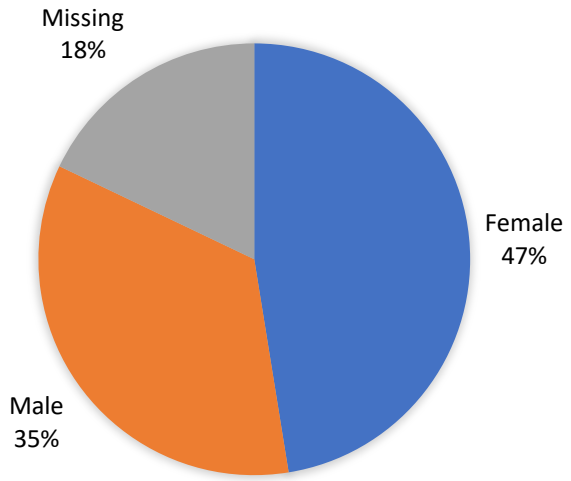


Figure 4. 1— Gender Demographics

4.2.1.2 Age

One of the questions in the questionnaire was about the age of the respondents. Among the female respondents, 7% were 18 years, the oldest in the group, 13% were 17 years, 20% were 16 years, 31% were 15-year olds and 26% 14 years, while 3% of the respondents did not include their age.

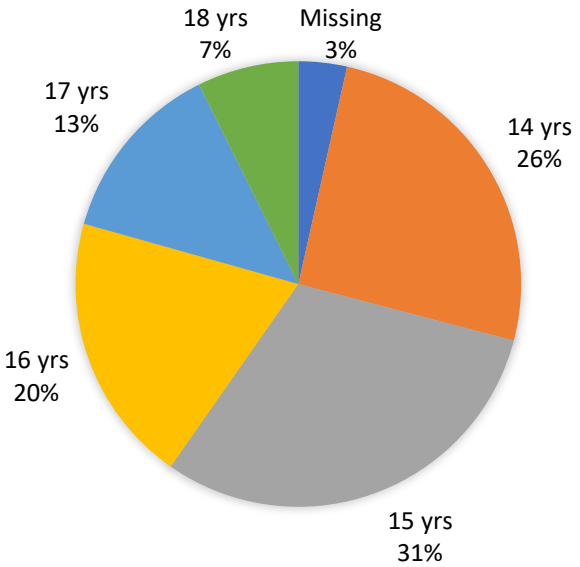


Figure 4. 2— Respondents by Age

Table 4. 2— Age Statistics

Raw Age		
N	Valid	878
	Missing	32
Mean		15.44
Median		15.00
Std. Deviation		1.230
Range		4
Minimum		14
Maximum		18

4.2.1.3 Ethnic Background

The population in South Africa is mixed and a question was asked about respondents' ethnicity.

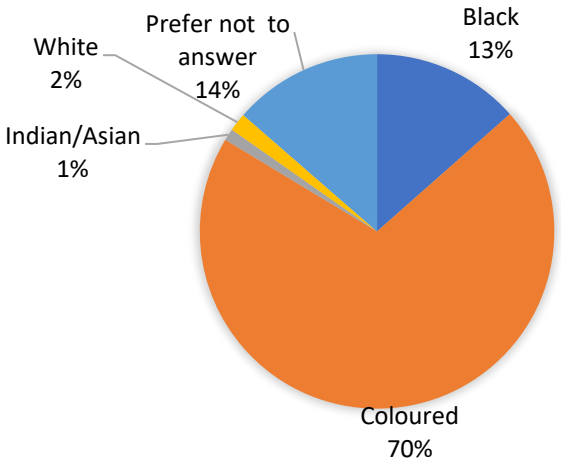


Figure 4. 3—Respondents by Ethnicity

Table 4. 3—Ethnicity Statistics

		ETHNIC (**Missing records not included)				
	Ethnic Group Code		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1		Black	113	12.4	13.5
	2		Coloured	588	64.6	70.2
	3		Indian/Asian	9	1.0	1.1
	4		White	14	1.5	1.7
	5		Prefer not to answer	114	12.5	13.6
			Total	838	92.1	100.0

4.2.1.4 Family Background

For the question on respondents' family backgrounds, the following were the results.

Figure 4. 4— Respondents by Family Background

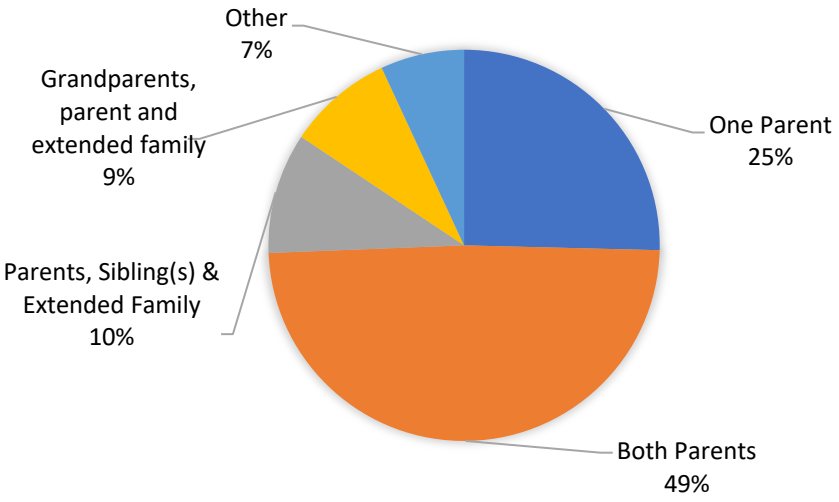


Table 4. 4— Respondents' Family Background Statistics

FAMILY (**Missing records not included)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**One Parent**	224	24.6	25.4	25.4
	Both Parents	432	47.5	49.0	74.4
	Parents, Sibling(s) & Extended Family	88	9.7	10.0	84.4
	Grandparents, parent and extended family	77	8.5	8.7	93.1
	Other	61	6.7	6.9	100.0
	Total	882	96.9	100.0	

4.3 General Reliability and Validity Testing

Reliability tests are carried out to establish the appropriateness of the questions used to measure the variables being studied. There is a requirement for the instruments of data collection to meet the standard of reliability to be seen as reliable measures. Validity entails the item of measure to be consistent and without bias, measure the construct it is set up to measure.

According to Volk et al. (2017), the assessment of reliability helps in recognizing the validity of the questionnaire systems. The equipment of *data collection* should determine the standard definition of reliability to provide an appropriate measure. This formulates an impartial outcome for the benefit of objectifying the consistency of

the measures of information. This can be achieved by testing over and over again, the same construct or concept in different ways or with different words or questions (Dikko, 2016). This is referred to as the 'check for internal consistency' and its basic aim is to determine how reliable results of the study is (Dülmer, 2016).

To establish the validity of a set of questions used to measure constructs in a study, the researcher must aim to show that the mechanism used to measure concepts adequately captures the intended concepts (Heale & Twycross, 2015). Thus, there should be content validity: where items used to represent the concept are adequate, construct validity: to ensure that the measures are a right fit for the theories being advanced as well as criterion-related validity: differentiation of items using appropriate criteria. Validity may also be achieved by the use of pre-interviews or pilot studies to add credibility and validity to a research study (Van Wijk & Harrison, 2013).

In practise, a Cronbach Alpha score of 0.7 is acceptable (See Appendix) and in this study (almost) all of the questions met the criteria. SPSS Statistics 25 is the statistical analysis tool used to compute the data analysis for this study. In the following sub sections, the details of the tests conducted are explained.

4.3.1 Schools

The data used in this study was collected over a range of eight schools. Two of the schools are Independent schools while the other six are public (non-fee paying) schools. For ethical reasons, the schools cannot be further identified beyond this; however, one of the study objectives was to investigate the differences in FMBV behaviour on the school socio-ecological level.

Table 4. 5— School Classification

SCHOOL CODE	SCHOOL TYPE
1	Public
2	Independent
3	Public
4	Independent
6	Public
7	Public
8	Public

4.3.2 Family

Studies have shown that children living with single parents, from dysfunctional family backgrounds and those that lack cohesion were more on the receiving end in cyberbullying (Buelga et al., 2016; Buelga et al., 2017; Nordhagen et al., 2005). Bully-victims have also been known to come from adverse family backgrounds (Lereya et

al., 2013). This was the basis for check on family type on female mobile bully-victim behaviour.

Table 4. 6— Breakdown of Family Responses

KEY

KEY	RESPONSE
1	One parent and sibling(s)
2	Both parents and sibling(s)
3	Parents, siblings and extended family
4	Grandparents, parents & extended family
5	Other

		Frequency	Percent	Valid Percent	Cumulative Percent
VALID	1	224	24.6	25.4	25.4
	2	432	47.5	49.0	74.4
	3	88	9.7	10.0	84.4
	4	77	8.5	8.7	93.1
	5	61	6.7	6.9	100.0
	TOTAL	882	96.9	100.0	

4.3.3 Bully-Victim Experience

4.3.3.1 IsVictim

A set of questions was asked to find out if the respondents have experienced bullying (i.e. victimised). Multiple questions were asked in different ways to get a definite answer to same question, given that bullying is somewhat considered shameful and victims are not open to talk about it. These questions were on a five-point scale (Never = 1; Rarely = 2; Sometimes = 3; Often = 4; Always = 5) A total of fifteen questions were asked to determine if the respondent is victimised. To test for reliability and validity of the Sum Score, the Cronbach's Alpha was computed using SPSS. A Cronbach's Alpha score greater that .7 is acceptable (See Appendix for full table of Cronbach's interpretation).

Table 4. 7— IsVictim Cronbach

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.722	.754	15

Further, a computation of each item's reliability in relation to the pool of questions was calculated and they were all within acceptable values except two items which were.

4.3.3.2 IsBully

Likewise, to elicit the respondents who are bullies, a set of questions was asked to find out if the respondents have bullied others. Again, several questions were asked in different ways to get a definite answer to same question. These questions were on a five-point scale (Never = 1; Rarely = 2; Sometimes = 3; Often = 4; Always = 5) A total of six questions were asked to determine if the respondent was a bully. A response of at least 'Sometimes i.e. 3 and above', are classified as bullies. To test for reliability and validity of the Sum Score, the Cronbach's Alpha was computed using SPSS.

Table 4. 8— IsBully Cronbach

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.709	.742	6

4.3.3.3 BullyVictim

From the above score computations, we needed to derive the number of Bully-Victims among the population. To find this, metrics were chosen from inspection among the questions that measured bullying and victimisation that had most answers that the researcher can work with. This total of responses for IsBully and IsVictim questions that scored greater than 2.0 were taken (See table below). Response of 2-3 were 161; 3-4 = 29; and 4-5 = 9 so total approximate =199 bully-victims.

Table 4. 9— Bully-Victim Derivation

	Frequency table: Bully-Victim K-S d=.21404, p<.01; Lilliefors p<.01					
Category	Count	Cumulative	Percent	Cumul %	% of all	Cumulative %
-1.000000 < x <= 0.000000	8	8	0.87912	0.8791	0.87912	0.8791
0.000000 < x <= 1.000000	365	373	40.10989	40.9890	40.10989	40.9890
1.000000 < x <= 2.000000	338	711	37.14286	78.1319	37.14286	78.1319
2.000000 < x <= 3.000000	161	872	17.69231	95.8242	17.69231	95.8242
3.000000 < x <= 4.000000	29	901	3.18681	99.0110	3.18681	99.0110
4.000000 < x <= 5.000000	9	910	0.98901	100.0000	0.98901	100.0000
Missing	0	910	0.00000		0.00000	100.0000

4.3.4 Internet Hours

'Internet hours was the variable used to test students' exposure to Internet. Inspection of responses from the groups showed some similarities in the response groups which made them candidates for a merger. This was also cross tab tested to ensure that the responses were similar enough to be merged during hypothesis testing.

Table 4. 10— Breakdown of Internet Hours Responses

KEY

KEY	RESPONSE
1	0 – 2 hours
2	3 – 5 hours
3	6 – 8 hours
4	8 – 10 hours
5	More than 10 hours

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**1**	429	47.1	50.2	50.2
	2	225	24.7	26.3	76.5
	3	109	12.0	12.7	89.2
	4	40	4.4	4.7	93.9
	5	52	5.7	6.1	100.0
	Total	855	94.0	100.0	

4.3.5 Mobile Phone Usage

A set of tests was also run on the questions that examined the mobile phone usage of all the students to identify extreme phone usage habits. These questions were on a five-point scale (Never = 1; Rarely = 2; Sometimes = 3; Often = 4; Always = 5) A total of seven questions were asked to determine this construct. A response of 'Sometimes', for half of the question pool classified as extreme. This was translated into a Sum Score which was generated to serve as one-unit value to represent whether a respondent has an Extreme Habitat in terms of mobile phone usage. To test for reliability and validity of the Sum Score, the Cronbach's Alpha was computed using SPSS. For this set of questions, our reliability computation showed strong reliability for all the questions.

Table 4. 11— Mobile Phone Usage Cronbach

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.760	.760	7

The above statistics have been computed for standard reasons because they these values help in determining the features of the data set provided in the context for generating valid outcomes (Martínez-Sánchez et al., 2019). The value of mean for the dependent variable of 199 bully victims has been generated to be about 2.942211. As mentioned by Van Dijk et al. (2017), the value of standard deviation defines the variances in the value of the mean among the group of victims. The value of the standard deviation of the 199 bully-victims has been computed to be 0.557707.

4.4 Hypothesis Testing and Results

In this section, statistical tests conducted to investigate the relationship between the constructs in the framework are presented. Different tests were conducted based after inspecting the responses and checking for reliability and validity as explained in previously. The results of the analysis considered the relationship between the constructs valid at the significance level, $p<0.05$.

The table below shows a description of the variables that were measured about student experiences and activities in the preceding six months.

Table 4. 12— Bully-victim Characteristics Explanation

ITEM	DESCRIPTION
(I) BEENMADEFUNOF	Student has been made fun of in a chat room
(II) KNOWNEMAILMADEYOUANGRY	Received an email from someone unknown that made student really mad
(III) UNKNOWNEMAILMADEYOUANGRY	Received an email from someone known that made student really mad. This does not include "spam" mail
(IV) HARDTIMEPHONECALL	Someone phoned student just to give them a hard time
(V) UNCOMFORTABLESOCIALMEDIAPOST	Someone posted something on student social media page that made them upset or uncomfortable
(VI) UNCOMFORTABLEWEBPAGEPOST	Someone posted something on another web page that made student upset or uncomfortable
(VII) BULLIEDONLINE	Student has received an instant message that made you upset or uncomfortable.
(VIII) POSTEDABOUTSOMEONE	Student has posted something online about someone else to make others laugh
(IX) SENTSMS	Student sent someone a text message to make them angry or to make fun of them
(X) SENTEMAIL	Student Sent someone an email message to make them angry or to make fun of them
(XI) POSTEDONTHEIRSOCIALMEDIA	Student posted something on someone's social media page to make them angry or to make fun of them
(XII) PICTUREWITHOUTPERMISSION	Student has taken a picture of someone and posted it online without their permission
(XIII) UNCOMFORTABLEIM	Student has received an instant message that made them upset or uncomfortable
(XIV) ONLINETHREAT	Student has received threats online that were carried out in school
(XV) POSTEDONLINE	Someone posted about student online that they didn't want others to see
(XVI) AFRAIDTOGOONLINE	Student has been afraid to go on online

4.4.1 Hypothesis 1

H1: Female Mobile Bully-Victim Behaviours will differ by Age Group

In H1, the researcher claimed that Female Mobile Bully-Victim Behaviours will differ by Age group. ANOVA was conducted to test if there are differences in mean scores on Female Mobile Bully-Victim Behaviours characteristics by different Age groups. The results in Table 4.13 show that there are significant differences in the mean scores on some Bullying and victimisation characteristics (see I, VII, VIII, X, XI, XII, XIII). The detailed breakdown of the mean scores of significant characteristics is shown in Table 4.14 (Full breakdown descriptives are in Appendix K). H1 therefore is partially supported.

Table 4. 13—Influence of Age on Female Mobile Bully-Victim behaviour (Characteristics)

Variable	Analysis of Variance Marked effects are significant at p < 0.05							
	SS	df	MS	SS	df	MS	F	p
(I) BEENMADEFUNOF	26.13969	4	6.53492	299.6708	185	1.619842	4.03430	0.003679
(II)KNOWNEMAILMADEYOUANGRY	13.11676	4	3.27919	275.8016	191	1.443987	2.27093	0.063118
(III)UNKNOWNEMAILMADEYOUANGRY	7.57628	4	1.89407	188.1418	183	1.028097	1.84231	0.122579
(IV)HARDTIMEPHONECALL	4.85575	4	1.21394	242.4437	192	1.262728	0.96136	0.429898
(V)UNCOMFORTABLESOCIALMEDIAPOST	7.77968	4	1.94492	213.8434	186	1.149695	1.69168	0.153673
(VI)UNCOMFORTABLEWEBPAGEPOST	4.70993	4	1.17748	236.9043	192	1.233877	0.95429	0.433844
(VII) BULLIEDONLINE	10.13871	4	2.53468	197.8766	191	1.036003	2.44659	0.047860
(VIII)POSTEDABOUTSOMEONE	62.10036	4	15.52509	181.8996	186	0.977955	15.87505	0.000000
(IX) SENTSMS	9.54131	4	2.38533	256.5305	190	1.350160	1.76670	0.137223
(X) SENTEMAIL	16.55989	4	4.13997	179.3878	186	0.964450	4.29257	0.002405
(XI)POSTEDONTHEIRSOCIALMEDIA	11.75718	4	2.93929	132.7377	189	0.702316	4.18515	0.002857
(XII)PICTUREWITHOUTPERMISSION	40.77652	4	10.19413	243.2953	190	1.280501	7.96104	0.000006

KEY: Values significant at 0 .05 or less are shown in red

Table 4. 14— Breakdown Table of Descriptive Statistics by Age

AGE	BEENMADE FUNOF (Mean)	BEEN MADE FUNOF (N)	BEENMA DEFUNO F (SD)	BULLIED ONLINE (Mean)	BULLIED ONLINE (N)	BULLIEDO NLINE (SD)	POSTED ABOUTS OMEONE (Mean)	POSTED ABOUT SOMEO NE (N)	POSTED ABOUTS OMEONE (SD)
<= 14	2.622642	53	1.496488	1.735849	53	1.040542	2.823529	51	1.211708
15	2.470588	51	1.301583	2.000000	55	1.247219	1.472727	55	0.741733
16	1.681818	44	1.073415	1.500000	44	0.902194	1.818182	44	1.062527
17	2.033333	30	1.159171	1.482759	29	0.687682	1.500000	26	0.860233
>= 18	2.000000	12	0.953463	1.333333	15	0.816497	2.533333	15	0.915475
All Grps	2.231579	190	1.312960	1.688776	196	1.032834	2.000000	191	1.133230
AGE	**SENTEMAIL (Mean)**	**SENTE MAIL (N)**	**SENTEM AIL (SD)**	**POSTED ONTHEI RSOCIAL MEDIA (Mean)**	**POSTED ONTHEI RSOCIAL MEDIA (N)**	**POSTEDO NTHEIRSO CIALMEDI A (SD)**	**PICTURE WITHOU TPERMIS SION (Mean)**	**PICTUR EWITH OUTPER MISSIO N (N)**	**PICTURE WITHOU TPERMIS SION (SD)**
<= 14	2.274510	51	1.184541	1.882353	51	1.259318	2.529412	51	1.433219
15	1.611111	54	0.940025	1.436364	55	0.687552	1.363636	55	0.676692
16	1.560976	41	0.672636	1.209302	43	0.411625	1.931818	44	1.404275
17	1.900000	30	0.922889	1.400000	30	0.674665	1.533333	30	0.860366
>= 18	1.600000	15	1.183216	1.400000	15	0.736788	1.600000	15	0.828079
All Grps	1.821990	191	1.015531	1.494845	194	0.865262	1.841026	195	1.210078
AGE	**SENTSMS (Mean)**	**SENTS MS (N)**	**SENTSM S (SD)**						
<= 14	3.117647	51	1.423335						
15	2.636364	55	1.176367						
16	2.545455	44	0.998942						
17	2.733333	30	0.691492						
>= 18	2.866667	15	1.302013						
All Grps	2.774359	195	1.171112						

4.4.2 Hypothesis 2

H2: Female Mobile Bully-Victim Behaviours will differ by school grade

In H2, the researcher predicted that Female Mobile Bully-Victim Behaviours will differ by school grade. ANOVA was conducted to test if there are differences in mean scores on Female Mobile Bully-Victim Behaviours characteristics by different school grade of the students. The results in Table 4.15 show that there are significant differences in the mean scores on some Bullying and victimisation characteristics (see I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII). The detailed breakdown of the mean scores of significant characteristics is shown in Table 4.16 (Full breakdown descriptives are in Appendix K). H2 therefore is strongly supported.

Table 4. 15— Influence of Grade on Female Mobile Bully-Victim behaviour (Characteristics)

Variable	Analysis of Variance Marked effects are significant at p < 0.05							
	SS	df	MS	SS	df	MS	F	p
(I)BEENMADEFUNOF	18.75238	3	6.25079	248.5770	163	1.525012	4.098847	0.007767
(II)KNOWNEMAILMADEYOUANGRY	33.09576	3	11.03192	243.2008	168	1.447624	7.620711	0.000083
(III)UNKNOWNEMAILMADEYOUANGRY	12.54797	3	4.18266	161.8118	160	1.011324	4.135824	0.007428
(IV)HARDTIMEPHONECALL	9.23743	3	3.07914	187.0631	169	1.106883	2.781815	0.042628
(V)UNCOMFORTABLESOCIALMEDIAPOST	4.95238	3	1.65079	202.3711	166	1.219103	1.354105	0.258730
(VI)UNCOMFORTABLEWEBPAGEPOST	1.36081	3	0.45360	190.2924	169	1.125990	0.402849	0.751135
(VII)BULLIEDONLINE	24.62667	3	8.20889	166.4947	169	0.985176	8.332411	0.000034
(VIII)POSTEDABOUTSOMEONE	21.77207	3	7.25736	187.8447	163	1.152421	6.297486	0.000455
(IX) SENTSMS	15.54811	3	5.18270	219.8320	167	1.316359	3.937149	0.009542
(X) SENTEMAIL	23.77638	3	7.92546	147.6119	166	0.889228	8.912744	0.000016
(XI)POSTEDONTHEIRSOCIALMEDIA	9.43450	3	3.14483	126.7773	166	0.763718	4.117790	0.007553
(XII)PICTUREWITHOUTPERMISSION	22.71294	3	7.57098	232.6321	167	1.393006	5.434994	0.001367

KEY – Values significant at 0 .05 or less are shown in red

Table 4. 16— Breakdown Table of Descriptive Statistics by Grade

GRADE	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
8	2.789474	38	1.358813	3.236842	38	1.514510	2.162162	37	1.258604
9	2.266667	45	1.286291	2.673913	46	0.944089	1.543478	46	0.656811
10	2.323529	34	1.036328	2.486486	37	1.095993	2.058824	34	1.229466
11	1.860000	50	1.212351	2.019608	51	1.224585	1.574468	47	0.878355
All Grps	2.275449	167	1.269022	2.563953	172	1.271129	1.798780	164	1.034259
GRADE	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)
8	3.473684	38	1.330248	1.315789	38	0.739074	2.583333	36	1.317465
9	2.826087	46	1.017717	2.086957	46	1.226125	2.152174	46	0.918148
10	3.000000	37	1.000000	2.135135	37	1.250826	1.513514	37	0.869918
11	3.019231	52	0.874259	1.384615	52	0.661367	1.958333	48	1.147770
All Grps	3.063584	173	1.068308	1.716763	173	1.054121	2.047904	167	1.123722
GRADE	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)	SENTEMAIL (Mean)	SENTEMAIL (N)	SENTEMAIL (SD)	POSTEDONTHEIRSOCIALMEDIA (Mean)	POSTEDONTHEIRSOCIALMEDIA (N)	POSTEDONTHEIRSOCIALMEDIA (SD)
8	3.194444	36	1.410561	2.138889	36	1.174802	1.777778	36	1.333333
9	3.065217	46	1.083250	2.288889	45	0.991377	1.760870	46	0.848130
10	2.432432	37	1.068242	1.432432	37	0.765236	1.189189	37	0.518429
11	2.615385	52	1.050748	1.519231	52	0.828189	1.431373	51	0.670967
All Grps	2.818713	171	1.176686	1.835294	170	1.007041	1.541176	170	0.897768
GRADE	PICTUREWITHOUTPERMISSION (Mean)	PICTUREWITHOUTPERMISSION (N)	PICTUREWITHOUTPERMISSION (SD)						
8	2.083333	36	1.250714						
9	2.326087	46	1.476548						
10	1.432432	37	0.800713						
11	1.576923	52	1.054331						
All Grps	1.853801	171	1.225573						

4.4.3 Hypothesis 3

H3: Female Mobile Bully-Victim Behaviour will differ by family type

In H3, the researcher predicted that Female Mobile Bully-Victim Behaviours will differ by type of family. ANOVA was conducted to test if there are differences in mean scores on Female Mobile Bully-Victim Behaviours characteristics by different family types that the students come from. The results in Table 4.17 show that there are significant differences in the mean scores on some Bullying and victimisation characteristics (see I, II, III, VI, VII, XI, XII, XIII). The detailed breakdown of the mean scores of significant characteristics is shown in Table 4.18 (Full breakdown descriptives are in Appendix K). H3 therefore is partially supported since family type influences some, but not all the behaviours measured.

Table 4. 17— Influence of Family on Female Mobile Bully-Victim behaviour (Characteristics)

Variable	Analysis of Variance Marked effects are significant at p < 0.05							
	SS	df	MS	SS	df	MS	F	p
(I)BEENMADEFUNOF	21.81643	4	5.45411	299.9931	184	1.630397	3.345264	0.011342
(II)KNOWNEMAILMADEYOUANGRY	44.72500	4	11.18125	249.6545	190	1.313971	8.509510	0.000002
(III)UNKNOWNEMAILMADEYOUANGRY	11.56663	4	2.89166	188.8826	182	1.037816	2.786290	0.027991
(IV)HARDTIMEPHONECALL	6.65036	4	1.66259	237.6507	191	1.244244	1.336225	0.257976
(V)UNCOMFORTABLESOCIALMEDIAPOST	4.53334	4	1.13333	197.8088	185	1.069237	1.059947	0.377755
(VI)UNCOMFORTABLEWEBPAGEPOST	12.96963	4	3.24241	227.1528	191	1.189282	2.726358	0.030655
(XIII)UNCOMFORTABLEIM	43.52995	4	10.88249	308.1903	188	1.639310	6.638456	0.000051
(VII) BULLIEDONLINE	13.39865	4	3.34966	194.9398	190	1.025999	3.264782	0.012862
(XIV) ONLINETHREAT	4.59428	4	1.14857	130.1829	188	0.692462	1.658674	0.161370
(XV) POSTEDONLINE	5.98092	4	1.49523	188.3646	186	1.012713	1.476459	0.211018
(VIII)POSTEDABOUTSOMEONE	10.41798	4	2.60450	231.4978	185	1.251340	2.081366	0.084953
(IX) SENTSMS	0.41721	4	0.10430	260.7426	189	1.379590	0.075604	0.989570
(X) SENTEMAIL	9.18078	4	2.29520	185.4297	185	1.002323	2.289876	0.061401
(XI)POSTEDONTHEIRSOCIALMEDIA	8.98556	4	2.24639	135.2631	188	0.719485	3.122220	0.016233
(XII)PICTUREWITHOUTPERMISSION	17.79203	4	4.44801	263.5946	189	1.394680	3.189268	0.014551

KEY – Values significant at 0 .05 or less are shown in red

Table 4. 18— Breakdown Table of Descriptive Statistics by Family

FAMILY	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
1	1.886364	44	0.969678	2.956522	46	1.365553	2.044444	45	1.347650
2	2.247191	89	1.227348	2.296703	91	1.090306	1.623529	85	0.723360
3	3.040000	25	1.881489	3.370370	27	0.966681	2.148148	27	1.166972
4	2.105263	19	1.328940	2.105263	19	0.936586	1.944444	18	1.211330
5	2.250000	12	0.965307	1.666667	12	1.302678	1.333333	12	0.651339
All Grps	2.253968	189	1.308340	2.543590	195	1.231836	1.812834	187	1.038116

FAMILY	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)	UNCOMFORTABLEIM (Mean)	UNCOMFORTABLEIM (N)	UNCOMFORTABLEIM (SD)	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)
1	2.217391	46	1.459270	2.695652	46	1.244893	1.586957	46	0.858321
2	1.582418	91	0.907572	2.433333	90	1.272439	1.977778	90	1.141434
3	1.821429	28	0.983327	3.785714	28	1.524058	1.357143	28	0.731021
4	1.631579	19	0.830698	2.526316	19	1.123903	1.473684	19	1.123903
5	1.666667	12	1.302678	2.100000	10	0.994429	1.333333	12	0.887625
All Grps	1.775510	196	1.109683	2.683938	193	1.353468	1.707692	195	1.036296

FAMILY	ONLINETHREAT (Mean)	ONLINETHREAT (N)	ONLINETHREAT (SD)	POSTEDONTHEIRSOCIALMEDIA (Mean)	POSTEDONTHEIRSOCIALMEDIA (N)	POSTEDONTHEIRSOCIALMEDIA (SD)	PICTUREWITHOUTPERMISSION (Mean)	PICTUREWITHOUTPERMISSION (N)	PICTUREWITHOUTPERMISSION (SD)
1	1.282609	46	0.910752	1.173913	46	0.383223	2.130435	46	1.469825
2	1.450549	91	0.909991	1.625000	88	0.875103	1.775281	89	1.063365
3	1.178571	28	0.547964	1.607143	28	1.257254	2.142857	28	1.353029
4	1.000000	19	0.000000	1.736842	19	0.933459	1.157895	19	0.374634
5	1.555556	9	1.130388	1.166667	12	0.577350	1.416667	12	1.164500
All Grps	1.331606	193	0.837833	1.497409	193	0.866773	1.829897	194	1.207461

4.4.4 Hypothesis 4

H4: Female Mobile Bully-Victim Behaviour will differ by ethnicity

In H4, the prediction was that Female Mobile Bully-Victim Behaviours will differ by ethnicity. ANOVA was conducted to test if there are differences in mean scores on Female Mobile Bully-Victim Behaviours characteristics by different ethnic groups that the students hail from. The results in Table 4.19 show that there are significant differences in the mean scores on some Bullying and victimization characteristics (see I, II, III, VI, VII, XI, XII, XIII). The detailed breakdown of the mean scores of significant characteristics is shown in Table 4.20 (Full breakdown descriptives are in Appendix K). H4 is strongly supported given that significant differences were observed across most behaviours measured.

Table 4. 19— Influence of Ethnicity on Female Mobile Bully-Victim behaviour (Characteristics)

Variable	Analysis of Variance Marked effects are significant at p < 0.05							
	SS	df	MS	SS	df	MS	F	p
(I)BEENMADEFUNOF	42.83916	4	10.70979	266.6165	164	1.625710	6.587761	0.000061
(II)KNOWNEMAILMADEYOUANGRY	31.46896	4	7.86724	220.2453	170	1.295561	6.072460	0.000137
(III)UNKNOWNEMAILMADEYOUANGRY	19.77642	4	4.94411	135.2413	164	0.824642	5.995455	0.000158
(IV)HARDTIMEPHONECALL	21.34468	4	5.33617	201.5133	171	1.178440	4.528163	0.001678
(V)UNCOMFORTABLESOCIALMEDIAPOST	8.35001	4	2.08750	196.9735	165	1.193779	1.748651	0.141726
(VI)UNCOMFORTABLEWEBPAGEPOST	34.32579	4	8.58145	191.1060	171	1.117579	7.678604	0.000010
(XII)UNCOMFORTABLEIM	60.91680	4	15.22920	261.8925	168	1.558884	9.769299	0.000000
(VII) BULLIEDONLINE	8.11403	4	2.02851	178.6631	170	1.050959	1.930148	0.107612
(XIV) ONLINETHREAT	11.65075	4	2.91269	120.4071	168	0.716709	4.063978	0.003593
(XV) POSTEDONLINE	28.06915	4	7.01729	154.3727	167	0.924387	7.591285	0.000012
(VIII)POSTEDABOUTSOMEONE	15.96906	3	5.32302	203.0251	166	1.223043	4.352278	0.005570
(IX) SENTSMS	20.65257	4	5.16314	240.1520	169	1.421018	3.633411	0.007219
(X) SENTEMAIL	20.46757	4	5.11689	150.6207	165	0.912853	5.605387	0.000296
(XI)POSTEDONTHEIRSOCIALMEDIA	3.18313	4	0.79578	119.6492	168	0.712198	1.117361	0.350066
(XII)PICTUREWITHOUTPERMISSION	33.28280	4	8.32070	229.8494	169	1.360056	6.117913	0.000127

KEY — Values significant at 0.05 or less are shown in red

Table 4. 20— Breakdown Table of Descriptive Statistics by Ethnicity

ETHNIC	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
1	2.000000	29	1.336306	2.906250	32	1.227622	1.814815	27	1.144789
2	1.981308	107	1.165392	2.254545	110	1.087345	1.633028	109	0.812638
3	3.000000	3	0.000000	3.000000	3	0.000000	4.000000	3	0.000000
4	4.000000	4	0.000000	1.000000	4	0.000000	1.000000	4	0.000000
5	3.115385	26	1.704745	3.115385	26	1.336471	1.923077	26	1.092633
All Grps	2.224852	169	1.357202	2.485714	175	1.202761	1.733728	169	0.960586

ETHNIC	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)	UNCOMFORTABLEIM (Mean)	UNCOMFORTABLEIM (N)	UNCOMFORTABLEIM (SD)
1	2.593750	32	1.266424	2.500000	32	1.391217	2.875000	32	1.408500
2	3.234234	111	1.017617	1.540541	111	0.892227	2.435185	108	1.284510
3	2.000000	3	0.000000	1.000000	3	0.000000	2.000000	3	0.000000
4	3.000000	4	0.000000	1.000000	4	0.000000	2.000000	4	0.000000
5	3.653846	26	1.231010	2.307692	26	1.319674	4.076923	26	0.976650
All Grps	3.153409	176	1.128483	1.806818	176	1.134981	2.745665	173	1.369963

ETHNIC	ONLINETHREAT (Mean)	ONLINETHREAT (N)	ONLINETHREAT (SD)	POSTEDONLINE (Mean)	POSTEDONLINE (N)	POSTEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)
1	1.312500	32	0.997982	1.625000	32	1.008032	2.093750	32	1.058281
2	1.361111	108	0.814108	1.504587	109	0.789091	1.864865	111	1.124007
3	1.000000	3	0.000000	1.000000	3	0.000000	1.000000	3	0.000000
4	3.000000	4	0.000000	1.000000	4	0.000000		0	
5	1.230769	26	0.862911	2.625000	24	1.555146	2.666667	24	1.129319
All Grps	ONLINETHREAT (Mean)	ONLINETHREAT (N)	ONLINETHREAT (SD)	1.662791	172	1.032914	2.005882	170	1.138342

ETHNIC	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)	SENTEMAIL (Mean)	SENTEMAIL (N)	SENTEMAIL (SD)	PICTUREWITHOUTPERMISSION (Mean)	PICTUREWITHOUTPERMISSION (N)	PICTUREWITHOUTPERMISSION (SD)
1	3.375000	32	1.128802	1.741935	31	1.153769	1.656250	32	1.095721
2	2.522523	111	1.189705	1.537037	108	0.858448	1.648649	111	1.100815
3	3.000000	3	0.000000	3.000000	3	0.000000	1.000000	3	0.000000
4	3.000000	4	0.000000	2.000000	4	0.000000	1.000000	4	0.000000
5	3.041667	24	1.398109	2.416667	24	1.176460	2.833333	24	1.606148
All Grps	2.770115	174	1.227820	1.735294	170	1.006159	1.787356	174	1.233286

4.4.5 Hypothesis 5

H5: Female Mobile Bully-Victim Behaviour will differ across the school type

In H5, the prediction was that Female Mobile Bully-Victim Behaviours will differ by type of school. ANOVA was conducted to test if there are differences in mean scores on Female Mobile Bully-Victim Behaviours characteristics by different schools surveyed. The results in Table 4.21 show that there are significant differences in the mean scores on some Bullying and victimisation characteristics (see II, V, VI, VII, IX, X, XIV, XVI). The detailed breakdown of the mean scores of significant characteristics is shown in Table 4.22 (Full breakdown descriptives are in Appendix K). H5 is partially supported given that significant differences were observed across some but not all behaviours measured.

Table 4. 21— Influence of School on Female Mobile Bully-Victim behaviour (Characteristics)

	Analysis of Variance Marked effects are significant at p < 0.05							
Variable	**SS**	**df**	**MS**	**SS**	**df**	**MS**	**F**	**p**
(I)BEENMADEFUNOF	21.75597	7	3.107996	304.6972	184	1.655963	1.876851	0.075572
(II)KNOWNEMAILMADEYOUANGRY	25.42409	7	3.632012	271.7527	190	1.430277	2.539376	0.016069
(III)UNKNOWNEMAILMADEYOUANGRY	5.12301	7	0.731859	196.0559	182	1.077230	0.679389	0.689378
(IV)HARDTIMEPHONECALL	6.91923	7	0.988462	245.1411	191	1.283461	0.770153	0.613023
(V)UNCOMFORTABLESOCIALMEDIAPOST	17.13614	7	2.448019	206.5737	185	1.116615	2.192358	0.036773
(VI)UNCOMFORTABLEWEBPAGEPOST	19.85741	7	2.836772	223.8511	191	1.171995	2.420463	0.021359
(XIII)UNCOMFORTABLEIM	14.89704	7	2.128149	345.1999	188	1.836170	1.159015	0.328401
(VII) BULLIEDONLINE	15.32544	7	2.189348	194.4927	190	1.023646	2.138774	0.041504
(XVI)AFRAIDTOGOONLINE	12.46663	7	1.780948	133.6784	185	0.722586	2.464686	0.019326
(XIV) ONLINETHREAT	22.33558	7	3.190797	112.7665	188	0.599822	5.319577	0.000014
(XV) POSTEDONLINE	12.88874	7	1.841248	182.6422	186	0.981947	1.875099	0.075795
(VIII)POSTEDABOUTSOMEONE	2.99476	7	0.427822	242.0001	185	1.308108	0.327054	0.940989
(IX) SENTSMS	21.60576	7	3.086537	249.1151	189	1.318069	2.341711	0.025807
(X) SENTEMAIL	18.80771	7	2.686816	177.8451	185	0.961325	2.794909	0.008685
(XI)POSTEDONTHEIRSOCIALMEDIA	2.16220	7	0.308886	142.8174	188	0.759667	0.406607	0.897443
(XII)PICTUREWITHOUTPERMISSION	16.72159	7	2.388799	268.0804	189	1.418415	1.684133	0.115030

KEY — Values significant at 0 .05 or less are shown in red

Table 4. 22— Breakdown Table of Descriptive Statistics by School

SCHOOLCODE	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)
1	1.625000	8	1.407886	2.000000	8	1.069045	1.875000	8	1.457738
2	2.741935	31	1.237410	1.620690	29	1.082781	1.741935	31	1.237410
3	1.800000	10	0.918937	1.700000	10	0.823273	2.000000	10	1.154701
4	2.000000	1		4.000000	1		5.000000	1	
5	3.333333	3	2.081666	3.666667	3	1.154701	3.333333	3	1.527525
6	2.750000	28	0.967050	1.857143	28	1.112697	1.678571	28	0.818923
7	2.000000	23	1.243163	1.695652	23	0.926125	1.541667	24	0.883627
8	2.680851	94	1.211173	1.758242	91	1.078483	1.776596	94	1.089088
All Grps	2.540404	198	1.228215	1.792746	193	1.079424	1.783920	199	1.109437

SCHOOLCODE	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	AFRAIDTOGOONLINE (Mean)	AFRAIDTOGOONLINE (N)	AFRAIDTOGOONLINE (SD)	ONLINETHREAT (Mean)	ONLINETHREAT (N)	ONLINETHREAT (SD)
1	1.142857	7	0.377964	1.714286	7	0.951190	1.625000	8	0.916125
2	1.516129	31	0.926318	1.483871	31	0.889605	1.133333	30	0.434172
3	1.400000	10	0.516398	1.111111	9	0.333333	1.300000	10	0.674949
4	4.000000	1		4.000000	1		4.000000	1	
5	3.000000	3	2.000000	2.666667	3	2.081666	3.000000	3	2.000000
6	1.821429	28	1.090483	1.444444	27	0.697982	1.214286	28	0.629941
7	1.833333	24	1.049500	1.500000	24	1.063219	1.708333	24	1.398109
8	1.691489	94	1.037227	1.428571	91	0.790820	1.217391	92	0.608115
All Grps	1.696970	198	1.032021	1.476684	193	0.872452	1.326531	196	0.832365

SCHOOLCODE	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)	SENTEMAIL (Mean)	SENTEMAIL (N)	SENTEMAIL (SD)			
1	2.000000	8	0.925820	1.250000	8	0.462910			
2	2.741935	31	0.929794	1.833333	30	0.985527			
3	2.100000	10	0.737865	1.444444	9	0.881917			
4	1.000000	1		1.000000	1				
5	2.000000	3	1.000000	1.666667	3	1.154701			
6	3.111111	27	1.250641	2.259259	27	1.059484			
7	2.500000	24	1.503619	1.250000	24	0.896854			
8	2.935484	93	1.130664	1.934066	91	1.008874			
All Grps	2.771574	197	1.175257	1.818653	193	1.012044			

4.4.6 Hypothesis 6

H6: Female Mobile Bully-Victim Behaviour is influenced by type of Intervention (teacher, family or peers)

In H6, the prediction was that Female Mobile Bully-Victim Behaviours will differ by type of Intervention from teachers, family and friends. ANOVA was conducted to test if there are differences in mean scores on Female Mobile Bully-Victim Behaviours characteristics by different student perceptions of teacher interventions. The results in Table 4.23 show that there are significant differences in the mean scores on some Bullying and victimisation characteristics (see I, II, III, V, VI, VII, VIII, IX, X, XI, XII, XIII). The detailed breakdown of the mean scores of significant characteristics is shown in Table 4.24 (Full breakdown descriptives are in Appendix K).

Table 4. 23—Influence of Teacher Intervention on Female Mobile Bully-Victim behaviour (Characteristics)

Variable	Analysis of Variance Marked effects are significant at p < 0.05							
	SS	df	MS	SS	df	MS	F	p
(I) BEENMADEFUNOF	42.58892	4	10.64723	255.2732	169	1.510492	7.048849	0.000028
(II) KNOWNEMAILMADEYOUANGRY	18.93239	4	4.73310	238.1067	174	1.368429	3.458781	0.009526
(III) UNKNOWNEMAILMADEYOUANGRY	15.04509	4	3.76127	175.0936	168	1.042224	3.608890	0.007521
(IV) HARDTIMEPHONECALL	6.89974	4	1.72494	218.8656	174	1.257848	1.371339	0.245813
(V) UNCOMFORTABLESOCIALMEDIAPOST	27.26573	4	6.81643	170.9424	168	1.017514	6.699103	0.000050
(VI) UNCOMFORTABLEWEBPAGEPOST	26.42170	4	6.60543	197.7235	174	1.136342	5.812884	0.000205
(XIII) UNCOMFORTABLEIM	37.43307	4	9.35827	273.6067	171	1.600039	5.848774	0.000196
(VII)BULLIEDONLINE	32.34590	4	8.08647	164.5480	174	0.945678	8.550981	0.000003
(XVI) AFRAIDTOGOONLINE	3.43041	4	0.85760	135.8066	168	0.808373	1.060900	0.377599
(XIV) ONLINETHREAT	5.11267	4	1.27817	124.7453	171	0.729505	1.752104	0.140802
(XV) POSTEDONLINE	6.67511	4	1.66878	174.4548	172	1.014272	1.645295	0.165060
(VIII) POSTEDABOUTSOMEONE	24.73321	4	6.18330	204.2154	170	1.201267	5.147319	0.000613
(IX) SENTSMS	15.14282	4	3.78570	225.5276	174	1.296135	2.920763	0.022687
(X) SENTEMAIL	19.07454	4	4.76864	134.3197	170	0.790116	6.035360	0.000145
(XI) POSTEDONTHEIRSOCIALMEDIA	12.22918	4	3.05729	126.2484	173	0.729759	4.189455	0.002905
(XII) PICTUREWITHOUTPERMISSION	37.02121	4	9.25530	218.5989	174	1.256316	7.367020	0.000017

KEY – Values significant at 0 .05 or less are shown in red

Table 4. 24—Breakdown Table of Descriptive Statistics by Teacher Intervention

TEACHERSINTERVENE	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
1	1.411765	17	0.870260	2.555556	18	1.041618	1.941176	17	1.248529
2	2.882353	17	1.166316	2.235294	17	0.903425	1.470588	17	0.799816
3	1.793103	58	1.072113	2.344828	58	1.291697	1.679245	53	0.893859
4	2.771429	35	1.330319	2.500000	36	1.298351	1.583333	36	0.769972
5	2.468085	47	1.442387	3.100000	50	1.035098	2.260000	50	1.258603
All Grps	2.241379	174	1.312153	2.597765	179	1.201682	1.832370	173	1.051407

TEACHERSINTERVENE	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)	UNCOMFORTABLEIM (Mean)	UNCOMFORTABLEIM (N)	UNCOMFORTABLEIM (SD)
1	2.437500	16	1.314978	2.611111	18	1.685191	1.500000	18	1.043185
2	2.470588	17	0.943242	2.294118	17	1.159995	2.764706	17	1.200490
3	1.581818	55	1.012714	1.431034	58	0.900528	2.368421	57	1.079543
4	2.000000	36	1.069045	1.527778	36	0.774084	2.638889	36	1.290687
5	1.367347	49	0.858630	1.840000	50	1.113186	3.104167	48	1.519232
All Grps	1.774566	173	1.073486	1.765363	179	1.122160	2.573864	176	1.333180

TEACHERSINTERVENE	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)
1	1.888889	18	1.182663	1.444444	18	0.704792	2.388889	18	1.092159
2	2.941176	17	1.344925	2.117647	17	0.696631	3.294118	17	1.212678
3	1.655172	58	1.018284	1.724138	58	1.005129	2.551724	58	0.920953
4	1.361111	36	0.542627	2.000000	32	1.319824	2.611111	36	1.419814
5	1.540000	50	0.930438	2.540000	50	1.248836	3.060000	50	1.132272
All Grps	1.709497	179	1.051734	2.017143	175	1.147082	2.759777	179	1.162790

TEACHERSINTERVENE	SENTEMAIL (N)	SENTEMAIL (SD)	POSTEDONTHEIRSOCIALMEDIA (Mean)	POSTEDONTHEIRSOCIALMEDIA (N)	POSTEDONTHEIRSOCIALMEDIA (SD)	SENTEMAIL (N)	PICTUREWITHOUTPERMISSION (Mean)	PICTUREWITHOUTPERMISSION (N)	PICTUREWITHOUTPERMISSION (SD)
1	18	0.427793	1.222222	18	0.548319	18	1.666667	18	1.371989
2	17	1.159995	1.625000	16	0.500000	17	1.352941	17	0.606339
3	55	0.798568	1.206897	58	0.486975	55	1.637931	58	0.911876
4	35	0.742469	1.750000	36	1.204159	35	1.500000	36	1.055597
5	50	1.073807	1.760000	50	1.041192	50	2.560000	50	1.387407
All Grps	175	0.938923	1.511236	178	0.884511	175	1.843575	179	1.198361

KEY	
LEVEL OF INTERVENTION	MEANING
1	Strongly Disagree
2	Disagree
3	Somehow (Fairly) Agree
4	Agree
5	Strongly Agree

ANOVA was conducted to test if there are differences in mean scores on Female Mobile Bully-Victim Behaviours characteristics by different student perceptions of family interventions. The results in Table 4.25 show that there are significant differences in the mean scores on some Bullying and victimisation characteristics (see I, II, III, V, XV, XVI, IX). The detailed breakdown of the mean scores of significant characteristics is shown in Table 4.26 (Full breakdown descriptives are in Appendix K).

Table 4. 25—Influence of Family Intervention on Female Mobile Bully-Victim behaviour (Characteristics)

Variable	Analysis of Variance Marked effects are significant at p < 0.05							
	SS	df	MS	SS	df	MS	F	p
(I) BEENMADEFUNOF	26.84452	4	6.711130	248.6860	159	1.564063	4.290832	0.002527
(II) KNOWNEMAILMADEYOUANGRY	18.76117	4	4.690293	220.0900	163	1.350246	3.473659	0.009416
(III) UNKNOWNEMAILMADEYOUANGRY	17.36464	4	4.341160	165.6477	157	1.055081	4.114529	0.003374
(IV) HARDTIMEPHONECALL	8.17800	4	2.044499	204.6553	163	1.255554	1.628364	0.169538
(V)UNCOMFORTABLESOCIALMEDIAPOST	22.51745	4	5.629363	170.5690	157	1.086427	5.181541	0.000602
(VI) UNCOMFORTABLEWEBPAGEPOST	6.63029	4	1.657573	205.6554	163	1.261690	1.313772	0.267027
(XIII) UNCOMFORTABLEIM	7.43950	4	1.859874	288.1605	160	1.801003	1.032688	0.392155
(VII) BULLIEDONLINE	5.62238	4	1.405594	187.4967	163	1.150286	1.221951	0.303538
(XVI) AFRAIDTOGOONLINE	23.23384	4	5.808460	114.3949	162	0.706141	8.225633	0.000005
(XIV) ONLINETHREAT	5.19692	4	1.299229	112.4152	160	0.702595	1.849187	0.122014
(XV) POSTEDONLINE	10.29246	4	2.573115	166.4846	161	1.034066	2.488347	0.045468
(VIII) POSTEDABOUTSOMEONE	2.19593	4	0.548984	209.8041	163	1.287142	0.426514	0.789344
(IX) SENTSMS	13.01109	4	3.252772	216.6972	163	1.329431	2.446740	0.048484
(X) SENTEMAIL	6.62917	4	1.657292	142.9466	160	0.893416	1.855006	0.120947
(XI) POSTEDONTHEIRSOCIALMEDIA	3.01639	4	0.754099	132.6962	162	0.819112	0.920629	0.453435
(XII) PICTUREWITHOUTPERMISSION	8.19321	4	2.048301	240.1818	163	1.473508	1.390085	0.239646

KEY—Values significant at 0 .05 or less are shown in red

Table 4. 26— Breakdown Table of Descriptive Statistics by Family Intervention

Breakdown Table of Descriptive Statistics Smallest N for any variable: 162;
Include condition: Bully-victim >= 2.5

FAMILYINTERVENES	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
1	1.777778	9.000000	0.971825	1.333333	9.000000	0.707107	1.333333	9.000000	0.500000
2	2.200000	35.000000	1.367694	2.527778	36.000000	1.319873	2.000000	33.000000	1.030776
3	1.645161	31.000000	0.838586	2.647059	34.000000	1.124988	1.562500	32.000000	0.800705
4	2.148936	47.000000	1.459284	2.872340	47.000000	1.095783	1.659574	47.000000	0.787859
5	2.809524	42.000000	1.194256	2.738095	42.000000	1.190604	2.341463	41.000000	1.424952
All Grps	2.213415	164.00000	1.300143	2.636905	168.00000	1.195929	1.864198	162.00000	1.066172

FAMILYINTERVENES	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	AFRAIDTOGOONLINE (Mean)	AFRAIDTOGOONLINE (N)	AFRAIDTOGOONLINE (SD)	POSTEDONLINE (Mean)	POSTEDONLINE (N)	POSTEDONLINE (SD)
1	2.000000	9.000000	1.118034	1.888889	9.000000	1.166667	1.714286	7.000000	0.755929
2	2.028571	35.000000	1.248192	1.333333	36.000000	0.676123	2.027778	36.000000	1.463579
3	1.406250	32.000000	0.756024	1.147059	34.000000	0.500445	1.852941	34.000000	1.076818
4	2.181818	44.000000	1.262569	1.361702	47.000000	0.845076	1.404255	47.000000	0.741900
5	1.333333	42.000000	0.721336	2.121951	41.000000	1.076920	1.500000	42.000000	0.773021
All Grps	1.765432	162.00000	1.095123	1.526946	167.00000	0.910543	1.668675	166.00000	1.035073

FAMILYINTERVENES	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)
1	2.444444	9.000000	1.333333
2	3.138889	36.000000	1.312637
3	2.647059	34.000000	0.917254
4	3.000000	47.000000	1.318761
5	2.452381	42.000000	0.916046
All Grps	2.791667	168.00000	1.172817

KEY	
LEVEL OF INTERVENTION	**MEANING**
1	Strongly Disagree
2	Disagree
3	Somehow (Fairly) Agree
4	Agree
5	Strongly Agree

ANOVA was conducted to test if there are differences in mean scores on Female Mobile Bully-Victim Behaviours characteristics by different student perceptions of friend interventions. The results in Table 4.27 show that there are significant differences in the mean scores on some Bullying and victimisation characteristics (see II, III, IV, VI, VII, VIII, IX, X, XI). The detailed breakdown of the mean scores of significant characteristics is shown in Table 4.28 (Full breakdown descriptives are in Appendix K).

Table 4. 27— Influence of Friend Intervention on Female Mobile Bully-Victim behaviour (Characteristics)

Variable	Analysis of Variance Marked effects are significant at p < 0.05							
	SS	df	MS	SS	df	MS	F	p
(II) KNOWNEMAILMADEYOUANGRY	21.41753	4	5.354383	190.3873	159	1.197405	4.471657	0.001886
(III) UNKNOWNEMAILMADEYOUANGRY	11.42920	4	2.857299	126.9062	153	0.829453	3.444801	0.009990
(IV) HARDTIMEPHONECALL	24.40769	4	6.101922	180.0984	159	1.132694	5.387086	0.000429
(V) UNCOMFORTABLESOCIALMEDIAPOST	1.97485	4	0.493712	186.8859	153	1.221477	0.404193	0.805417
(VI) UNCOMFORTABLEWEBPAGEPOST	14.43989	4	3.609973	191.2857	159	1.203055	3.000672	0.020210
(XIII) UNCOMFORTABLEIM	11.81063	4	2.952657	285.4689	156	1.829929	1.613537	0.173532
(VII) BULLIEDONLINE	15.70146	4	3.925366	175.3961	159	1.103120	3.558421	0.008255
(XVI) AFRAIDTOGOONLINE	2.58937	4	0.647343	122.1223	158	0.772926	0.837522	0.503257
(XIV) ONLINETHREAT	2.65397	4	0.663492	101.0355	156	0.647663	1.024440	0.396528
(XV) POSTEDONLINE	4.81935	4	1.204838	169.1806	157	1.077584	1.118093	0.349988
(VIII) POSTEDABOUTSOMEONE	13.77289	4	3.443222	203.0747	159	1.277199	2.695916	0.032814
(IX) SENTSMS	34.45077	4	8.612693	198.2017	159	1.246551	6.909216	0.000037
(X) SENTEMAIL	20.75558	4	5.188896	123.3065	156	0.790426	6.564678	0.000066
(XI) POSTEDONTHEIRSOCIALMEDIA	11.56423	4	2.891056	123.0615	158	0.778871	3.711858	0.006454
(XII) PICTUREWITHOUTPERMISSION	6.92633	4	1.731582	241.3846	159	1.518142	1.140593	0.339443

KEY – Values significant at 0 .05 or less are shown in red

Table 4. 28— Breakdown Table of Descriptive Statistics by Friend Intervention

FRIENDSINTERVENE	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)
1	1.960000	25	1.098484	1.560000	25	0.916515	3.640000	25	1.075484
2	2.703704	27	1.409168	1.518519	27	0.642733	2.703704	27	1.265361
3	2.829787	47	0.892460	2.170213	47	1.166920	2.787234	47	1.061913
4	2.333333	42	1.004057	1.609756	41	0.737497	2.904762	42	0.932071
5	3.086957	23	1.202764	1.722222	18	0.826442	3.652174	23	1.027295
All Grps	2.585366	164	1.139919	1.765823	158	0.938679	3.054878	164	1.120107
FRIENDSINTERVENE	**UNCOMFORTABLEWEBPAGEPOST (Mean)**	**UNCOMFORTABLEWEBPAGEPOST (N)**	**UNCOMFORTABLEWEBPAGEPOST (SD)**	**BULLIEDONLINE (Mean)**	**BULLIEDONLINE (N)**	**BULLIEDONLINE (SD)**	**POSTEDABOUTSOMEONE (Mean)**	**POSTEDABOUTSOMEONE (N)**	**POSTEDABOUTSOMEONE (SD)**
1	1.760000	25	1.300000	1.240000	25	0.663325	1.440000	25	1.003328
2	1.444444	27	0.506370	1.296296	27	0.608581	2.000000	27	1.300887
3	1.446809	47	0.829052	1.978723	47	1.132319	2.297872	47	1.266884
4	2.166667	42	1.305087	1.904762	42	1.185471	2.190476	42	1.017843
5	1.869565	23	1.391675	1.869565	23	1.324742	1.869565	23	0.919701
All Grps	1.737805	164	1.123441	1.719512	164	1.082764	2.030488	164	1.153409
FRIENDSINTERVENE	**SENTSMS (Mean)**	**SENTSMS (N)**	**SENTSMS (SD)**	**SENTEMAIL (Mean)**	**SENTEMAIL (N)**	**SENTEMAIL (SD)**	**POSTEDONTHEIRSOCIALMEDIA (Mean)**	**POSTEDONTHEIRSOCIALMEDIA (N)**	**POSTEDONTHEIRSOCIALMEDIA (SD)**
1	1.920000	25	1.115049	1.200000	25	0.645497	1.160000	25	0.553775
2	2.703704	27	1.488800	1.370370	27	0.687702	1.666667	27	1.330124
3	2.914894	47	0.996293	2.127660	47	0.991639	1.638298	47	0.845076
4	3.333333	42	1.096928	1.976190	42	1.023816	1.780488	41	0.935740
5	2.478261	23	0.845822	1.600000	20	0.820783	1.086957	23	0.288104
All Grps	2.774390	164	1.194703	1.751553	161	0.948888	1.527607	163	0.911605

KEY	
LEVEL OF INTERVENTION	**MEANING**
1	Strongly Disagree
2	Disagree
3	Somehow (Fairly) Agree
4	Agree
5	Strongly Agree

H6 is strongly supported for friend intervention given that significant differences were observed across most behaviours measured while for parent and teacher interventions it is only partially supported.

The survey results for the first and second hypothesis shed light on the side of the spectrum female mobile bully-victim characteristics leans harder on. This is useful in

understanding what targeted interventions to proffer to the problem. Results for the third hypothesis explained family dynamics in female mobile bully-victim characteristics for our research subjects. Ethnicity found distinguishing characteristics among the different races studied. While some unexpected results were found with type of school during the study, some plausible explanations were prescribed. Interventions from different parties showed different results which were discussed further in the Discussion of Findings chapter (6). The researcher expands on the findings, explaining plausible reasons for the results observed in this section of the study.

CHAPTER 5: ARTEFACT DEVELOPMENT AND EVALUATION

5.1 Introduction

In this chapter, the discourse will be about addressing the second objective of this research, which is to design a digital intervention to address mobile bullying among the high school learners. The aim of this is to design and develop a mobile app as an anti-bullying intervention for high school students in South Africa. From the literature review in Chapter 2, findings recommended to proffer encompassing solutions and not just punitive measures for reported cases. Literature also recommends using every intervention opportunity to teach the intended users, as suggested by (Graham, 2010) behaviours that steered away from bullying. These suggested features will be embedded to help report cyberbullying, provide information to victims of bullying which will also be useful for bystanders to help fight bullying and support victims.

The hard task will be to adequately balance the design communication with the demonstration of its use in achieving knowledge about the research problem. Following the principles of Design Science laid down by the chosen Design School of Thought will guide the achievement of this objective. Much has been discussed in preceding chapters about the mobile bullying issue; however, to demonstrate the need for this study's proposed intervention, the existing trends are briefly discussed. Designing for school-aged adolescents can easily become tricky, as they, being digital natives and technology experts, can devise alternative motives than intended for the use of technology. This means designing with the intended users such as in participatory design (Yip et al., 2013) was considered for this study.

Many schools have taken up a school-based approach to tackling mobile bullying with rigorous evaluations conducted to measure the impact but too many differing conclusions exist (Menesini & Salmivalli, 2017; Popovac & Fine, 2018; Vreeman et.al., 2007; Zych et al., 2017). Suggestions on how to improve some of these interventions have also been presented (Stevens et al., 2001; Pearce et al., 2011; Paul et al., 2012; Faccio et al., 2014; Popovac & Fine, 2018) highlighting the importance of focusing on individual's behaviours when online among other considerations. This motivates, in the researcher's opinion, for a digital intervention since it directly addresses this suggestion, being a tool for online interaction.

Although digital technologies can have some unintended consequences, it can be purposefully utilized to enhance users' experience. Several techniques, such as augmentation, feedback, and goal seeking, are employed and embedded in the plethora of existing technologies available today, all directed towards ethical and productive use from both providers and the end users. Virtual Reality (VR) has been used in augmentation to evaluate bystander responses in medical emergencies (Buckler et al., 2019) and other benefits such as improved learning motivation, engagement, enjoyment of tasks and understanding of information have been accomplished by augmentation and VR technology (Das et al., 2017; Gómez-Puerta, et al., 2019). Digital tools have also been used to teach goal seeking skills which is an

intervention that distracts from delinquent behaviours (Barbieri, 2016; Humphreys et al., 2015)

Technology is in many ways assistive and can foster self-realising experiences, improve collaboration and help achieve communication and support as seen in business solutions. Virtual reality is another technology, among others (serious gaming, video games, etc.) used to engage users due to its ability to capture attention and has the potential of promoting a positive emotion from its users (Argenton et. al, 2016). In Education, digital technology interventions have been used to teach behavioural and social skills with the intention of positive change towards violence (Bowen et al., 2014; Klimmt, 2009).

High school students experiencing mobile bullying can be considered as domain experts in the topic. They were thus highly considered in the build and design considerations of the artefact as some previous studies have done (Fitton et al., 2014; Nicolalde & Brennan, 2014). The final artefact would be the determinant of the theme outlined in Table 5.1 below (Bowler et al., 2014) that these young designers direct the process to. It will be useful in prescribing the type of intervention that may suit the context of intervening mobile bullying in high schools in South Africa.

Table 5. 1— Design Theme Recommendations (Bowler et al., 2014)

DESIGN THEMES	DESIGN PRINCIPLES	DESIGN FEATURES
Design for Reflection	Design that creates a pause, slowing users down so they can consider the ramifications of their actions	Pop-up warning about cyberbullying timed to last for ten seconds so that users can stop and think. Alert boxes with reflective questions anytime one clicks "like", asking the user "why do you like this?"
Design for Consequence	Design that ensures that there are consequences for bullying behaviour	Public shaming through a "bully button". Facebook-imposed restrictions as a punishment for bullying behaviour. Reports of inappropriate online behaviour sent to perpetrator's school.
Design for Empathy	Design that can make pain and sadness concrete, allowing bullies and their followers to see how victims suffer.	Design affordances such as sad music and emoticons. Design features that create a more emotive social media environment.
Design for Empowerment	Design features that redress an imbalance of power.	Adult interventions figure largely in this design feature. The system facilitates adult interaction, thereby lending the power of adults to the victim. Adults post supportive messages or warn the bullies that adults are watching.
Design for Fear	Design that harnesses the power of fear.	A "bully button" and the use of personalization, both of which send the message that "you're being watched".
Design for Attention	Design that catches the attention of bullies.	Anti-bullying messages that are prominent, loud, personalized, and even irritating. Bright colors should be used.
Design for Control and Suppression	Design that would trigger the suppression of content either by Facebook administrators or through an algorithm.	The system alerts Facebook staff when there are too many "likes" within a short period of time (a clue that something is going viral), resulting in the removal of offensive and cruel content. Facebook-imposed filters for offensive words.

This chapter forms an imperative part of this thesis to align with the requirement to produce an objective knowledge. This is achieved by providing high level details of the process of designing and evaluating the artefact (Anderson & Shattuck, 2012). The design phases are detailed further but first a background of Design Science and the type appropriated in this study is presented.

5.2 Introduction to Design Science

Design Science is defined in several ways but generally describes a process used in designing, building and evaluating an artefact which will be utilized in resolving an identified problem. The process targets pertinent real-life problems, whereby an artefact is created, and the product is appraised, to measure the value it has added to the problem situation and to explain the resulting implications (Becker et al., 2009; Lee et al., 2015; Orlikowski & Iacono, 2001). There are several approaches in Design Science research, but it generally consists iterations with one of various resulting artefacts either an instantiation (implementation), a prototype (model), a method or a construct (Baskerville & Myers, 2015; Voigt et al 2013; Wang et al., 2011).

One of the benefits of the design science approach is that it helps the researcher understand the problem that the artefact will address as well how feasible is the proposed artefact in addressing the problem (Hevner et al, 2004). Design Science (DS) is not random or out of sync with all other research approaches, rather, it has a framework to guide all the activities in the process. as shown in Figure 5.1 below. It appropriates all aspects of research: problem topic selection, review of literature, theory development, and clarification of research questions, research design, data collection and analysis, conclusion. The place of theory in DS demonstrated in the practice of reflection on the process which produced the design and thus improving on the execution of the solution (Peffers et al., 2018; Reeves, 2000). Design theory does not prescribe, rather the specification of the artefact is what prescribes the reason that an artefact can be used to solve a class of problems (Wieringa, 2010). It is this characteristic of producing knowledge that takes the place of theory and puts it at the centre of the method (Venable, 2006).

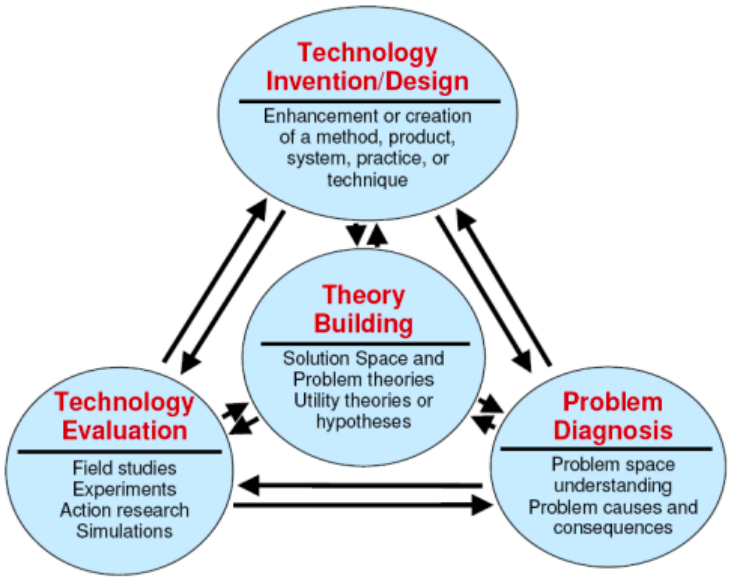


Figure 5. 1— Framework of Activity in Design Science Research (Edutech Wiki, 2019)

Over the years, Design Science has moved from being practised in a landmark approach (Walls et al., 1992; March & Smith, 1995) to a huge number of variants (Davis, 2013; Hevner et al., 2004; Hevner, 2017; Kuechler & Vaishnavi, 2012; Lee et al., 2012; Sein et al., 2011; Voigt et al., 2013; Wang et al., 2011; Yi & You, 2012) to guide the

achievement of conducting high quality Design Science Research. All of these different guidelines are similar, with the difference being in the sequence of steps and the resulting artefact, which could be a construct, an instantiation (implementation), a method or a prototype (model) (Orlikowski & Iacono, 2001). To guide the process of arriving at a digital intervention to help in addressing Female Mobile Bully-Victim Behaviour among high school students, this study will appropriate the Design Thinking approach in Figure 5.2 below with details of the process will be explained following.

Design Thinking methods are practised by design professionals and bodies such as Hasso Plattner Institute of Design (HPID D-School) founded in 2005 in Stanford University. The D-School has since inception championed several projects and in the process developed design practice guidelines that have been used in many Design Science projects (Brenner & Uebernickel, 2016; Fischer, 2015; Lindberg et al., 2010; Mayer ey al., 2018; Meinel & Leifer, 2010; Meinel & Leifer, 2012). It involves a five-phase process (*Understand, Define, Ideate, Prototype* and *Test*) and the appropriation of the process in this study is explained as follows.

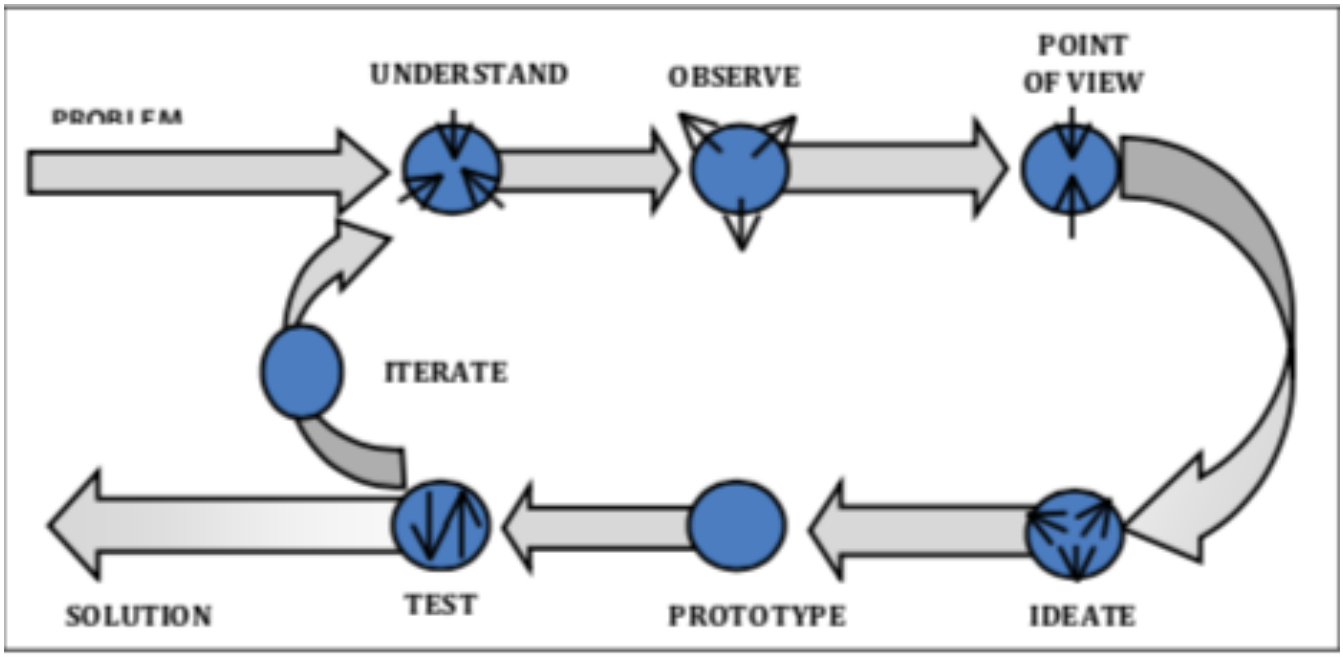


Figure 5. 2— Design Thinking process

5.2.1 Understand

This process starts with activities where the designer observes, listens and learns from an empathetic position from the individuals experiencing the problem. To better understand and appreciate the people, problem, needs and context, the designer gathers information using methods such as interviews, questionnaires and search of archived records.

In this study, the researcher has searched literature to understand mobile bullying from previous studies findings. This information was used to create a questionnaire that was administered to the high school students in Cape Town to understand mobile bullying from their perspective.

5.2.2 Define

The Define phase redefines the problem to context, providing a broad, unrefined representation to serve as a starting point for tackling the problem. Inputs from the data gathered form the initial understand phase can be used to refine the representation of the problem. This may entail broadening the problem space or constricting to a feasible workable aspect aiming at forming a (or several) point of view that is relevant to the specific context of the problem.

The researcher appropriated this phase for the study by designing the initial skeletal pilot app (Appendix C). The app had minimal features of reporting suggested from indications in literature about the need for digital interventions. The questionnaire and the app requested the participants to suggest features that would suit an intervention for mobile bullying.

5.2.3 Ideate

The purpose of this phase is to get creative ideas that can help to begin to address the problem articulated and redefined in the previous Define stage. It involves brainstorming sessions to collect diverse opinions and depending on how much time and resources available, there may be several solutions presented for prototyping.

To ideate the proposed mobile bullying solution, the researcher worked with students via the app to get inputs on what features could be embedded in the app. Due to limited time in the workshop sessions with students which lasted only one class period, where the teachers gave the researcher a chance to integrate with the students, feedback was encouraged via the app. Responses came in trickles, but with each suggestion that came, the features were noted for the design criteria of the app.

5.2.4 Prototype

This phase of the design process is where the ideas from the previous stages are transformed into physical models or instantiations. A prototype can typically take several forms including a role, video or sketch — the most crucial factor is that is must be in a tangible form. The first prototype can be a rough sketch that evolves through iterations the final most refined version of the model.

This study's prototype started with the pilot app and then evolved to a modified version and eventually to a final app. Thus, the app went through three iterations with the features being modified through each loop to include features that were suggested by the students who gave feedback on the app.

5.2.5 Test

The testing stage much like the prototyping stage is an iterative process where feedback received from those for whom the designer is designing is implemented. In a test phase, different outcomes may emerge: proceeding with the current prototype and evolve it into a higher version of the original; proceed by incorporating slight adjustments; return to the understand phase of the design process to reframe the idea; return to the point of view to begin to work with another idea that will be prototyped; or even restart the whole design thinking process all over.

Despite the challenges encountered in this study with getting responses from students, the testing phase took the researcher through minor modifications of the app features on each iteration until the final artefact was arrived at.

As mentioned earlier, all Design Science approaches have the same expectation of designing an artefact as a resolution to a problem, only the steps in arriving at the artefact differ. This particular method was particularly chosen because it has been proved useful in gathering insights about the needs of the intended users and also, the method has been widely used in the context of education like the current study (Thoring & Müller, 2011; Thoring et al., 2014).

5.3 Experimental Process (Technical Environment, Creating models, Execution)

5.3.1 Mobile App Design

The Researcher has some experience in software application design and knowledge of a variety of application development tools available. One of such tools was a website called Appy Pie (https://www.appypie.com/) which allows the creation of mobile apps in a fast and scalable manner. This tool was useful and decided on because it would remove the extra time required if the app were to be coded from scratch and several additional costs incurred in paying for web and server services would also be avoided.

An initial test account was created for the first prototype. At the point of creation of the second iteration, the features were extended and to enable features like the feedback email to be stored. This was upgraded to a paid subscription which has since expired. The end product, however, is an apk file which is available for download on an Android device at the online location, https://mycloud.ngportal.com/index.php/s/6RoADZGkMr8wNy3. The term 'apk' is the short for Android application package, which is the format used by the Android software operating system to distribute files that are needed to install a program on mobile devices.

The dashboard and interface features of the website are shown below. In Fig 5.3, the dashboard where mobile apps created are listed. Functions here allow the user to download the apk file to distribute and test on other devices. The app features can also be modified using the 'Edit' link on this view.

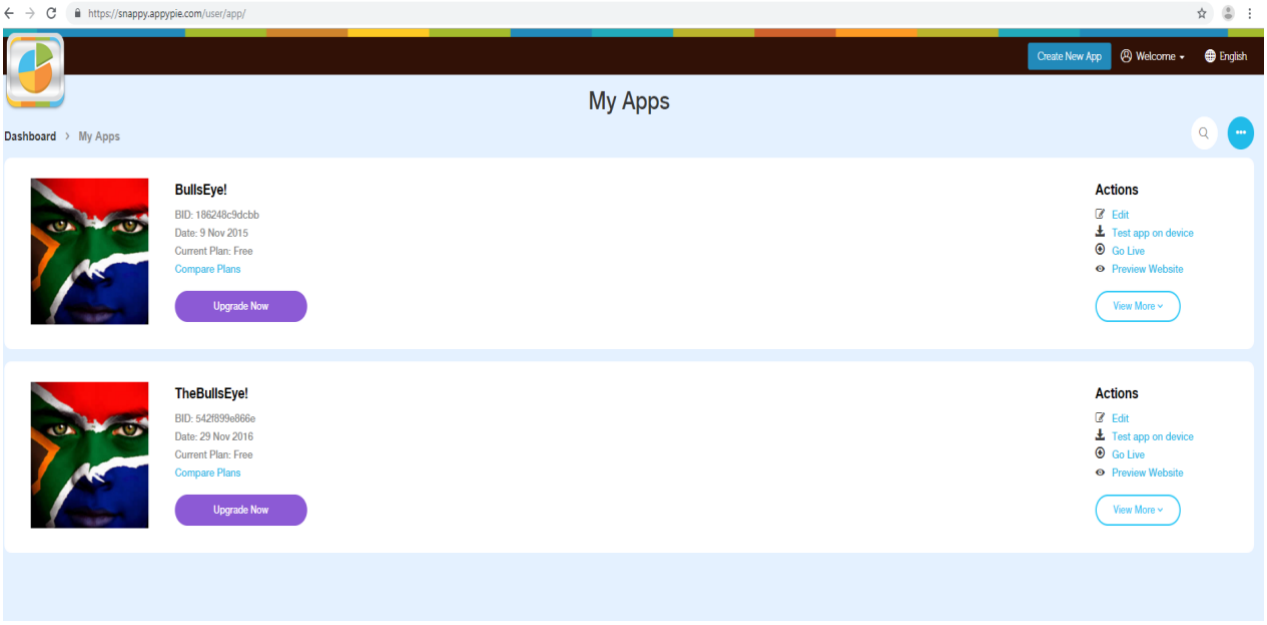


Figure 5. 3— AppyPie dashboard

In Figure 5.4, more options are available on the view when an app is selected from the dashboard list above. Download and testing of the app is also available on this view as well 'Edit' to modify the app features. Several other options are also available but are outside the scope of the design process of this study.

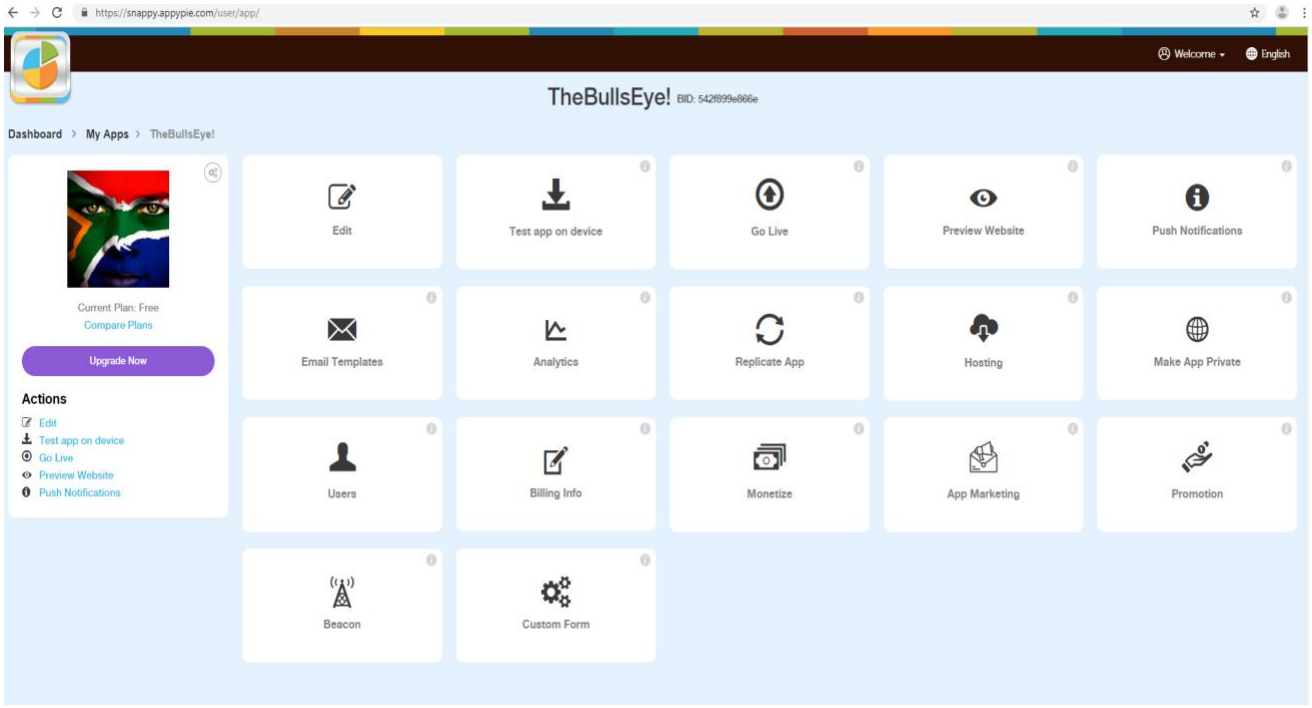


Figure 5. 4— 'TheBullsEye!' dashboard

In Figure 5.5, the view to edit or create app pages is shown. The feature allows creating and formatting text, for the page content and titles.

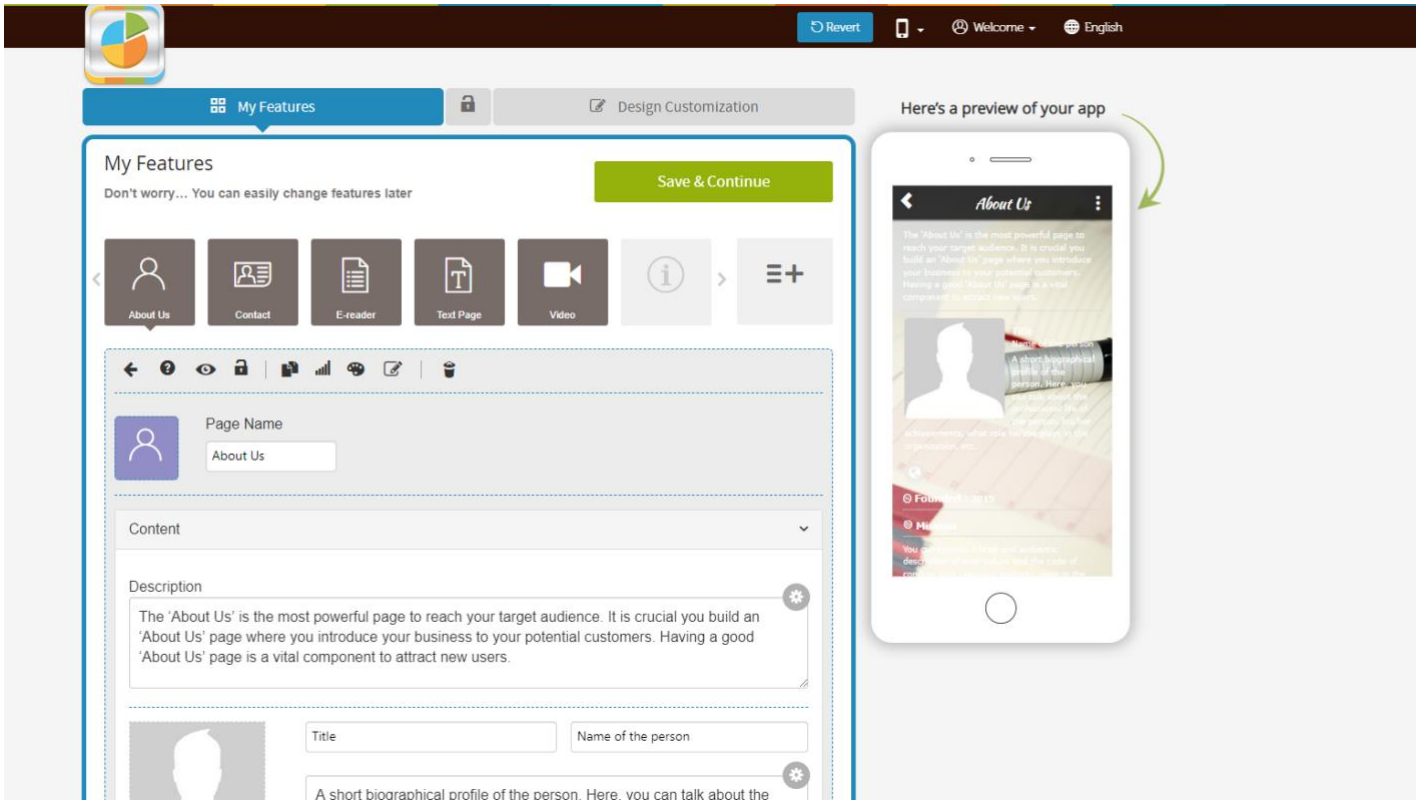
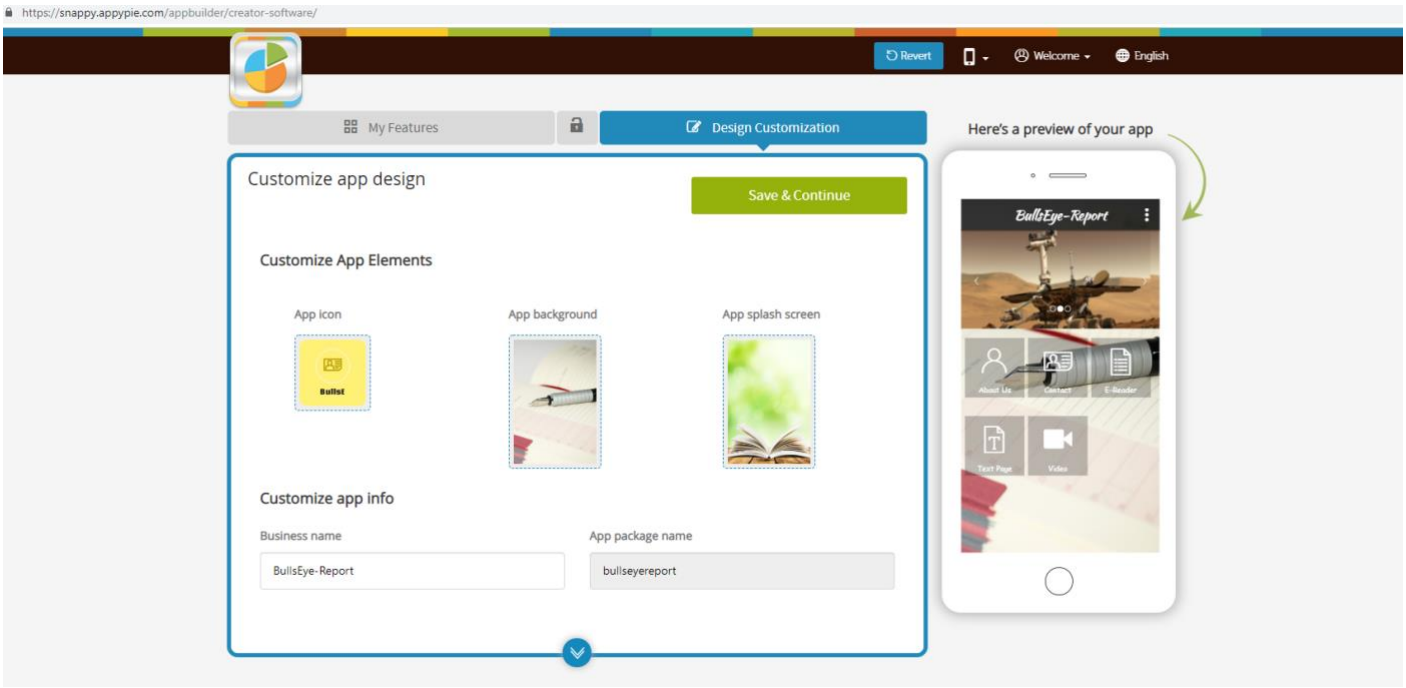


Figure 5. 5— App creation Edit mode

Figure 5.6 shows the view that allows design customization such as background displays, view and layout formatting. This process was vital in creating a user interface that would appeal to the users as they had advised in the feedback from the process of getting their input on the app features.



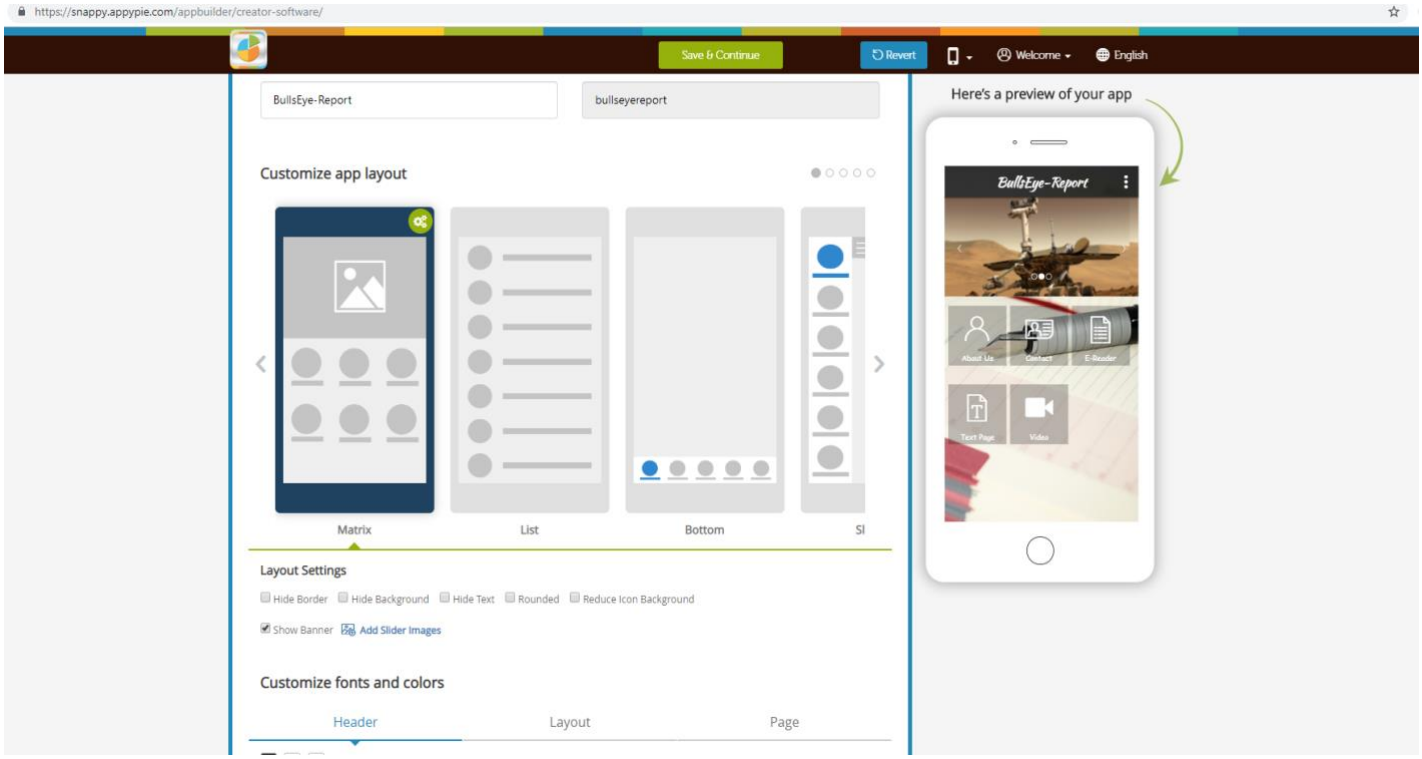


Figure 5. 6— App design and editing interface

5.3.2 Prototype Development

The initial artefact was designed before administering the questionnaire to students. It however contained barest minimum features gleaned from literature and when presented to students, they were encouraged to suggest features that would develop into the final artefact. This version of the app came about having the main feature as a reporting function. The review of literature had revealed that past interventions were curriculum-based. A critical review of all these interventions revealed two main features common among them all. First was the feature of educating for behavioural change, second was having a target focus on not just the bully or victim but the bystanders and authorities as well. This was the first critical consideration for the pilot app, given the relative success of past interventions but replicating it in a technological context.

The final artefact was developed over three iterations guided by the feedback from respondents. This process was intended to assist the researcher in determining key design criteria.

ITERATION 1
An initial skeletal pilot app (See Appendix C) was tested among about fifteen high school students. They were sat down in a focus group setting and asked to download and install the app which was available in Android, iPhone and Kindle versions. The students were asked to navigate the app and suggest additional features as well as test the basic available functionality of the app. They were given the opportunity to send

feedback over the next five days. The respondents had both Android (twelve respondents) and iPhone (three) devices, there was no tester with a Kindle device.

Based on this first iteration, the general feedback gathered from that exercise was about the look and feel of the app. The respondents were not satisfied with the presentation of the app and wanted a more user friendly and stimulating feel to the app on as many as possible phone platforms.

This was one of the two considerations taken into the second app iteration. The second consideration was in terms of the offerings of the app on the various available phone software. Since there were no kindle users in the iteration and as well as only very limited iPhone testers, it was decided that the next iteration would offer only the Android version. This was crucial in order to conserve the limited available resources for paying for different versions of the prototype on the design platform.

ITERATION 2

The second iteration (See Appendix G) was designed only in Android version. About fifty students tested the version over a period of one year. Most of the respondents felt like they would not use the report function much but would like to have a chat function rather than the report form.

Avenues were explored in terms of resources available in order to incorporate that feature in the final version. The principals and guidance counsellors of different schools were approached to discuss the initiative. The research was reintroduced, and the progress made with students concerning the intervention was discussed.

The purpose was to discuss the possibility of the school to have a dedicated resource person who is qualified to moderate the information that the students would provide via the mobile app. They were asked to provide appropriate times for a more detailed presentation of the proposal and asked to schedule. Most of the requests did not get any response, so follow-up phone calls and visits were made, but the schools declined. Due to this shortcoming, the chat function of the app was not able to be incorporated.

ITERATION 3

By the third and final iteration (See Appendix H), it was already established that respondents wanted to be equipped to be able to deal with mobile-bullying by themselves. This is consistent with a finding that students want parent-free platforms when interacting online (Lenhart, 2015). Resources were sought from schools and websites to see if there was any service available that could provide support for young people.

After much research, a more detailed and interactive information page was developed on the app.

5.3.3 Presentation of Artefact

The final prototype app design, The BullsEye, resulting from the research on *Identifying Female Mobile Bully-Victim Characteristics in Selected High Schools in South Africa: Towards an Anti-Bullying Mobile Application* is hereby presented. The design criteria drawn from interviews with proposed users of the final artefact have been implemented. The app is accessible online at https://mycloud.ngportal.com/index.php/s/6RoADZGkMr8wNy3. The main features currently available are described in the following sections.

5.4 Artefact Testing

5.4.1 Evaluation Process

The BullsEye! Mobile App was tested and evaluated collaboratively by the Researcher and the respondents — high school students. Evaluation of Design Science artefacts can be done either with a simulation or in an experiment, and this can be carried out naturalistically or artificially. (Venable, 2006).

In a scenario where the artefact is to be used as it would in a real-life situation, a naturalistic evaluation can be conducted. The end product of this will be measures and actual results. However, if the artefact is tested by users that are not the expected real=life situation users (these may include the artefact designer or researcher and is an option where there are time, cost or environmental limitations to the evaluation), the process is an artificial evaluation.

This study adapted a naturalistic evaluation of the anti-mobile bullying app engaging high school learners. Considerations for evaluation was adapted from studies from literature (He et al, 2013; Law et al, 2010; Natris, 2013; Ou & Sia, 2010). These were also based on the following quality criteria: usability, functionality, consistency, accuracy, reliability and performance. The figure below represents the iteration of the artefact testing which was incrementally improved until the researcher established that it was good enough for the problem and intended users. Empirical analysis was used in evaluating and validating the artefact (Wieringa, 2010).

Figure 5.7 below shows the iteration process for testing the mobile app. The pilot prototype artefact was the input into the process, the activity Designed artefact test involved physical examination of the features of the artefact. The results gathered from this test was used in evaluating the activity and compared with the target goals that were initially intended. These tests drove the decision to iterate further where all suggestions for improvements were noted. Where possible, these suggestions were implemented in the next version of the artefact.

The specified functionality was decided during the Design phase in the context of the problem is tested. Evidence of the efficiency or effectiveness of the artefact in addressing the problem must also be provided.

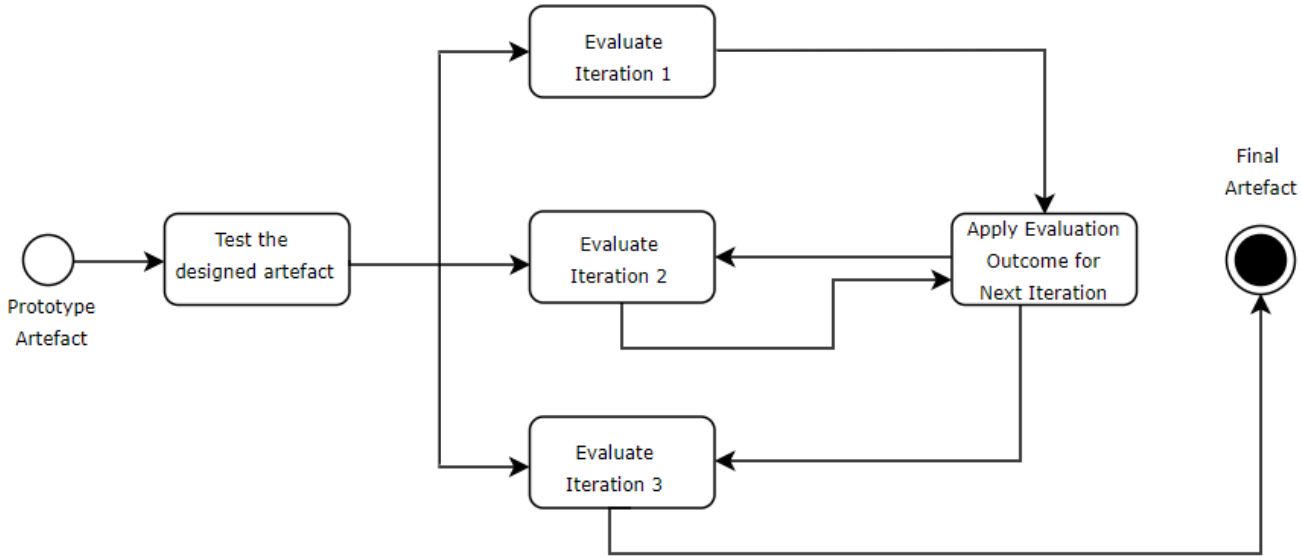


Figure 5. 7 — Artefact Iteration process

5.4.2 Mobile App Testing

The students were given the link to the app. Some were given an incentive to use the app over an extended period of time and send feedback via the app, but few responses came back each iteration. Given this, the final artefact was evaluated for the quality of the design since all possible features requested by respondents had been implemented over the iterations. This was deemed acceptable because the quality of a solution can be directly related to the user's experience of using the solution (Parsons & Ryu, 2006; Ryu & Cranshaw, 2006). This is further buttressed by the findings of Sarrab et al., (2016) in an empirical investigation on mobile application for learners.

5.4.3 Evaluation Criteria

The main purpose of this part of the research was to evaluate the efficiency of using Design Science and the artefact design in meeting the second research objective. For this process, three criteria were used to determine this effectiveness: Usability, Information Quality, and Heuristic evaluation.

These three criteria were encapsulated and using a range of questions in a survey to evaluate website efficiency — usability; information quality — users' perceptions of the app information based on the criteria like reliability and accuracy (Ou & Sa, 2010) and the effectiveness of the approach – heuristic (Natris, 2013) – in helping users learn about mobile bullying.

The respondents for this phase of the evaluation were provided the link to the survey at https://www.surveymonkey.com/r/ZTDMJJP. They were also provided a consent information as well as a link to the app to download and browse through. In the following section, results are presented and discussed.

5.5 Evaluation Results

The evaluation conducted was responded to by sixty-six learners after visiting the app link provided by the researcher. The respondents were asked to install the latest artefact iteration on their device and give some feedback on how the information available on the mobile app has helped their knowledge or dealing with mobile-bullying. In the following sections, more details on the usability and efficiency of the mobile app.

Table 5. 2— Mobile app Evaluation results

KEY	RESPONSES
Yes	Ext Satisfied / True, Satisfied/ True
No	Ext Dissatisfied / Untrue, Dis-satisfied/ Untrue
Unsure	Neutral

EVALUATION CONCEPT	QUESTION	RESPONSE					AGGREGATION		
		EXT SATISFIED	SATISFIED	NEUT	DISSATISFIED	EXT DIS-SATISFIED	YES	NO	UNSURE
Heuristic									
	How would you rate this app as a tool to learn about mobile bullying?	8	20	5	0	0	28	0	5
	How would you rate this app as a tool for reporting bullying that you have experienced or witnessed?	7	22	3	1	0	29	1	3
	How would you rate the information on this app as a tool to deal with bullying you have experienced or witnessed?	16	12	5	0	0	28	0	5
		EXT TRUE	TRUE	NEUT	UNTRUE	EXT UNTRUE	YES	NO	UNSURE
Information Quality									
	The resources provided on this app are useful	28	5	0	0	0	33	0	0
	The information on this app can be trusted	12	19	2	0	0	31	0	2
	The information on this app is comprehensible	25	3	0	2	3	28	5	0
Usability									
	The app is intuitive and easy to use	33	0	0	0	0	33	0	0
	The features of this app work as expected	27	3	2	1	0	30	1	2
	The app is user friendly	29	4	0	0	0	33	0	0

5.5.1 Mobile App Effectiveness

Heuristic and Information Quality evaluation on the mobile app measured the effectiveness. From Table 5.2 above, most respondents gave high ratings for the usefulness of the app. The final app provided an informative page as well as links to useful resources to handle mobile bullying. They appear to hold the app as a useful tool in dealing with mobile bullying either to report the issue or to learn about dealing with it as well. They also rated the information as trustworthy and easy to understand.

5.5.2 Usability of the Mobile App

The final app provided featured a more appealing interface and extended features. All the features available on the app were working and this is believed to have been responsible for the respondents' positive feedback. This characteristic was carefully implemented so that bugs and deadlinks would not impede the learning purpose of the app, making the implementation successful from the Researcher's perspective.

5.6 Summary

This chapter aimed at presenting the artefact development of the anti-mobile bullying app. One crucial aspect of research is the documentation of the process encountered to ensure that the work is replicable and with enough information to guide future research works. This was done by explaining the initial process engaged by the researcher in developing the design artefact — the digital intervention in addressing the second research question in this study. Insights from literature guided the pilot app design which formed a basis for modification via inputs from the intended users until the final artefact was arrived at.

Following the Hasso Plattner Institute of Design (D School) approach, the steps in the process of a generic Design Science project were outlined and the application of those guidelines in this study were also presented. The practical process of designing the prototype was also described with the platform information and offerings available on the site. The tools for development were presented as well as the outcomes of the artefact developed have been explained. From literature, a designer's perspective of classification of apps was examined and it was noted that it would be informational to see which of the mentioned classes the final app from this study would fall into.

CHAPTER 6: FINDINGS AND DISCUSSIONS

6.1 Introduction

This study was focused on understanding the characteristics of female mobile bully-victim behaviour in South African high schools. The other objective of the study was to design a digital intervention to bullying for the students. The hypothesis put forward and findings are reiterated here for clarity and discussion. Table 4.12 helps to explain the characteristics and contexts in which the respondents were asked about their behaviours. A discussion on the findings on the intervention is also provided.

6.2 Hypothesis Findings

6.2.1 Findings on Age and Female Mobile Bully-Victim Behaviour

In the first hypothesis, it was predicted that Female Mobile Bully-Victim characteristics will differ by age. The tested different behaviours were compared across the age ranges of the respondents; results were positive, and the hypothesis accepted. In Table 4.13 for the questionnaire items, student being made fun of by others, online bullying via SMS or instant message, posting messages about others on their social media pages, sending of emails to annoy or make fun of others, posting on other students' social media pages to annoy or make fun of them and taking other students' picture without their permission (I - BEENMADEFUNOF, VII - BULLIEDONLINE, VIII - POSTEDABOUTSOMEONE, X- SENTEMAIL, XI - POSTEDONTHEIRSOCIALMEDIA and XII - PICTUREWITHOUTPERMISSION) where the p-value was less than 0.05, the differences were considered to be significant. This suggests that age influences these Female Mobile Bully-Victim behaviours, and we see which age ranges each of these behaviours were most pronounced in Table 4.14.

According to the findings, the 14-year-olds scored highest means in the cohort of students that experienced behaviour (I) of being made fun at by others in chat rooms. The 15-year-olds were most at the receiving end online bullying (VII) of upsetting instant messages. Among those that post upsetting messages about others online, the behaviour (VIII) was rife among the 14-year-olds and they were also the most that exhibited behaviours (X, XI and XII) of sending hurtful emails and posting hurtful messages on others' social media as well as posting others' pictures online without their permission.

The finding thereby surmises that Female Mobile Bully-Victim Behaviour are more pronounced at a younger age and this corroborates findings that students outgrow bully-victim behaviours as they grow older and become more mature and probably better understand the consequences of bullying (Carlyle & Steinman, 2007; Kyobe et al., 2016, Tarugsa et al., 2017). These studies as well as others attribute the finding to the fact that younger students are the usual cohort used in bullying studies. This study however posits that the finding is more likely to be true than untrue because, despite

the wide variety of studies and age ranges and methodologies available in the body of knowledge, the rate of bullying more often than not reduces with age. This study therefore conforms largely with other studies. It also shows that students are equally likely to be bullies as well as be targets of victimisation at this age. This was not the case in another study (Smith et al., 2002; Tarugsa et al., 2017) where at younger age ranges, bully-victims tended more on the side of being a bully than being a victim. In the study by Tarugsa et al., (2017), it was thought that the fact that there is generally an unacceptability of bullying which accounted for the under-reporting of the act. The study also thought that students at the young age were not aware that their actions alluded to bullying. This study however found equal likelihood of being a bully and a victim and therefore posits that at a young age, if children do not know the difference between bullying and friendly teasing, they would not likely be trying to hide the fact that they bully other students.

The age of 14 is a developmental phase of females' lives where self-confidence is just starting to be actualized and lots of messages and jokes could become distorted, leading to quick anger and feelings of low self-esteem. In the case of online bullying and social media posts, taking from the finding that there is less maturity at younger ages, more can be done by online websites in the verification of identity of users before approving use of their platforms. (Grigonis, 2017; Shariff, 2015). Practical measures such as the ability to remove denigrating remarks form one's social media page can be made available to all social media users. Another feature that can be the implemented on social media pages is a conspicuous call to action button that provides instant professional help to users when facing bullying. (Cohen-Almagor, 2018). This is particularly pertinent to websites that promote posting and sharing of pictures (such as Pinterest, Instagram, etc.) which are dominated by females.

6.2.2 Findings on School Grade and Female Mobile Bully-Victim Behaviour

In the second hypothesis, it was predicted that Female Mobile Bully-Victim characteristics will differ across the students' school grades, and the hypothesis was accepted. In Table 4.15 for the questionnaire items, Student being made fun of in chat room, receiving annoying emails from known and unknown persons, receiving phone calls that gave the student a hard time, student receiving instant messages that made them uncomfortable or upset, posting about someone online to make others laugh, sending someone an SMS or email to annoy or make fun of them, posting on others' social media to annoy them or make others laugh and posting others' picture online without their permission (I - BEENMADEFUNOF, II - KNOWNEMAILMADEYOUANGRY, III - UNKNOWNEMAILMADEYOUANGRY, IV - HARDTIMEPHONECALL, VII - BULLIEDONLINE, VIII - POSTEDABOUTSOMEONE, IX - SENTSMS, X - SENTEMAIL, XI - POSTEDONTHEIRSOCIALMEDIA and XII - PICTUREWITHOUTPERMISSION) where the p-value was less than 0.05, the differences were considered to be significant. This suggests that school grade influences these Female Mobile Bully-Victim Behaviours, and we see which grades each of these behaviours were most pronounced in Table 4.16.

According to the findings, the Grade 8 students scored highest means in the cohort of students that experienced or exhibited behaviours (I, II, III, IV, VIII, IX, XI) of being made fun of, receiving upsetting emails from known and unknown people, receiving upsetting phone calls, posting hurtful messages about others online and on others' social media as well as sending hurtful SMS messages. Grade 10 students engaged most in online bullying (VII) while Grade 9 students engaged most in sending hurtful emails (X).

Again, this finding shows most of the behaviours on the lower end of the school grade range, suggesting as in the first hypothesis that Female Mobile Bully-Victim Behaviours are pronounced earlier in life and gradually fade out as maturity sets in. Accessibility of technology can also be an explanation for decline in bully-victim behaviour. At younger school grades, children may be given mobile devices to occupy them without much attention given to what they may do with it because of their assumed innocence. As children grow older, it is likely that parents are more conscious of vices and tend to do a bit more in monitoring online activity on the devices provided to children (Bhat et al., 2017). Grade 8 is the closest to when students have left primary school and as they progress higher, they become more aware of the consequences of behaviours associated with bully-victims and thus gradually drop the habit, as seen in Grade 9 upwards. At Grades 11 and 12, students are more loaded with academic tasks such as extra lessons and remedial classes in preparation for university entry examinations and as such have less time to play pranks or cyber bully. This finding is also consistent with studies such as those by Craig (1998), Çelebi and Aliyev (2017) and (Werth (2017). However, there are still inconsistences based on the recent study by Smith et al., (2019) about the consistency in findings of several surveys on bullying. The explanation for these inconsistencies according to the study ranges from difference in methods, in terms of face-to-face verses questionnaire enquiries. They explained that admission of guilt can be evaded in questionnaires than when inquired conversationally. They also alluded the contradictions to the gender of respondents, positing that boys are less likely to seek help than girls. Country or context differences can also account for the difference in experiences. Level of awareness of consequences can also be impacted by sensitivity environment in schools, which will be discussed in the school hypotheses. The findings of this study despite reducing rates of bullying as grade level increases found students to engage more in bullying as the grade increased than being victimised. Thais may be due to the fact that middle to high school, i.e. Grades 7 upwards, students are developing physically in features such as height and muscles (Ryoo, Wang & Swearer, 2015) and may use these features as a social privilege expressed via mobile bullying.

6.2.3 Findings on Family and Female Mobile Bully-Victim Behaviour

In the third hypothesis, it was predicted that Female Mobile Bully-Victim characteristics will differ in the different family types (See Table 4.6). This hypothesis was partially accepted. In Table 4.17 for the questionnaire items, Student being made fun of in chat room, receiving annoying emails from known and unknown persons,

having posts about them that made them feel uncomfortable or upset on other web pages, student receiving instant messages that made them uncomfortable or upset, being bullied online via instant message, posting on others' social media to annoy them or make others laugh and posting others' picture online without their permission (I - BEENMADEFUNOF, II - KNOWNEMAILMADEYOUANGRY, III - UNKNOWNEMAILMADEYOUANGRY, VI - UNCOMFORTABLEWEBPAGEPOST, XIII - UNCOMFORTABLEIM, VII - BULLIEDONLINE, XI - POSTEDONTHEIRSOCIALMEDIA and XII - PICTUREWITHOUTPERMISSION) where the p-value was less than 0.05, the differences were considered to be significant. This suggests that family type influences these Female Mobile Bully-Victim behaviours and we see which family types each of these behaviours were most pronounced in Table 4.18.

According to the findings, the students from Family type 3 (Parent(s), siblings and extended family) scored highest means in the cohort of students that experienced or exhibited behaviours (I, II, III, XIII, XIII) of being made fun of, receiving upsetting emails from known and unknown people, receiving upsetting instant messages in chat rooms and posting others' pictures without their permission. Students from Family type 1 (One parent and sibling(s)) were mostly victimized by having uncomfortable web posts (VI) about them; Students from Family type 2 (Both parents and sibling(s)) were mostly victimized (VII) via online instant messages; Students from Family type 4 (Grandparents, parents & extended family) bullied (XI) others mostly by posting hurtful messages on others' social media.

Studies have suggested that conventional family types with both parents and the children will provide a better environment for the growth and development of children (Buelga et al., 2016; Buelga et al., 2017; Lereya et al., 2013). This is expected to result in less delinquency and Female Mobile Bully-Victim behaviour of the students; however, our finding showed that children from all family types experienced and exhibited Female Mobile Bully-Victim behaviour. However, much of the Female Mobile Bully-Victim behaviour was found among a non-conventional family type (Parent(s), sibling(s) and extended family), therefore the hypothesis is partially accepted.

Most of the findings in this category pointed more to the students being victimized. Parenting styles differ according to the role model being followed. South Africa is a country where traditional roles within the family prescribe a lot of the way things are done and response to situations. The mother culturally plays a supporting role in the well-being of children while the father is more involved in guidance and decision-making. In a family scenario where one of the parents is missing, children are more likely to take up outlook of whoever is available as such children from homes with both parents are usually deemed to be more balanced in their reactions to situations. This is consistent with studies that have found insufficient parent support to engender diminished self-control among students and increase aggressive behaviour (Navarro et al., 2015). When children experience inability to openly share problems like victimization with parents, the issue persists and build up aggression in them which

may be let out via bullying. A clearer explanation of the finding may have resulted if more qualitative follow-up enquiries were made regarding this questionnaire item.

6.2.4 Findings on Ethnicity and Female Mobile Bully-Victim Behaviour

In the fourth hypothesis, it was predicted that Female Mobile Bully-Victim characteristics in students will differ by their ethnicity (See table 4.3) and hypothesis strongly accepted. In Table 4.19 for the questionnaire items, student being made fun of in chat room, receiving annoying emails from known and unknown persons, receiving phone calls that gave the student a hard time, having posts about them that made them feel uncomfortable or upset on other web pages, posting about someone online to make others laugh, sent someone an SMS or email to annoy or make fun of them, posting on others' social media to annoy them or make others laugh, posting others' picture online without their permission, receiving uncomfortable instant message, receiving online threats that are eventually carried out in school and having posts about their personal issues publicized online (I - BEENMADEFUNOF, II - KNOWNEMAILMADEYOUANGRY, III - UNKNOWNEMAILMADEYOUANGRY, IV - HARDTIMEPHONECALL, VI - UNCOMFORTABLEWEBPAGEPOST, VIII - POSTEDABOUTSOMEONE, IX - SENTSMS, X - SENTEMAIL, XI - POSTEDONTHEIRSOCIALMEDIA, XII - PICTUREWITHOUTPERMISSION, XIII - UNCOMFORTABLEIM, XIV - ONLINETHREAT and XV - POSTEDONLINE) where the p-value was less than 0.05, the differences were considered to be significant. This suggests that ethnicity influences these Female Mobile Bully-Victim Behaviours and we see which ethnic groups each of these behaviours were most pronounced in Table 4.20.

According to the findings, the students from ethnic group 4 (White) scored highest means in the cohort of students that experienced or exhibited behaviours (I, XIV) of being made fun of in chat room and having online threats actualised in school. This points that these students were more likely to be victimised. Students from ethnic group 3 (Indian/Asian) scored highest means in the cohort of students that experienced or exhibited behaviours (III, X) receiving hurtful emails from unknown persons and sending hurtful emails to others. These students had an equal likelihood of being victimized and of bullying others. Students from ethnic group 1 (Black) scored highest means in the cohort of students that experienced or exhibited behaviours (VI, IX) of finding hurtful posts about them on social media and sending hurtful SMS messages to other. They were equally likely to be bullied and victimised. Students from ethnic group 5 (Prefer not to answer) scored highest means in the cohort of students that experienced or exhibited behaviours (II, IV, VIII, XII, XV) of receiving hurtful emails from unknown persons, receiving hurtful phone calls, posting hurtful messages online about others', posting others' pictures online without their permission, having hurtful posts about them spread online. This cohort of students were the most notorious, but their true identity cannot be ascertained.

However, students from Ethnic group 5 form a small group and as such could be a minority group. Some studies have found that immigrants are usually uncomfortable

about disclosing their identity (Figueroa, 2017; Muñoz, 2016). It has been said that bullying occurs in a space where the individuals have no voice in determining what group they would like to be in the space (Wolke & Lereya, 2015). In such a situation, children may feel caged in with others and in a school or class scenario, they may feel the need to exert power or influence over the other children. Children who easily show emotions or have nobody or few people to stand up for them become vulnerable in this situation. Being from a minority ethnic group in school breeds an inegalitarian situation for such kids. This may be a factor that attracts them to be targets of victimisation given that they find it more difficult to blend with the wider population in terms of norms and social expectations (Mazzone et al., 2018; Teräsajo & Salmivalli, 2003; Thornberg & Knutsen, 2011) as such could trigger both intra- and inter-ethnic bullying (Peguero & Williams, 2011). Prejudice may also be contributing to it - it is a stronger trigger for bullying immigrants than having a powerful status among peers (Bucchianeri et al., 2016; Caravita et al., in press). This trend may be less prominent in multi-cultural schools where there is less prevalence of any particular race.

6.2.5 Findings on School Type and Female Mobile Bully-Victim Behaviour

In the fifth hypothesis, it was predicted that Female Mobile Bully-Victim characteristics will differ by type of school and accepted the hypothesis. In Table 4.21 for the questionnaire items, receiving annoying emails from known persons, having posts about them that made them feel uncomfortable or upset on other web pages and also on social media, being bullied online via instant messaging, being afraid to go online, receiving online threats that are eventually carried out in school and sent someone an SMS or email to annoy or make fun of them (II - KNOWNEMAILMADEYOUANGRY, V - UNCOMFORTABLESOCIALMEDIAPOST, VI - UNCOMFORTABLEWEBPAGEPOST, VII - BULLIEDONLINE, XVI - AFRAIDTOGOONLINE, XIV - ONLINETHREAT, IX - SENTSMS and X – SENTEMAIL) where the p-value was less than 0.05, the differences were considered to be significant. This suggests that school type influences these Female Mobile Bully-Victim behaviours and we see which schools each of these behaviours were most pronounced in Table 4.22.

According to the findings, students from School 5 scored highest means in the cohort of students that experienced the behaviour (II) of receiving hurtful emails from known persons. School 4 scored highest means in the cohort of students that experienced or exhibited behaviours (V, VI, VII, XVI, XIV) of receiving upsetting online web page, social media posts and instant messages, had threats made online executed in school and been afraid to go online. These students leaned more on the side of being bullied. School 6 scored highest means in the cohort of students that exhibited behaviours (IX, X) of sending hurtful SMS and email messages to others. These students were more likely to be victimized.

The finding is interesting with School 4, an Independent school, showing most amount of behaviours. It is thought that in Independent schools, the structure and

teacher/school support is better (Zuze et al., 2016) and Kyobe et al., (2016) found that learners in rural schools; associated with low socio-economic status and poverty experienced significantly higher bully-victim behaviours. According to Berkowitz and Benbenishty (2012) bully-victim behaviours are known to be pronounced where there is the least support from schools from the student's perspective. There is the expectation that Independent schools will measure better in terms of management and leadership and thus have more robust processes to prevent and deal with bullying. Contrary to this norm, this finding may be explained by the fact that the Independent Schools consist of students from higher socio-economic backgrounds and as such higher affordances of sophistication are available to them, leading to more negative behaviours.

6.2.6. Findings on Interventions and Female Mobile Bully-Victim Behaviour

In the sixth hypothesis, it was predicted that Female mobile bully-victim characteristics will differ by type of intervention and this hypothesis was accepted. The types of interventions from, teacher, family and peers were compared.

6.2.6.1 Teacher Interventions

In Table 4.25 on teacher interventions, for the questionnaire items, student being made fun of in chat room, receiving annoying emails from known and unknown persons, having posts about them that made them feel uncomfortable or upset on social media and other web pages, receiving uncomfortable instant messages, posting about someone online to make others laugh, sent someone an SMS or email to annoy or make fun of them, posting on others' social media to annoy them or make others laugh and posting others' picture online without their permission (I - BEENMADEFUNOF, II - KNOWNEMAILMADEYOUANGRY, III - UNKNOWNEMAILMADEYOUANGRY, V - UNCOMFORTABLESOCIALMEDIAPOST, VI – UNCOMFORTABLESWEBPAGEPOST, XIII - UNCOMFORTABLEIM, VII - BULLIEDONLINE, VIII - POSTEDABOUTSOMEONE, IX - SENTSMS, X - SENTEMAIL, XI - POSTEDONTHEIRSOCIALMEDIA and XII - PICTUREWITHOUTPERMISSION) where the p-value was less than 0.05, the differences were considered to be significant. This suggests that teacher interventions influence these Female Mobile Bully-Victim behaviours and we see which levels of teacher interventions each of these behaviours were most pronounced in Table 4.26.

According to the findings, students that did not feel strong teacher intervention or support experienced or exhibited behaviours (I, V, VI, VII, IX, X) of being made fun of in chat rooms, receiving uncomfortable social media and web page posts, online bullying via instant messaging and sending hurtful SMS and email messages. Students that had perception of strong teacher intervention and support also experienced and exhibited behaviours (II, III, XIII, VIII, XI, XII) of receiving hurtful emails and instant messages from known and unknown persons, posted hurtful messages about others online, on social media and posted others' pictures without their permission.

This finding was surprising as there seemed to be no alleviation of bully victim behaviours regardless of teacher support or a lack of it. This may also be debated on the grounds of the type of school. Again, Independent school teachers may have more avenues to combat bully-victim behaviours but the sophistication of the devices of such students may make it easier to mask perpetuation. Lack of resources however, in public schools may lead to ineffective teacher interventions.

According to Pyżalski (2011), acts of electronic aggression substantially differ when one considers the social and psychological mechanisms used and their consequences. Behaviours observed, like receiving unknown emails, online bullying via instant messages, posting online and the likes (UNKNOWNEMAILMADEYOUANGRY, BULLIEDONLINE, PICTUREWITHOUTPERMISSION, UNCOMFORTABLEIM, POSTEDONLINE) are such that leverage anonymity, and these can be mitigated with appropriate laws surrounding use of Internet. This can take the form of putting in place rules that enforce authentication and as such force users to identify themselves when connecting to the school network which can easily be applied in a school environment under duty of care laws (Pelletier et al., 2015).

6.2.6.2 Family Interventions

In Table 4.23 on family interventions, for the questionnaire items, student being made fun of in chat room, receiving annoying emails from known and unknown persons, having posts about them that made them feel uncomfortable or upset on social media, receiving uncomfortable instant messages, student been afraid to go online, posting about someone online to make others laugh and sent someone an SMS to annoy or make fun of them (I - BEENMADEFUNOF, II - KNOWNEMAILMADEYOUANGRY, III - UNKNOWNEMAILMADEYOUANGRY, V - UNCOMFORTABLESOCIALMEDIAPOST, XVI - AFRAIDTOGOONLINE, XV - POSTEDONLINE and IX - SENTSMS) where the p-value was less than 0.05, showed significant differences. This suggests that family interventions only partially influence these Female Mobile Bully-Victim behaviours and we see which levels of family interventions each of these behaviours were most pronounced in Table 4.24.

According to the findings, students that felt strong family intervention or support experienced or exhibited behaviours (I, II, III, V, XVI) of being made fun of in chat rooms, receiving hurtful emails from known and unknown persons, receiving uncomfortable social media and being afraid to go online. Likewise, students that did not have a perception of strong family intervention and support also experienced and exhibited behaviours (XV, IX) of having posts about them spread online and sending hurtful SMS messages to others. There has been evidence found of a linkage between children's display of emotion (physical as well as in online communication) and their ability to communicate with parents suggesting a link between offline communication and online interactions (Botsari & Karagianni, 2014). The interventions from family may need further examination, as different families have different ways of handling conflict. Some families may advise a tit-for-tat approach while others may refer to school authorities. Family interventions, however, seem to give a buffer to students as

the number of behaviours experienced and exhibited was less than those with teacher interventions.

6.2.6.3 Peer Interventions

In Table 4.27 on peer interventions, for the questionnaire items, student being made fun of in chat room, receiving annoying emails from known and unknown persons, having posts about them that made them feel uncomfortable or upset on social media and other web pages, receiving uncomfortable instant messages, posting about someone online to make others laugh, sent someone an SMS or email to annoy or make fun of them, posting on others' social media to annoy them or make others laugh and posting others' picture online without their permission (II - KNOWNEMAILMADEYOUANGRY, III - UNKNOWNEMAILMADEYOUANGRY, IV - HARDTIMEPHONECALL, V - UNCOMFORTABLESOCIALMEDIAPOST, VI - UNCOMFORTABLEWEBPAGEPOST, VII - BULLIEDONLINE, VIII - POSTEDABOUTSOMEONE, IX - SENTSMS, X - SENTEMAIL and XI - POSTEDONTHEIRSOCIALMEDIA) where the p-value was less than 0.05, showed significant differences. This suggests that peer/friend interventions strongly influence these Female Mobile Bully-Victim behaviours and we see which levels of friend interventions each of these behaviours were most pronounced in Table 4.28.

According to the findings, students that felt strong peer intervention or support experienced or exhibited behaviours (II, III, IV, V, VI, VII, VIII, IX, X, XI) of receiving hurtful emails from known and unknown persons, receiving uncomfortable phone calls, social media and web page posts, instant messages about them, posted hurtful messages about others, sent hurtful SMS and email messages to others and posted hurtful messages on others' social media.

This finding is interesting and sheds better light on the other two types of interventions examined before. This finding reveals that interventions that currently exist do not adequately support bully-victims as they are still experiencing and perpetuating the behaviours. This is consistent with the study that found that students are lacking the appropriate kind of help needed to solve cyberbullying issues (Brooks et al., 2012; Martinez-Ferrer, 2013). It also highlights, however, that student will ask for help and as such more effort should be put into designing interventions. Given this, parents and teachers should seek help in understanding how to help children in their care either professionally or by getting training to handle such situations. Students will also benefit from such training in order to be equipped with skills to support peers that need such help.

6.3 Digital Intervention Findings

The aim of this section is to present the findings from the analysis of the digital tool that was designed in this study to intervene mobile bullying. The development of the tool followed a design principle which proposes that details of the process of a design action should be duly documented in such a way that it allows further research to build on it and determine the applicability to different contexts (Anderson & Shattuck, 2012).

The process of design started out from the literature review where trends in interventions had been earlier observed. The past and related works showed that interventions usually target educating students, teachers and parents and where possible involving them all in this learning. However, it was important for the researcher to engage the main intended users, students, in the development of the artefact that would suit them, so the pilot app was somewhat skeletal around the general literature recommendations for interventions. The architecture of the tool, design and evaluation process has already been detailed in the preceding chapter hence the next section discusses the evaluation findings.

The final app was evaluated for effectiveness and efficiency and the contribution of this phase of the study (Natris, 2013; Ou & Sia, 2010) is also mentioned. The app respondents were motivated with incentives in order to keep participating in the evaluation of the tool. This pointed again to the fact that young adolescents prefer environments free of adult supervision. The final app features were rated in terms of how well the app served in helping them to learn about mobile bullying by themselves (Heuristics). The evaluation also measured reliability and accuracy of the information (Information Quality). Efficiency was assessed by rating how well features worked as expected (Usability).

The students evaluated all aspects of the app with high ratings, as seen in Table 5.2. When asked about the app as a learning tool, and the usefulness in dealing with mobile bullying experiences, 84% responded positively. About 88% of the respondents would use the tool in reporting incidents. The app contains external links to resources that can help in understanding mobile bullying situations and dealing with them. When asked if the resources provided were useful, 100% of respondents thought it was useful, 94% thought it was trustworthy information, and 84% found the information comprehensible. Finally, on the usability of functions available, 100% rated the app user-friendly, easy and intuitive. 91% experienced that the app worked as expected.

The evaluation process was assessed successful because the users had no difficulty in navigating or understand what all aspects of the app was meant to do. An artefact can be deemed successful if it provides the intended users valuable communication and helps achieve the goal for which it is intended (Johnson & Craven, 2010). The app was adaptable and every call to action functioned as was expected. Thus, the learning of the researcher through the iterations of the app from the domain experts was insightful. One key point that cannot be over-emphasised is the finding that young people are reflexive and have a high level of response when they have a stimulating learning environment. Another importance of an appealing interface is that it increases the likelihood of the adoption of a solution (Zhang & Adipat, 2005) and the probability that users will utilize it frequently and keep coming back to use it.

The final app can be classified according to the themes developed in the study by Bowler et al., (2014). Given that the main emergent feature was the information it

provided and a platform for reports to be made, The BullsEye! mobile app falls under the Design for Empowerment theme. The dynamics of mobile bullying lean largely of anonymity and imbalance of power. Even though students want to be empowered to deal with the issues themselves, at certain ages and within certain circumstances in times of their life, they may be unable to adequately handle the situation. Having the facility of reporting to an adult that can moderate the situation, presenting a form of power to the victimized.

6.4 Summary

The findings from the hypothesis shed light on the behaviours bully-victims experience and perpetuate. Some of the findings were explainable; however, in some surprising results, this may be attributed to the fact that more research that digs deeper would be helpful in interpretation of those findings. The findings also exhibited that most reports of behaviours were for victimization and this also poses the question on whether the students are ashamed to admit when they are on the offending side. Another thought from the findings, especially on interventions provided by parents, teachers and the students is to continually improve the quality of resources that equip for them to assist. This will ensure that the avenues already open in bully-victims' acceptance of help is maximized and the right and effective type of help is available.

The design phase of the study was interesting despite the limitations encountered. The level of acceptance of the artefact can be alluded to the fact that the design process prescribed by the guidelines of design science are well tested in theory in practise. The insight provided by the students in the evolution of the design even though perceived to be minimal at the time of the process, resulted in anticipated success of the perception and usability of the app. It can be concluded that students are willing to engage in decent and cordial online environments. More designers should leverage the valuable inputs they can offer in the design of mobile bullying interventions.

CHAPTER 7: CONCLUSION

7.1 Overview of the Study

The first objective of this study was to explore the characteristics of female mobile bully-victim behaviour in South African high schools. The analysis was based on socio-ecological factors relating to the students and trends among certain behaviours identified in literature was compared.

In terms of age, Female Mobile Bully-Victim behaviours were found most common among younger students of about 14 years and those in lower school grades, i.e. Grades 8 and 9. This was attributed to immaturity of the students at that stage, hence targeted intervention of monitoring and education is suggested.

The family structure and make-up did not show conclusive differences in students exhibiting Female Mobile Bully-Victim behaviours; however, students with more adult support in the family have the advantage of better examples and role models in dealing with conflict. To get better understanding of the influence of family, more detailed method of enquiry is suggested for future research.

Ethnicity was found to impact Female Mobile Bully-Victim behaviours greatly and creating a feeling of inclusion in the school environment is suggested as an intervention for students from minority race groups in society who may not align with social expectations.

This follows on to the influence of type school in Female Mobile Bully-Victim behaviours which showed significant differences. Though it was expected that Independent schools would have better results in the form of fewer bully-victims than Public schools, the findings showed that Independent schools may experience more Female Mobile Bully-Victim behaviours due to advanced level of masking behaviours aided by more sophisticated mobile devices.

The influence of interventions on Female Mobile Bully-Victim behaviours was significant. The findings reveal that students will ask for help from teachers, parents and peers more often. This points to the need for interventions to be holistic and targeted. Schools and families will also benefit from being trained to intervene appropriately in such a way that does not multiply the occurrences of violence, but rather instruct in appropriate behaviour. This recommendation is specific because it follows as per the views of van Royen et al. (2015). Also, the training should be conducted in such a way that victims can successfully prevent the bullying. Training will help in raising the awareness among the female population in the South African schools and also will be helpful in terms of creating an awareness regarding the actions that ought to be taken by the victims when they are bullied (Shariff, 2013). Therefore, with the help of this recommendation, the victims will be guided through the actions that can be taken on the spot at the time of bullying.

The second research objective was to design a digital tool in intervening mobile bullying. This was achieved and a resulting mobile application, ***The BullsEye!*** emerged from the design process. Shariff (2015) has suggested that materials such as children's literature could also be used, and this study extends this to include content of digital literature and apps designed. Targeted interventions that teach empathetic behaviours for lower age and grade students could be leveraged to a high degree in mobile apps that use more advanced technology such as virtual reality and gamification. For older students and grades, more can be done to include them in participating in the design and development of apps that will suit their maturity.

Shariff (2013) adds that corporate efforts must focus on educating professionals as well as the public, i.e. students, parents and teachers. She proposes a conspicuous availability of information that can help individuals when posting online content to rethink their action and implications. This extends also to a reinforcement of what the parties involved can and should do in terms of legal rights and obligations, including media and the way stories are publicized. The actions of media can be curbed by putting appropriate laws in place while government and agencies back these laws to ensure that they are enforced.

In conclusion, advancement in technology is not going to go away, therefore it is the duty of society to advance in the level of duty of care and protecting against unintended consequences of technology development. This study serves as an effort to do this and suggests ways that such initiatives can be further developed.

7.2 Research Contribution

This study has contributed to research in the Information Systems field and the Design Science domain. There have been calls for more theory-informed studies in cyberbullying generally (Addington, 2013) and gender- focused cyberbullying studies (Jamal et al., 2015), hence, this study contributes to filling this gap. The theories most used in studying bullying and cyberbullying have been applied to this study on bully-victims.

From the review of literature, factors in an individual's environment has been considered in understanding their relationship to bullying and being victimised. This study applied the same principle in understanding students that have both bullied and been bullied by others – bully-victims. A conceptual model comprising constructs namely: age, grade, school, family, ethnicity and interventions was designed. These factors were considered given that bully-victim behaviours are not formed in isolation but are an interplay of the factors surrounding the individual. The understanding that school and home environment cannot be separated in evaluating students' bullying behaviours, encourages further investigation of these factors while suggesting targeted interventions for teachers and parents alike (Gomez-Garibello et al., 2012).

This has strengthened the baseline understanding available in the body of knowledge on the topic. It has provided useful insights into the reliability of what is known about other countries outside Africa, the similarities of the challenges surrounding cyberbullying - particularly bully-victims and applicability of interventions. For instance, it was found that many of the results from this study are comparable to the findings from other countries. This affords the opportunity to learn from the policies, processes and affordance of interventions already existing. Though more precision is required in applying the rules and interventions to the African context, however, it provides more than enough starting ideas for us to implement in the continent.

Another contribution is in terms of methodology, seen in the documentation of the design process, which is a key differentiator of Design Science Research from design practice (Servillo & Schreurs, 2013). Also, most Mixed Methods research is quantitative and qualitative (Venkatesh et al., 2013); however, this has been with Quantitative and Design Science methods. The dominant method of the two was the quantitative method, which employed the use of questionnaires that helped to investigate the mobile bully-victims. This provided an understanding of some of their characteristics. The process also helped identify and recruit a cohort of students to help in the evolvement of the final artefact that was designed as an intervention.

This study has also contributed methodologically by highlighting the limitations in examining the bully-victim phenomenon with a generalised approach. Although the quantitative method has delineated and confirmed some previous assumptions on age and grade variances of bully-victim behaviour, there are still some inconsistencies in the findings such as ethnicity and interventions. Qualitative methods of enquiry are suggested as they may further help to address these contradictions in findings.

Most evaluations are monomorphic, however, this study has incorporated practicality, utility and suitability assessments, all in one. This supports a pluralist view of science, showing the individual strengths of those assessments and thus represents an effective way of evaluating a design science research (Venable et al., 2016).

The practical contribution of the study is the understanding of the characteristics of female bully-victim behaviour in high schools in South Africa. This knowledge is vital for the proffering of an appropriate solution to those affected, importantly showing that there are steps already in place that are laudable but can be improved on. It will also serve as a foundation for further related studies on bullying and victimization. Finally, the designed anti-bullying mobile application (artefact) is a step in the right direction for cyberbullying mitigation.

7.3 Recommendations for Future Work

The findings from the quantitative aspect of this study have provided a good insight into the understudied subgroup of female bully-victims. However, as in previous research, some findings are unexplained. For this reason, the researcher recommends

a greater depth in the exploration of the characteristics of female mobile bully-victims. This may be achieved by supporting quantitative methods with follow-up qualitative interviews or focus groups enquiries.

From experience, a study such as this may benefit from bigger campaigns and backing from recognized organizations and regulatory bodies (for example, Google, Facebook, Department of Basic Education, International affiliations with schools and organizations fighting cyberbullying, etc.). For instance, an organisation like Facebook can provide branded 'swag packs' having T-Shirts, stickers, mouse pads, characters, statuettes, mascots, etc with bold inscriptions that communicate their commitment to fight mobile bullying and create a safer online environment. On the online platforms, technology companies can as well as provide access to intuitive support for users who may be experiencing bullying. For regulatory bodies like the Department of Basic Education, initiatives like creating a mobile bullying week or day during term packed with activities that educate. Suggested activities could include workshops, awards for 'heroes' or champions of anti-bullying and other initiatives. This may be useful in allaying the fears of school principals that such a study is not intended to brand the schools or attract any negative publicity.

In terms of designing artefacts for cyberbullying, once there is enough motivation from principals and school authorities, better organization of participatory research should be used to engage students intensively in designing the artefact. This, in the researcher's opinion, will make the students more open to express ideas on the app features. Other gamification features can also be included in designed app where students earn badges and medals for activities such as completing a short course or quiz or watching an available video on the app that teaches about online safety and decorum.

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APPENDICES

Appendix A DoE Research Approval Letter

Audrey.wyngaard@westerncape.gov.za
tel: +27 021 467 9272
Fax: 0865902282
Private Bag x9114, Cape Town, 8000
wced.wcape.gov.za

REFERENCE: 20151118-5419
ENQUIRIES: Dr A T Wyngaard

Mrs Oluyomi Kabiawu
Room 3.05
Department of Information Systems
Faculty of Commerce
UCT

Dear Mrs Oluyomi Kabiawu

RESEARCH PROPOSAL: DESIGNING AN ANTI-BULLYING MOBILE APPLICATION FOR HIGH SCHOOL STUDENTS: A FEMALE BULLY-VICTIM STUDY

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **01 February 2016 till 30 March 2016**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number?
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000

We wish you success in your research.

Kind regards.
Signed: Dr Audrey T Wyngaard
Directorate: Research
DATE: 18 November 2015

Appendix B Ethics Applications

UNIVERSITY OF CAPE TOWN

FACULTY OF COMMERCE

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required to complete this form and obtain approval before conducting research. The completed form should be submitted as an electronic document to departmental Ethics Committee representatives for submission to the Commerce Faculty Ethics in Research Committee. Please also submit electronic copies of your research proposal, informed consent form or other information used to obtain consent, and any questionnaires other material shown to subjects.

1. PROJECT DETAILS			
Project title:	Designing an Anti-Bullying Mobile Application For High School Students: A Female Bully-Victim Study		
Principal Researcher/s:	Oluyomi Kabiawu	**Email address(es):**	**oluyomi.kabiawu@uct.ac.za**
Research Supervisor:	Prof. Mike Kyobe	**Email address(es):**	**michael.kyobe@uct.ac.za**
Co-researcher(s):	N/A	**Email address(es):**	**N/A**

Brief description of the project:
Bullying is becoming more and more rampant in school environments and with the ever increasing mobile penetration among youths in South Africa, mobile bullying is posing a new kind of threat. Many studies existing touch on general cyberbullying, however this project examines female mobile bully-victims whom we do not know much about from literature and in the South African context. This study aims to gain an understanding about this group in order to understand where interventions should be directed. Furthermore, the project proposes an intervention to the issue by designing an anti-mobile bullying app as a contribution towards resolution of the bullying problem in South African high schools.

Data collection: (please select)

☐ Interviews ☐ Questionnaire ☐ Experiment ☐ Secondary data ☐ Observation

☐ Other (please specify): Artifact Evaluation

Procedure: (please describe)
Following previous research in the field of Psychology, this study will adopt bullying theories and in order to situate it in Information Systems field, mobile technoly theories are also considered. The resulting framework includes the Socio-Ecological theory, Social Information Processing theory anf the Uses and Gratifications theory. In order to fully capture the research objectives, a pragmatic approach will be employed, incorporating the use of questionnaires as well as design science to collect data. Quantitative analysis and artefact evaluation over iterations will be employed in data analysis.

2. PARTICIPANTS

Characteristics of participants:

Gender:

Male and

Race / Ethnicity:

A

Age ran
e: 14 and

South

Location:

Other:

Race / Ethnicity:

Have you included a "**Prefer not to Answer**" response category in your questionnaire? (please select)

Yes No Not applicable

If you answered 'No' why not?

Affiliations of participants: (please select)

Company employees UCT staff General public UCT Students

Other (please specify): _____

If your sample includes children (aged 18 and below), mentally incompetent persons, or legally restricted groups please explain below why it is necessary to use these particular groups. If subjects are minors or mentally incompetent, please describe how and by whom permission will be granted? If you are including children under the age of 18 and are not getting parental consent, please explain why you believe that their parents would consent if it was possible to contact them.

The respondents will include students under the age of 18 and this is inevitable due to the nature of the bullying problem which affects students of all ages. A permission from UCT and the Department of Education will suffice to convince parents and school authorities that the necessary precautions have been taken in order to ensure that the survey does not put the students under any unnecessary discomfiture.

3. ORGANISATIONAL PERMISSION

If your research is being conducted within a specific organisation, please provide organisational permission or explain how permission will be obtained.

UCT Ethics clearance is required in order to get permission from the Department of Education and these permissions will be firther presented to the schools authorities before the survey is conducted.

Are you making use of UCT students as respondents for your research? (please select) ☐ Yes ☐ No

If yes, have you contacted Executive Director: Student Affairs for permission? (please select) ☐ Yes ☐ No

Was approval granted? (please select) ☐ Yes ☐ No ☐ Awaiting a response

Are you making use of UCT staff as respondents for your research? (please select) ☐ Yes ☐ No

If yes, have you contacted Executive Director: Human Resources for permission? (please select) ☐ Yes ☐ No

Was approval granted? (please select) ☐ Yes ☐ No ☐ Awaiting a response

Contact Emails: Executive Director: Human Resources (**Miriam.Hoosain@uct.ac.za)**
Executive Director: Student Affairs (**Moonira.Khan@uct.ac.za)**

4. INFORMED CONSENT

What type of consent will be obtained from study participants?

- written consent
- anonymous survey
- oral consent (please justify)
- other (please specify)

- Oral Consent
- Written Consent
- Anonymous survey questionnaire (covering letter required, no consent form needed)
- Other (please specify)

How and where will consent/permission be recorded?
The instructions declare that proceeding to answer the questionnaire is a consent however, the respondents are allowed to withdraw form participation at any time they choose to do so. This will be emphasised to the respondents before administration of the questionnaire. The artefact aspect of the instrument will also include a consent agreement at the point of installation of the test application.

5. CONFIDENTIALITY OF DATA

What precautions will be taken to safeguard identifiable records of individuals? Please describe specific procedures to be used to provide confidentiality of data by you and others, in both the short and long run. This question also applies if you are using secondary sources of data that is not anonymous.

The survey is entirely anonymous and personal information will not be requested from respondents. All responses will be collected by hand and stored securely as an extra measure even though no identifiable information will be requested.

6. RISK TO PARTICIPANTS

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)**

Yes No

If yes, answer the following questions:

1. Describe in detail the nature and extent of the risk and provide the rationale for the necessity of such risks

2. Outline any alternative approaches that were or will be considered and why alternatives may not be feasible in the study

1. Respondents may be drawn back to recollect a time when they were mobile bullied. This could bring back memories of unpleasant situations and cause emotioan pain. Respondents are encouraged to answer only what they feel they are bale to answer. The questionnaire will be administered under supervision and any respindent that is adversely affected will be withdrawn from continuing participation for their own well-being.

2.

3.

What authorship agreement have you reached with your co-researchers or supervisor?

__ This research is not intended for publication

__ Standard authorship agreement (principal researcher first author, co-researcher(s) and supervisor(s) co-authors)

__ Customised agreement (please specify below):

I certify that we have read the the UCT Authorship Policy, and Commerce Faculty Authorship Guidelines __ (http://www.commerce.uct.ac.za/Commerce/Information/research.asp)

I certify that that the material contained herein is truthful and that all co-researchers and supervisors are __aware of the contents thereof.

I understand that it is my responsibility to conduct research in accordance with the ethical requirements of __UCT.

_____

Applicant's signature:

Date: 6th November 2015

CHECKLIST	SELECT
A full copy of a research proposal or a literature review with methodology is attached	__
Research proposal/ interview schedules / cover letters / questionnaires / forms and other materials used in the study are attached/ consent form	__
Organisational consent letter / UCT student or staff approval letter	__
On your cover letter to your questionnaire have you included the following? 1. The following UCT Logo  2. A sentence explaining the aim of the research 3. Sentences of a similar nature to below must be included in the cover letter or consent form:	NA __ __ __ __

	This research has been approved by the Commerce Faculty Ethics in Research Committee. **Your participation in this research is voluntary. You can choose to withdraw from the research at any time.** **The questionnaire will take approximately X minutes to complete** **You will not be requested to supply any identifiable information, ensuring anonymity of your responses.** **Due to the nature of the study you will need to provide the researchers with some form of identifiable information however, all responses will be confidential and used for the purposes of this research only.** **Should you have any questions regarding the research please feel free to contact the researcher (insert contact details).**	**OR** **NA**
4.	**Have you scanned in your signature for the last section of the form?**	

For Ethics committee representative only	
Recommendation(s):	
Signature: **Date:**	
For Ethics committee chairperson only	
Recommendation:	
Signature: **Date:**	

ETHICS ADDENDUM – KBWOLU001

The respondents will include students under the age of 18 and this is inevitable due to the nature of the bullying problem which affects students of all ages. A permission from UCT and the Department of Education (already obtained) will suffice to convince parents and school authorities that the necessary precautions have been taken in order to ensure that the survey does not put the students under any unnecessary discomfiture.

The instructions declare that proceeding to answer the questionnaire is a consent however, the respondents are allowed to withdraw form participation at any time they choose to do so. This will be emphasized to the respondents before administration of the questionnaire. The artefact aspect of the instrument will also include a consent agreement at the point of installation of the test application.

The survey is entirely anonymous and personal information will not be requested from respondents. All responses will be collected by hand and stored securely as an extra measure even though no identifiable information will be requested.

Following previous research in the field of Psychology, this study will adopt bullying theories and in order to situate it in Information Systems field, mobile technology theories are also considered. The resulting framework includes the Socio-Ecological theory, Social Information Processing theory and the Uses and Gratifications theory. The Socio-Ecological theory explains the impact of socio-economic environment of individuals in their behaviour, hence this makes it necessary to inquire about the ethnicity and family background of the respondents.

In order to fully capture the research objectives, a pragmatic approach will be employed, incorporating the use of questionnaires as well as design science to collect data. Quantitative analysis and artefact evaluation over iterations will be employed in data analysis.

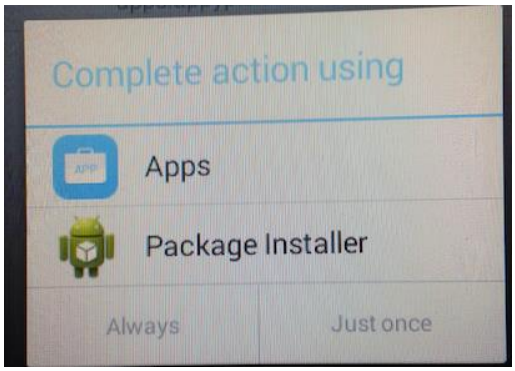
Appendix C Pilot App Testing Instructions

BULLSEYE! MOBILE BULLYING REPORTING APP PILOT TESTING

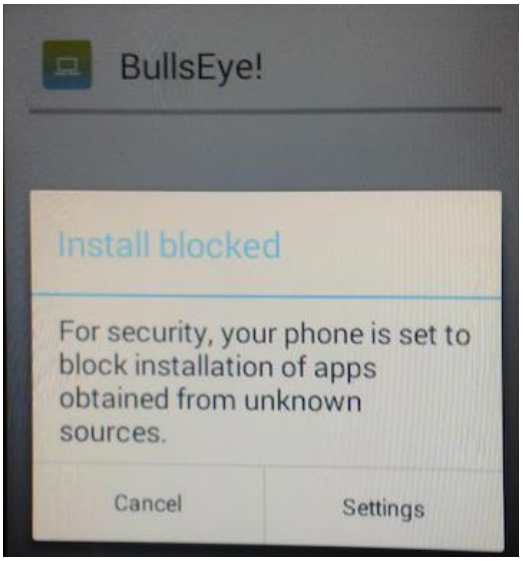
Dear User,

Thank you for accepting to test BullsEye! Mobile Bullying Reporting App. The following steps will guide you through the installation on your mobile device. Your feedback will be highly appreciated if you forward to oluyomi.kabiawu@uct.ac.za or just use the Feedback icon on the app to send your message through.

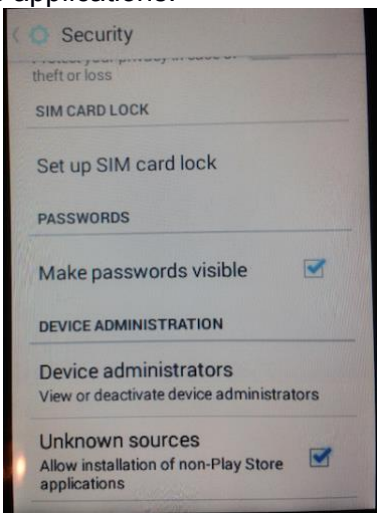
1. Ensure that you have an Android device with at least 12MB of free space available.
2. On your Android device, click the link http://apps.appypie.com/media/appfile/186248c9dcbb.apk .
3. Select your preferred browser to use to access the link. Please note the file will not open in your browser, rather the file with the extension, '. apk' is downloaded to your Downloads folder.
4. Go to your device's Downloads folder and click on the app. Choose 'Package Installer' from the options that come up.



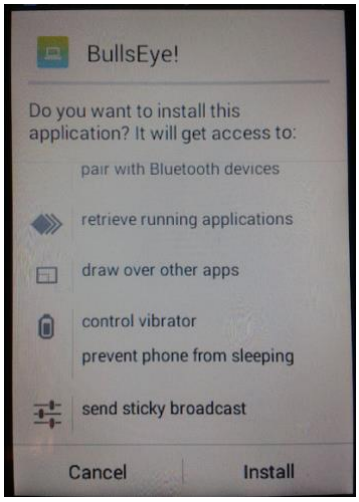
5. If your device issues an 'Install blocked' message, click on Settings, (If you do not get this message, skip to Step 6b)



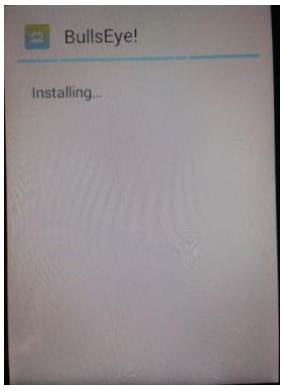
In the settings options, select the checkbox under ‘Unknown sources’ to allow installation of non-Play store applications.

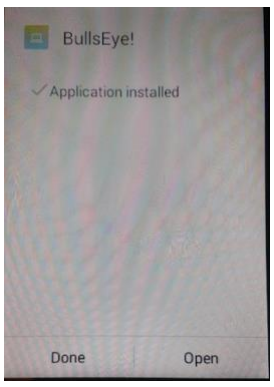


6. (a) Return to the Downloads folder and try to install again.
   (b) Select the ‘Install’ option to confirm that you want to install the app.

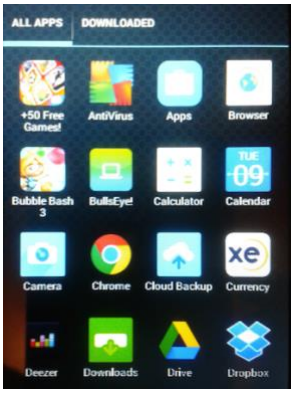


7. The install window shows and notifies you when installation is complete.





8. Go to your device apps list and locate the BullsEye! icon, then click on it to open.

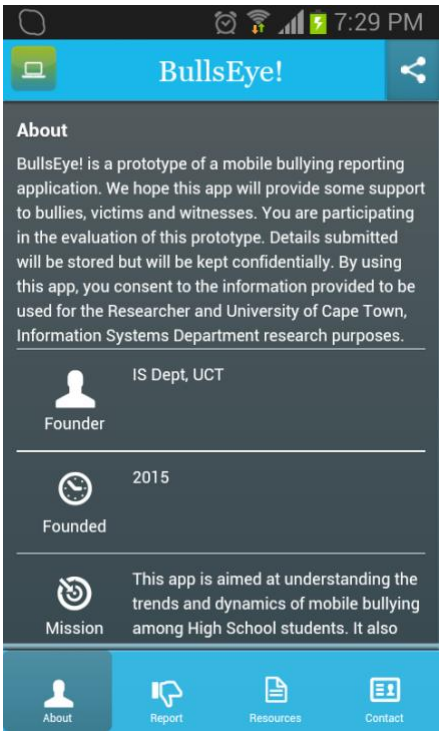


9. Navigate through the tabs and explore the available options. (If you open the app and it shows a blank page, give it a minute and then close and reopen it for it to display correctly on your device.)

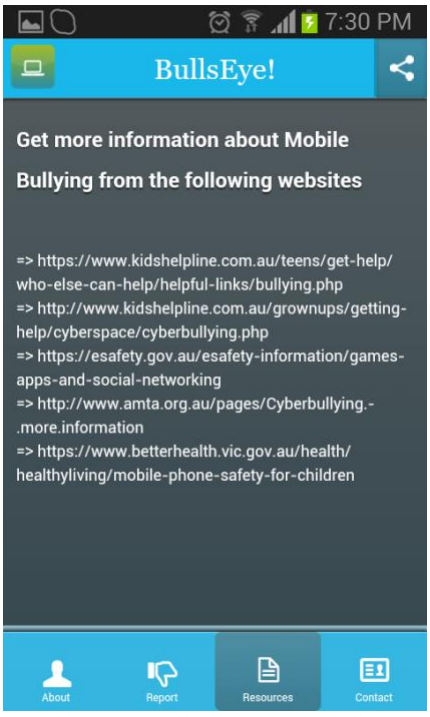
Thank you!

Appendix D Pilot Mobile Bullying Intervention App Interface

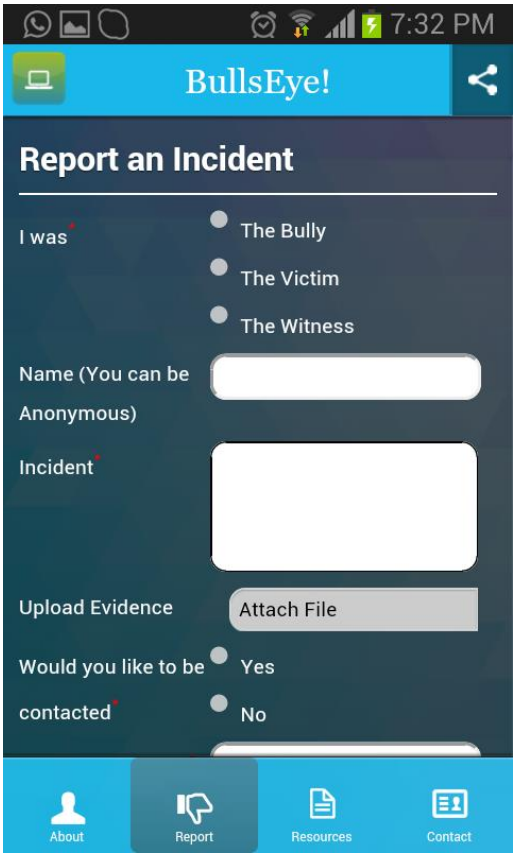
About Page – This gives a brief description about the app and the authors and purpose of the app.

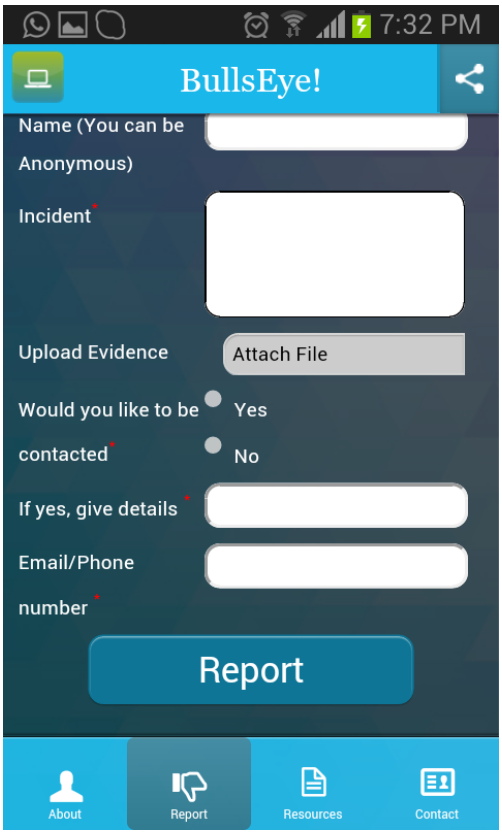


Resources – This page gives links to other anti-bullying information.



Report – This is a function that allows the user to report a mobile bullying incident





Appendix E Parent Cover Consent Letter

UNIVERSITY OF CAPE TOWN
FACULTY OF COMMERCE
Igniting Knowledge and Opportunity

PARENT AUTHORIZATION

Dear Parent/Guardian,

Your child is invited to participate in a research study conducted by Yomi Kabiawu from the Department of Information Systems, University of Cape Town. The study is about understanding mobile bullying trends in South African high schools. The research focuses on finding out the trends surrounding female mobile bully-victims (these are individuals that experience bullying and simultaneously bully others). However, it also involves testing a developed mobile app, anticipated to help students (both male and female) report bullying incidents in order to get help from school counsellors and authorities. It is also anticipated that this reporting system will help curb the habit since perpetrators will be aware that they can be easily reported. The research is approved by University of Cape Town and Department of Education, Western Cape.

Your child was selected as a possible participant in this study because he/she is currently in high school however we understand that he/she is under the age of 14 and we require your approval in order for him/her to participate. If you decide to allow your child to participate, he/she will be asked questions about him/herself and a recollection of present or past bullying experiences.

By taking part in this study, your child may experience the following risks:

- Emotional risk: Recalling past or reliving present bullying incidents may produce or increase feelings of sadness and/or anxiety.

- There may also be risks involved from taking part in this study that are not known to researchers at this time.

As a participant in this research study, there may be no direct benefit for your child if they have never experienced being mobile bullied; however, information from this study may benefit them when they are faced as a witness of a mobile bullying incident and they will get information on the right steps to take to help a victim.

Your child's participation is voluntary. Your decision whether or not to allow your child to participate will not affect you or your child's relationship with the school. If you have any questions about the study, please feel free to contact oluyomi.kabiawu@uct.ac.za or 0790800797.

Your signature indicates that you have read and understood the information provided above, that you willingly agree to allow your child to participate, that you and/or your child may withdraw your consent at any time and discontinue participation without penalty, that you will receive a copy of this form, and that you are not waiving any legal claims.

Thank you.

Signature..... Date: .....

Appendix F School Consent Cover Letter

UNIVERSITY OF CAPE TOWN
FACULTY OF COMMERCE
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Dear Principal,

STUDENT AUTHORIZATION

Your students are invited to participate in a research study conducted by Yomi Kabiawu from the Department of Information Systems, University of Cape Town. The study is about understanding

Your students have been selected as possible participants in this study because they are currently in high school however we understand that some are under the age of 18 and we require your approval in order for them to participate. There are also questions regarding socio-economic background (e.g. race, family, etc.) that would be asked. If you decide to allow your students to participate, they will be asked questions about themselves and a recollection of present or past bullying experiences.

By taking part in this study, your students may experience the following risks:

- Emotional risk: Recalling past or reliving present bullying incidents may produce or increase feelings of sadness and/or anxiety.
- There may also be risks involved from taking part in this study that are not known to researchers at this time.

As a participant in this research study, there may be no direct benefit for a student if they have never experienced being mobile bullied; however, information from this study may benefit them when they are faced as a witness of a mobile bullying incident and they will get information on the right steps to take to help a victim.

Your students' participation is voluntary. If you have any questions about the study, please feel free to contact oluyomi.kabiawu@uct.ac.za or 0790800797.

Your signature indicates that you have read and understood the information provided above, that you willingly agree to allow your students to participate, that they may withdraw their consent at any time and discontinue participation without penalty, that you will receive a copy of this form, and that you are not waiving any legal claims.

Thank you.

Signature..... Date: .....

Appendix G Questionnaire

UNIVERSITY OF CAPE TOWN
FACULTY OF COMMERCE
Igniting Knowledge and Opportunity

Research Information Sheet
Title of Study: Designing an Anti-Bullying Mobile Application for High School Students: A Female Bully-Victim Study

Purpose

You are being asked to participate in a research study that is trying to understand mobile bullying in South African high schools. The study also examines females within this group in order to understand the factors surrounding their actions. A mobile bullying reporting application has been developed and at the end of the survey we would like you to indicate and go ahead if you would also like to participate in the testing of the app.

Please read this form and ask any questions you may have before agreeing to be in the study.

Study Procedures

If you agree to take part in this research study, you will be asked questions about yourself (e.g. race, family, etc.) and your recollection of present or past bullying experiences. The survey should take about 15 minutes to complete.

Benefits

As a participant in this research study, there may be no direct benefit for you if you have never experienced being mobile bullied; however, information from this study may benefit you when you are faced as a witness of a mobile bullying incident and you will get information on the right steps to take to help a victim.

Risks

By taking part in this study, you may experience the following risks:

- *Emotional risk*: Recalling past or reliving present bullying incidents may produce or increase feelings of sadness and/or anxiety.
- There may also be risks involved from taking part in this study that are not known to researchers at this time.

Confidentiality

- All information collected about you during the course of this study will be kept without any identifiers.

Voluntary Participation /Withdrawal
Taking part in this study is voluntary. You have the right to choose not to take part in this study. You are free to only answer questions that you want to answer. You are free to withdraw from participation in this study at any time.

Questions

This research has been approved by the University of Cape Town, Commerce Faculty Ethics in Research Committee. If you have any questions about this study now or in the future, you may contact Yomi Kabiawu (oluyomi.kabiawu@uct.ac.za) or Professor Mike Kyobe (michael.kyobe@uct.ac.za) in the Department of Information Systems, University of Cape Town at 0216502597.

Consent

By completing the survey, you are agreeing to participate in this study.

Duration

The survey should take just about 10 – 15 minutes to complete.

INTRODUCTION

Bullying refers to any written or verbal message (including videos or photos) conveyed to you directly by somebody or conveyed to other people about you, which you have been made aware of and:

i. you consider to be nasty/hostile, hurtful, abusive or coercive;
ii. make jest of you;
iii. represent you negatively such as calling you names; or
iv. are lies or spread false rumors about you.

Cyber-bullying is carried out via some form of media such as:

i. Text messaging
ii. Pictures/photos or video clips
iii. Phone calls (mean, silent, etc.)
iv. Email
v. Chat rooms
vi. Instant messaging
vii. Social Networking Websites (posted/sent through Facebook, MySpace, Twitter, Live Journal, or similar social networking sites)

Remember

The incident is considered to be mobile-bullying, only when these things have happened more than once. When the messages are conveyed in a playful or friendly manner (e.g. teasing), we do not consider it as mobile-bullying.

Mobile-bullying communications are intentionally intended to harm you in some way. This may happen through communications sent to you, as well as when messages are sent to others about you (that you have become aware of).

A - GENERAL INFORMATION (Tick ✓ only one box)					
Gender	Female		Male		
Age	14 or younger	15	16	17	18 or older
Ethnic Background	Black	Colored	Indian/Asian	White	Prefer not to Answer
Your Grade	7	8	9	10	11 - 12
My family consists of	One parent and sibling(s)	Both parents and sibling(s)	Parents, siblings and extended family	Grandparents, parent and extended family	Other
On average I daily spend these hours in the Internet	0 - 2hours	3 - 5hours	6 -8hours	8- 10 hours	More than 10hours
What brand of phone do you use?	iPhone	Samsung smartphone	Simple feature phone	Other (Specify below)	
Phone model					
What service plan do you have on your mobile phone?					

B – MOBILE PHONE ONLINE BEHAVIOUR (Tick ✓ only one box)					
How often in the last 6 months have you experienced the following when using your MOBILE PHONE?					
	Never	**Rarely**	**Sometimes**	**Often**	**Always**
Been made fun of in a chat room?					
Received an email from someone you know that made you really mad?					
Received an email from someone you didn't know that made you really mad? This does not include "spam" mail.					
Someone phoned you just to give you a hard time?					
Someone posted something on your social media page that made you upset or uncomfortable?					
Someone posted something on another web page that made you upset or uncomfortable?					
Received an instant message that made you upset or uncomfortable?					
Have your parents talk to you about being safe on the Internet?					
Have a teacher talk to you about being safe on the Internet?					
Have been bullied or picked on by another person while online?					
Have been afraid to go on online?					
Threats made online were carried out in school?					
Someone posted about you online that you didn't want others to see?					
A female carried out the above?					
An unknown individual carried out the above?					

How often in the last 6 months have you done the following when using your MOBILE PHONE?					
	Never	Rarely	Sometimes	Often	Always
Lied about your age while online?					
Posted something online about someone else to make others laugh?					
Sent someone a text message to make them angry or to make fun of them?					
Sent someone an email to make them angry or to make fun of them?					
Posted something on someone's social media page to make them angry or to make fun of them?					
Taken a picture of someone and posted it online without their permission?					
Reported mobile bullying to friends?					
Reported mobile bullying to your parents/family?					
Reported mobile bullying to your teacher / school authority?					

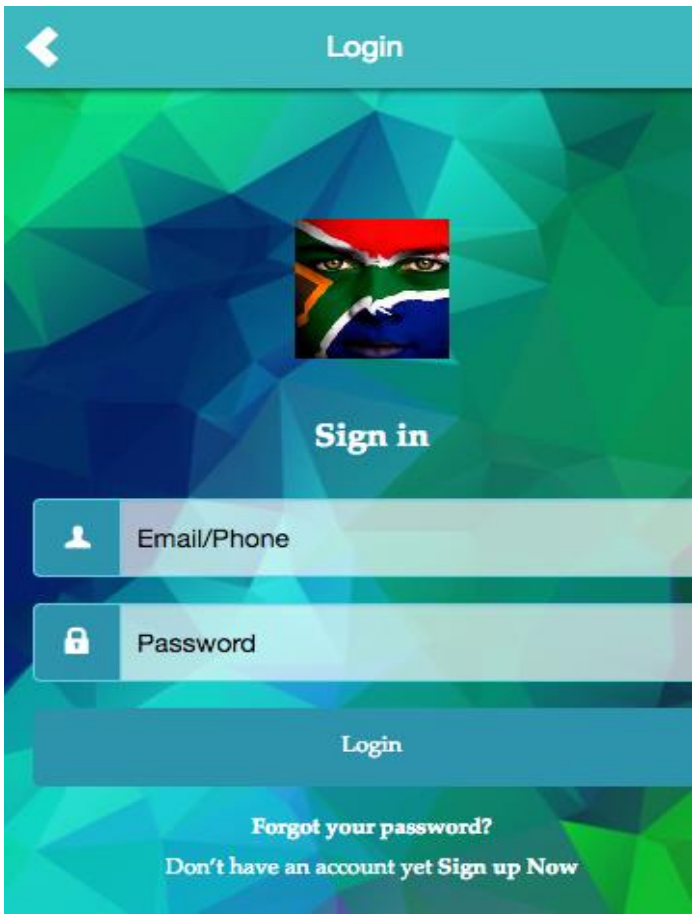
C - YOUR GADGETS AND HABITS (Tick ✓ only one box)					
	Strongly Disagree	Disagree	Somehow Agree	Agree	Strongly Agree
I feel preoccupied with my mobile phone (think about previous on-line activity or anticipate next on-line session)?					
I feel the need to use my mobile phone with increasing amounts of time in order to achieve satisfaction?					
I have repeatedly made unsuccessful efforts to control, cut back, or stop my mobile phone or Internet use?					
I feel restless, moody, depressed, or irritable when attempting to cut down my mobile phone use?					
I stay online longer than originally intended					
I have lied to family members or others to conceal my extent of involvement with the Internet					
I use my mobile phone as a way of escaping from problems or relieving a dysphoric mood (e.g. feelings of helplessness, guilt, anxiety, depression)					
I join (repost/cheer) cyberbullying when it occurs					
I watch but do not participate when cyberbullying is ongoing					
I leave the online environment when cyberbullying is ongoing					
I have many friends who engage in mobile bullying					
In your own opinion, which application is most commonly used in mobile bullying?	SMS /MMS	Email	Instant Messaging (BBM, WhatsApp)	Social Network (Facebook,Twitter)	Voice Calls

D – INTERVENTIONS (Tick ✓ only one box)					
Teachers intervene adequately when mobile bullying is reported	**Strongly Disagree**	**Disagree**	Somehow Agree	**Agree**	**Strongly Agree**
Explain why you think so					
Family intervene adequately when mobile bullying is reported	**Strongly Disagree**	**Disagree**	Somehow Agree	**Agree**	**Strongly Agree**
Explain why you think so					
Friends intervene adequately when mobile bullying is reported	**Strongly Disagree**	**Disagree**	Somehow Agree	**Agree**	**Strongly Agree**
Explain why you think so					
There are mobile apps that can help protect against mobile bullying	**Strongly Disagree**	**Disagree**	Somehow Agree	**Agree**	**Strongly Agree**
If there are, please mention a few					
What features are your favorites in any of the apps?					
Would you like an app that enables you report mobile bullying anonymously?					
Would you like an app that gives you information on what to do about mobile bullying?					
Features of the app should support the following people: (Check all that apply)	**Bully**	**Victim**	**Witness / Bystander**	**Parents**	**Teachers**
Would you be willing to participate in the evaluation of such an app at a later time?					
Please include any other suggestions for the anti-mobile bullying app					

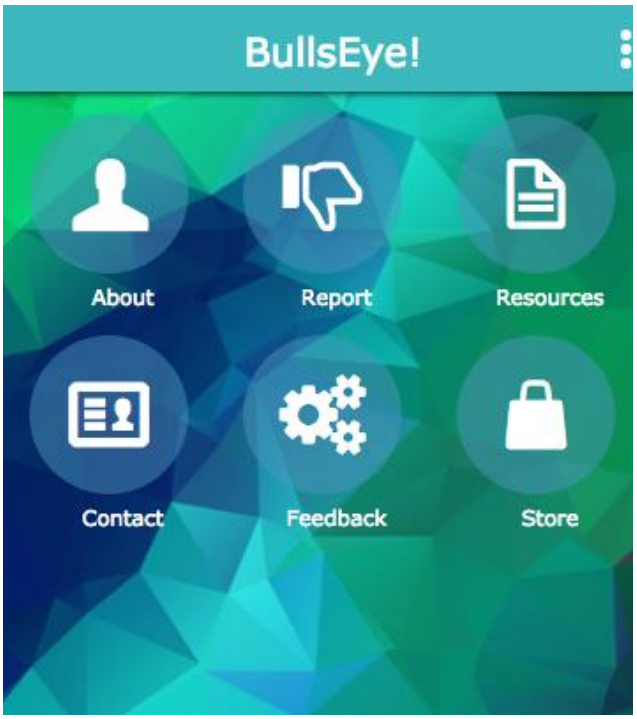
If you would like to test the mobile bullying reporting app, please do so at
(For Android devices only)
http://snappy.appypie.com/media/user_space/186248c9dcbb/186248c9dcbb.apk
Leave a comment on the Feedback page of the app and we will be happy to get back to you if you supply your details. Thank you!

Appendix H Second Iteration Mobile Bullying Intervention App Interface

Login page



Menu page

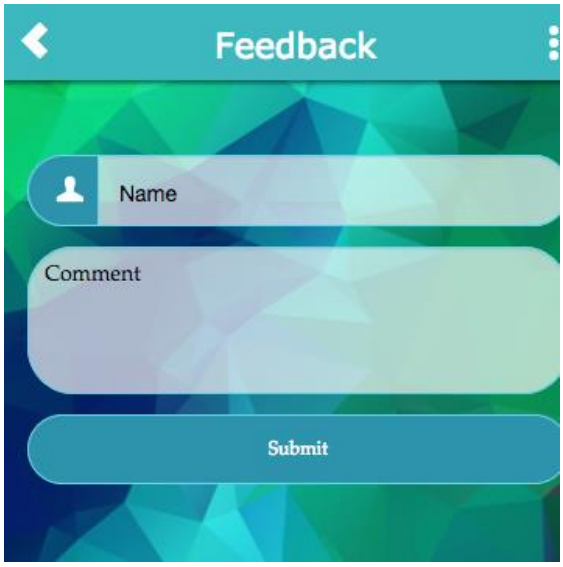


About page


About
BullsEyel is a prototype of a mobile bullying reporting application. We hope this app will provide some support to bullies, victims and witnesses. You are participating in the evaluation of this prototype. Details submitted will be stored bu will be kept confidentially. By using this app, you consent to the information provided to be used for the Researcher and University of Cape Town, Information Systems Department research purposes.
Founder
IS Dept, UCT
Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book
Founded : 2015
Mission
This app is aimed at understanding the trends and dynamics of mobile bullying among High School students. It also provides support to help address the problem.
Vision
To provide support for parties involved in Mobile Bullying in High Schools

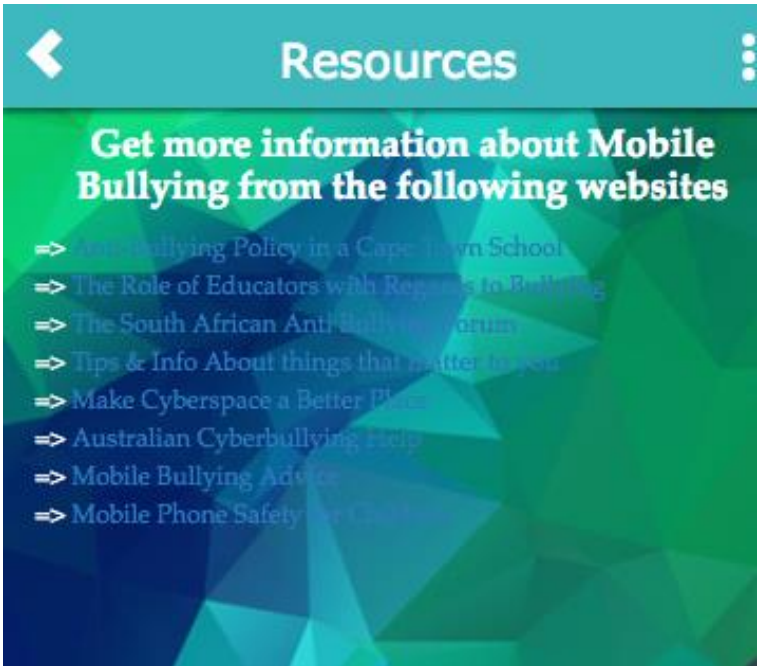
Report Page

Feedback



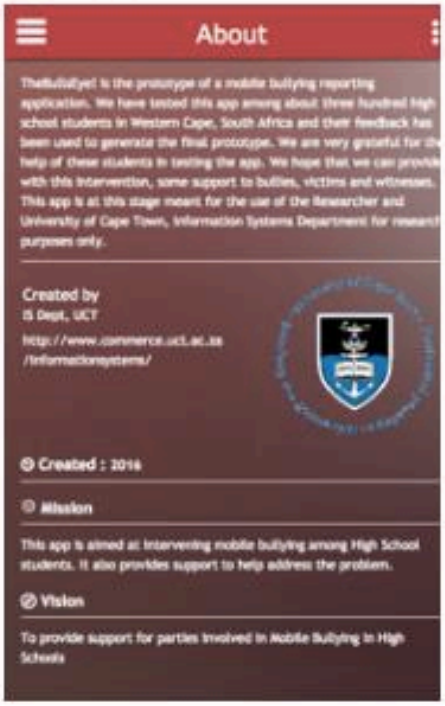
Contact page

Resources page

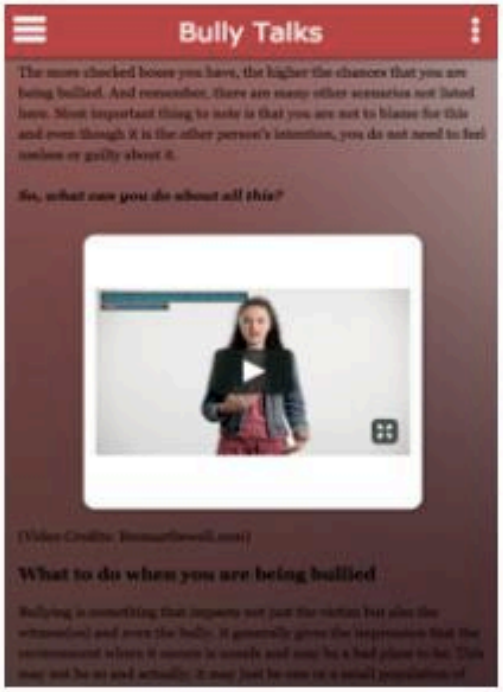


Appendix I Final Mobile Bullying Intervention App Interface

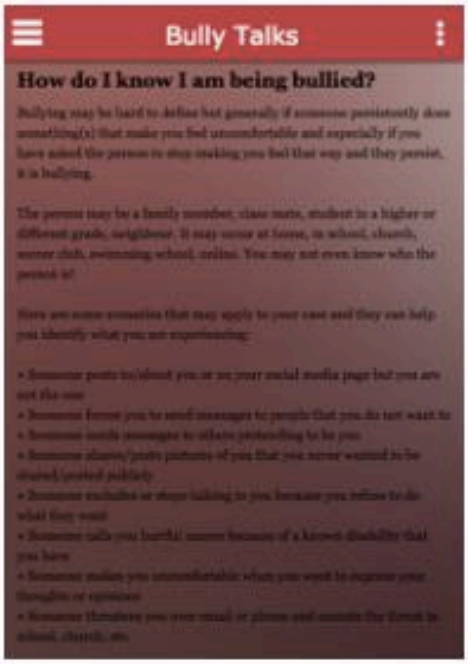
About page

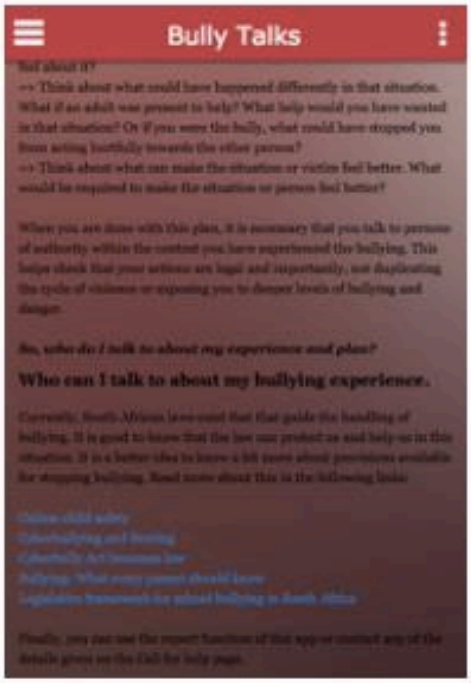


Bully Talks



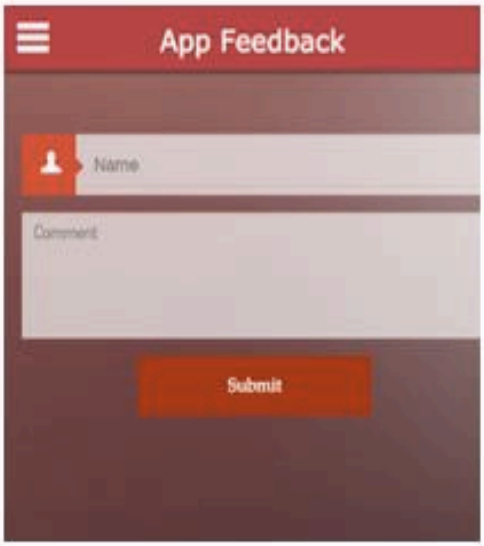
Bully talks





Feedback Page

App Feedback Page



Appendix J App Survey Information Sheet

UNIVERSITY OF CAPE TOWN
FACULTY OF COMMERCE
Igniting Knowledge and Opportunity

Research Information Sheet
Title of Study: Designing an Anti-Bullying Mobile Application for High School Students: A Female Bully-Victim Study

Purpose
Last year, we had the pleasure of conducting a survey on mobile bullying with over 2500 school learners in Cape Town. A (non-gender specific) mobile bullying reporting application has been developed and we now require feedback from ongoing use of the app between now and September 2017. From the previous leg of the research, it was observed that many learners wanted information to handle bullying and a few would report incidents if given the assurance of support from authorities. Your students are kindly asked to participate in this study that is trying to understand and intervene mobile bullying in South African schools.

Study Procedures
Learners with Android mobile devices can download the app from the following link: http://d2wuvg8krwnvon.cloudfront.net/appfile/542f899e866e.apk which can also be obtained by scanning the QR Code. For non-Android users the link can be obtained as follows: http://snappy.appypie.com/html5/thebullseye and the app can be used on any Internet browser application (e.g. Safari, Google Chrome, Mozilla Firefox, Opera).

Once the app is downloaded, there is text information, a video and a report feature available at any time to make a bullying report. There is also an app feedback menu that they can use to tell us about their experience using the app and any suggested feature enhancements. **Students are encouraged to report anonymously as this exercise is for test purposes only**. The key findings on the nature of bullying across the study can be provided if the school would like to have the information.

Benefits
We are happy to offer an incentive of R50 to users that give app feedback and make reports. (Please not that to receive the airtime, learners need to provide us their school name, mobile provider and phone number to send the airtime to when making the report or giving feedback e.g. *Mt Hawthorn College – MTN 0891590072*).

Risks
There are no known risks involved from taking part in this study.

Confidentiality
All information collected during the course of this study will be kept without any identifiers.

Voluntary Participation /Withdrawal
Taking part in this study is voluntary. Students are free to withdraw from participation at any time.

Questions
This research has been approved by the Department of Education, University of Cape Town, Commerce Faculty Ethics in Research Committee. If you have any questions about this study now or in the future, you may contact Yomi Kabiawu (oluyomi.kabiawu@uct.ac.za) or Professor Mike Kyobe (michael.kyobe@uct.ac.za) in the Department of Information Systems, University of Cape Town at 0216502597.

Consent
By using the app, learners are agreeing to participate in this study.

Definitions
Bullying refers to any written or verbal message (including videos or photos) conveyed to you directly by somebody or conveyed to other people about you, which you have been made aware of and:

v. you consider to be nasty/hostile, hurtful, abusive or coercive;
vi. make jest of you;
vii. represent you negatively such as calling you names; or
viii. are lies or spread false rumors about you.

Cyber-bullying is carried out via some form of media such as:

viii. Text messaging or chat rooms
ix. Pictures and photos or video clips
x. Phone calls (mean, silent, etc.)
xi. Email
xii. Instant messaging
xiii. Social Networking Websites (posted/sent through Facebook, Myspace, Twitter, Live Journal, or similar social networking sites)

Remember
The incident is considered to be mobile-bullying, only when these things have happened more than once. If the messages are conveyed in a playful or friendly manner (e.g. teasing), we do not consider it as mobile-bullying.

Mobile-bullying communications are intentionally intended to harm you in some way. This may happen through communications sent to you, as well as when messages are sent to others about you (that you have become aware of).

Thank you for your participation!

Appendix K Full Post hoc tables of Descriptive Statistics

Breakdown Table of Descriptive Statistics by Age

AGE	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
<= 14	2.622642	53	1.496488	2.943396	53	1.307009	1.886792	53	0.912738
15	2.470588	51	1.301583	2.400000	55	0.973729	1.796296	54	0.959159
16	1.681818	44	1.073415	2.340909	44	0.986966	1.463415	41	0.710548
17	2.033333	30	1.159171	2.344828	29	1.564697	2.066667	30	1.507071
>= 18	2.000000	12	0.953463	2.333333	15	1.345185	2.000000	10	1.054093
All Grps	2.231579	190	1.312960	2.520408	196	1.217223	1.803191	188	1.023045
AGE	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)
<= 14	3.377358	53	1.304230	1.846154	52	1.226898	1.584906	53	0.886522
15	2.981818	55	1.130239	2.018182	55	1.178368	1.854545	55	1.177225
16	3.045455	44	0.987234	1.461538	39	0.755546	2.000000	44	1.380933
17	3.166667	30	1.116748	1.800000	30	0.996546	1.733333	30	0.980265
>= 18	3.066667	15	0.703732	1.600000	15	0.910259	1.666667	15	0.899735
All Grps	3.137056	197	1.123268	1.790576	191	1.080017	1.781726	197	1.110282
AGE	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)
<= 14	1.735849	53	1.040542	2.823529	51	1.211708	3.117647	51	1.423335
15	2.000000	55	1.247219	1.472727	55	0.741733	2.636364	55	1.176367
16	1.500000	44	0.902194	1.818182	44	1.062527	2.545455	44	0.998942
17	1.482759	29	0.687682	1.500000	26	0.860233	2.733333	30	0.691492
>= 18	1.333333	15	0.816497	2.533333	15	0.915475	2.866667	15	1.302013
All Grps	1.688776	196	1.032834	2.000000	191	1.133230	2.774359	195	1.171112
AGE	SENTEMAIL (Mean)	SENTEMAIL (N)	SENTEMAIL (SD)	POSTEDONTHEIRSOCIALMEDIA (Mean)	POSTEDONTHEIRSOCIALMEDIA (N)	POSTEDONTHEIRSOCIALMEDIA (SD)	PICTUREWITHOUTPERMISSION (Mean)	PICTUREWITHOUTPERMISSION (N)	PICTUREWITHOUTPERMISSION (SD)
<= 14	2.274510	51	1.184541	1.882353	51	1.259318	2.529412	51	1.433219
15	1.611111	54	0.940025	1.436364	55	0.687552	1.363636	55	0.676692
16	1.560976	41	0.672636	1.209302	43	0.411625	1.931818	44	1.404275
17	1.900000	30	0.922889	1.400000	30	0.674665	1.533333	30	0.860366
>= 18	1.600000	15	1.183216	1.400000	15	0.736788	1.600000	15	0.828079
All Grps	1.821990	191	1.015531	1.494845	194	0.865262	1.841026	195	1.210078

Breakdown Table of Descriptive Statistics by Grade

GRADE	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
8	2.789474	38	1.358813	3.236842	38	1.514510	2.162162	37	1.258604
9	2.266667	45	1.286291	2.673913	46	0.944089	1.543478	46	0.656811
10	2.323529	34	1.036328	2.486486	37	1.095993	2.058824	34	1.229466
11	1.860000	50	1.212351	2.019608	51	1.224585	1.574468	47	0.878355
All Grps	2.275449	167	1.269022	2.563953	172	1.271129	1.798780	164	1.034259

GRADE	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)
8	3.473684	38	1.330248	2.162162	37	1.280484	1.947368	38	0.868281
9	2.826087	46	1.017717	1.795455	44	1.111871	1.739130	46	1.143771
10	3.000000	37	1.000000	1.675676	37	1.106899	1.729730	37	1.216750
11	3.019231	52	0.874259	1.807692	52	0.950510	1.730769	52	0.992430
All Grps	3.063584	173	1.068308	1.852941	170	1.107595	1.780347	173	1.055586

GRADE	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)
8	1.315789	38	0.739074	2.583333	36	1.317465	3.194444	36	1.410561
9	2.086957	46	1.226125	2.152174	46	0.918148	3.065217	46	1.083250
10	2.135135	37	1.250826	1.513514	37	0.869918	2.432432	37	1.068242
11	1.384615	52	0.661367	1.958333	48	1.147770	2.615385	52	1.050748
All Grps	1.716763	173	1.054121	2.047904	167	1.123722	2.818713	171	1.176686

GRADE	SENTEMAIL (Mean)	SENTEMAIL (N)	SENTEMAIL (SD)	POSTEDONTHEIRSOCIALMEDIA (Mean)	POSTEDONTHEIRSOCIALMEDIA (N)	POSTEDONTHEIRSOCIALMEDIA (SD)	PICTUREWITHOUTPERMISSION (Mean)	PICTUREWITHOUTPERMISSION (N)	PICTUREWITHOUTPERMISSION (SD)
8	2.138889	36	1.174802	1.777778	36	1.333333	2.083333	36	1.250714
9	2.288889	45	0.991377	1.760870	46	0.848130	2.326087	46	1.476548
10	1.432432	37	0.765236	1.189189	37	0.518429	1.432432	37	0.800713
11	1.519231	52	0.828189	1.431373	51	0.670967	1.576923	52	1.054331
All Grps	1.835294	170	1.007041	1.541176	170	0.897768	1.853801	171	1.225573

Breakdown Table of Descriptive Statistics by Family

FAMILY	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
1	1.886364	44	0.969678	2.956522	46	1.365553	2.044444	45	1.347650
2	2.247191	89	1.227348	2.296703	91	1.090306	1.623529	85	0.723360
3	3.040000	25	1.881489	3.370370	27	0.966681	2.148148	27	1.166972
4	2.105263	19	1.328940	2.105263	19	0.936586	1.944444	18	1.211330
5	2.250000	12	0.965307	1.666667	12	1.302678	1.333333	12	0.651339
All Grps	2.253968	189	1.308340	2.543590	195	1.231836	1.812834	187	1.038116

FAMILY	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)
1	3.391304	46	1.255712	1.727273	44	1.064515	2.217391	46	1.459270
2	3.120879	91	1.073263	1.896552	87	0.976878	1.582418	91	0.907572
3	2.821429	28	1.306779	1.714286	28	1.272418	1.821429	28	0.983327
4	3.000000	19	0.881917	1.578947	19	0.901591	1.631579	19	0.830698
5	2.916667	12	0.514929	1.333333	12	0.887625	1.666667	12	1.302678
All Grps	3.117347	196	1.119297	1.763158	190	1.034695	1.775510	196	1.109683

FAMILY	UNCOMFORTABLEIM (Mean)	UNCOMFORTABLEIM (N)	UNCOMFORTABLEIM (SD)	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	ONLINETHREAT (Mean)	ONLINETHREAT (N)	ONLINETHREAT (SD)
1	2.695652	46	1.244893	1.586957	46	0.858321	1.282609	46	0.910752
2	2.433333	90	1.272439	1.977778	90	1.141434	1.450549	91	0.909991
3	3.785714	28	1.524058	1.357143	28	0.731021	1.178571	28	0.547964
4	2.526316	19	1.123903	1.473684	19	1.123903	1.000000	19	0.000000
5	2.100000	10	0.994429	1.333333	12	0.887625	1.555556	9	1.130388
All Grps	2.683938	193	1.353468	1.707692	195	1.036296	1.331606	193	0.837833

FAMILY	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)
1	1.586957	46	0.858321	1.847826	46	1.010333	2.782609	46	1.153026
2	1.977778	90	1.141434	1.941176	85	1.015979	2.764045	89	1.224953
3	1.357143	28	0.731021	2.571429	28	1.549876	2.892857	28	1.133310
4	1.473684	19	1.123903	2.000000	19	0.942809	2.842105	19	1.118688
5	1.333333	12	0.887625	2.000000	12	1.279204	2.833333	12	1.029857
All Grps	1.707692	195	1.036296	2.021053	190	1.131361	2.798969	194	1.163254

FAMILY	SENTEMAIL (Mean)	SENTEMAIL (N)	SENTEMAIL (SD)	POSTEDONTHEIRSOCIALMEDIA (Mean)	POSTEDONTHEIRSOCIALMEDIA (N)	POSTEDONTHEIRSOCIALMEDIA (SD)	PICTUREWITHOUTPERMISSION (Mean)	PICTUREWITHOUTPERMISSION (N)	PICTUREWITHOUTPERMISSION (SD)

1	2.133333	45	1.159937	1.173913	46	0.383223	2.130435	46	1.469825
2	1.848837	86	1.011899	1.625000	88	0.875103	1.775281	89	1.063365
3	1.678571	28	0.862965	1.607143	28	1.257254	2.142857	28	1.353029
4	1.368421	19	0.597265	1.736842	19	0.933459	1.157895	19	0.374634
5	1.666667	12	1.073087	1.166667	12	0.577350	1.416667	12	1.164500
All Grps	1.831579	190	1.014734	1.497409	193	0.866773	1.829897	194	1.207461

Breakdown Table of Descriptive Statistics by Ethnicity

Breakdown Table of Descriptive Statistics; Smallest N for any variable: 169;
Include condition: Bully-victim >= 2.5

ETHNIC	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
1	2.000000	29	1.336306	2.906250	32	1.227622	1.814815	27	1.144789
2	1.981308	107	1.165392	2.254545	110	1.087345	1.633028	109	0.812638
3	3.000000	3	0.000000	3.000000	3	0.000000	4.000000	3	0.000000
4	4.000000	4	0.000000	1.000000	4	0.000000	1.000000	4	0.000000
5	3.115385	26	1.704745	3.115385	26	1.336471	1.923077	26	1.092633
All Grps	2.224852	169	1.357202	2.485714	175	1.202761	1.733728	169	0.960586

ETHNIC	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)
1	2.593750	32	1.266424	2.062500	32	1.268413	2.500000	32	1.391217
2	3.234234	111	1.017617	1.728972	107	1.023959	1.540541	111	0.892227
3	2.000000	3	0.000000	1.000000	3	0.000000	1.000000	3	0.000000
4	3.000000	4	0.000000	2.000000	4	0.000000	1.000000	4	0.000000
5	3.653846	26	1.231010	2.208333	24	1.250362	2.307692	26	1.319674
All Grps	3.153409	176	1.128483	1.852941	170	1.102240	1.806818	176	1.134981

ETHNIC	UNCOMFORTABLEIM (Mean)	UNCOMFORTABLEIM (N)	UNCOMFORTABLEIM (SD)	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	ONLINETHREAT (Mean)	ONLINETHREAT (N)	ONLINETHREAT (SD)
1	2.875000	32	1.408500	1.812500	32	1.306004	1.312500	32	0.997982
2	2.435185	108	1.284510	1.554545	110	0.934422	1.361111	108	0.814108
3	2.000000	3	0.000000	3.000000	3	0.000000	1.000000	3	0.000000
4	2.000000	4	0.000000	2.000000	4	0.000000	3.000000	4	0.000000
5	4.076923	26	0.976650	1.769231	26	1.106623	1.230769	26	0.862911
All Grps	2.745665	173	1.369963	1.668571	175	1.036066	1.364162	173	0.876229

ETHNIC	POSTEDONLINE (Mean)	POSTEDONLINE (N)	POSTEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)
1	1.625000	32	1.008032	2.093750	32	1.058281	3.375000	32	1.128802
2	1.504587	109	0.789091	1.864865	111	1.124007	2.522523	111	1.189705
3	1.000000	3	0.000000	1.000000	3	0.000000	3.000000	3	0.000000
4	1.000000	4	0.000000		0		3.000000	4	0.000000
5	2.625000	24	1.555146	2.666667	24	1.129319	3.041667	24	1.398109
All Grps	1.662791	172	1.032914	2.005882	170	1.138342	2.770115	174	1.227820

ETHNIC	SENTEMAIL (Mean)	SENTEMAIL (N)	SENTEMAIL (SD)	POSTEDONTHEIRSOCIALMEDIA (Mean)	POSTEDONTHEIRSOCIALMEDIA (N)	POSTEDONTHEIRSOCIALMEDIA (SD)	PICTUREWITHOUTPERMISSION (Mean)	PICTUREWITHOUTPERMISSION (N)	PICTUREWITHOUTPERMISSION (SD)
1	1.741935	31	1.153769	1.625000	32	1.263635	1.656250	32	1.095721
2	1.537037	108	0.858448	1.390909	110	0.717992	1.648649	111	1.100815
3	3.000000	3	0.000000	1.000000	3	0.000000	1.000000	3	0.000000
4	2.000000	4	0.000000	2.000000	4	0.000000	1.000000	4	0.000000
5	2.416667	24	1.176460	1.458333	24	0.779028	2.833333	24	1.606148
All Grps	1.735294	170	1.006159	1.450867	173	0.845069	1.787356	174	1.233286

Breakdown Table of Descriptive Statistics by School

Breakdown Table of Descriptive Statistics; Smallest N for any variable: 190; Include condition: Bully-victim >= 2.5

SCHOOL CODE	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
1	1.375000	8	0.744024	1.625000	8	1.407886	1.250000	8	0.462910
2	1.933333	30	1.229896	2.741935	31	1.237410	1.793103	29	0.977581
3	1.571429	7	0.534522	1.800000	10	0.918937	2.111111	9	1.166667
4	2.000000	1		2.000000	1		1.000000	1	
5	3.333333	3	1.527525	3.333333	3	2.081666	2.333333	3	1.154701
6	2.678571	28	1.516662	2.750000	28	0.967050	1.857143	28	1.044005
7	2.130435	23	1.099766	2.000000	23	1.243163	1.714286	21	0.956183
8	2.315217	92	1.333667	2.680851	94	1.211173	1.835165	91	1.087952
All Grps	2.234375	192	1.307356	2.540404	198	1.228215	1.810526	190	1.031716

SCHOOL CODE	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)
1	3.500000	8	1.069045	2.000000	8	1.069045	1.875000	8	1.457738
2	2.967742	31	0.948116	1.620690	29	1.082781	1.741935	31	1.237410
3	3.700000	10	0.948683	1.700000	10	0.823273	2.000000	10	1.154701
4	4.000000	1		4.000000	1		5.000000	1	
5	3.333333	3	1.527525	3.666667	3	1.154701	3.333333	3	1.527525
6	3.214286	28	1.315355	1.857143	28	1.112697	1.678571	28	0.818923
7	3.208333	24	1.178767	1.695652	23	0.926125	1.541667	24	0.883627
8	3.053191	94	1.129916	1.758242	91	1.078483	1.776596	94	1.089088
All Grps	3.140704	199	1.128287	1.792746	193	1.079424	1.783920	199	1.109437

SCHOOL CODE	UNCOMFORTABLEIM (Mean)	UNCOMFORTABLEIM (N)	UNCOMFORTABLEIM (SD)	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	AFRAIDTOGOONLINE (Mean)	AFRAIDTOGOONLINE (N)	AFRAIDTOGOONLINE (SD)
1	2.625000	8	1.302470	1.142857	7	0.377964	1.714286	7	0.951190
2	2.566667	30	1.406471	1.516129	31	0.926318	1.483871	31	0.889605
3	2.400000	10	1.264911	1.400000	10	0.516398	1.111111	9	0.333333
4	5.000000	1		4.000000	1		4.000000	1	
5	4.000000	3	1.000000	3.000000	3	2.000000	2.666667	3	2.081666
6	2.821429	28	1.362285	1.821429	28	1.090483	1.444444	27	0.697982
7	2.875000	24	1.423789	1.833333	24	1.049500	1.500000	24	1.063219
8	2.543478	92	1.337646	1.691489	94	1.037227	1.428571	91	0.790820
All Grps	2.658163	196	1.358915	1.696970	198	1.032021	1.476684	193	0.872452

SCHOOL CODE	ONLINETHREAT (Mean)	ONLINETHREAT (N)	ONLINETHREAT (SD)	POSTEDONLINE (Mean)	POSTEDONLINE (N)	POSTEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)

1	1.625000	8	0.916125	1.375000	8	0.517549	2.125000	8	1.125992
2	1.133333	30	0.434172	1.633333	30	0.889918	1.903226	31	1.193171
3	1.300000	10	0.674949	1.777778	9	0.971825	1.900000	10	0.875595
4	4.000000	1		3.000000	1		2.000000	1	
5	3.000000	3	2.000000	3.333333	3	2.081666	1.666667	3	1.154701
6	1.214286	28	0.629941	1.592593	27	1.152231	2.230769	26	1.106623
7	1.708333	24	1.398109	1.375000	24	0.710939	1.833333	24	1.129319
8	1.217391	92	0.608115	1.630435	92	1.024077	2.033333	90	1.165516
All Grps	1.326531	196	0.832365	1.623711	194	1.006535	2.005181	193	1.129608

SCHOOL CODE	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)	SENTEMAIL (Mean)	SENTEMAIL (N)	SENTEMAIL (SD)	POSTEDONTHEIRSOCIALMEDIA (Mean)	POSTEDONTHEIRSOCIALMEDIA (N)	POSTEDONTHEIRSOCIALMEDIA (SD)
1	2.000000	8	0.925820	1.250000	8	0.462910	1.250000	8	0.462910
2	2.741935	31	0.929794	1.833333	30	0.985527	1.483871	31	0.926318
3	2.100000	10	0.737865	1.444444	9	0.881917	1.300000	10	0.674949
4	1.000000	1		1.000000	1		1.000000	1	
5	2.000000	3	1.000000	1.666667	3	1.154701	1.333333	3	0.577350
6	3.111111	27	1.250641	2.259259	27	1.059484	1.555556	27	0.800641
7	2.500000	24	1.503619	1.250000	24	0.896854	1.347826	23	0.934622
8	2.935484	93	1.130664	1.934066	91	1.008874	1.559140	93	0.902441
All Grps	2.771574	197	1.175257	1.818653	193	1.012044	1.489796	196	0.862256

SCHOOL CODE	PICTUREWITHOUTPERMISSION (Mean)	PICTUREWITHOUTPERMISSION (N)	PICTUREWITHOUTPERMISSION (SD)
1	1.750000	8	0.707107
2	1.903226	31	1.374890
3	1.300000	10	0.483046
4	2.000000	1	
5	1.333333	3	0.577350
6	2.370370	27	1.305260
7	1.375000	24	0.646899
8	1.860215	93	1.281909
All Grps	1.837563	197	1.205434

Breakdown Table of Descriptive Statistics by Teacher Intervention

Breakdown Table of Descriptive Statistics; Smallest N for any variable: 173; Include condition: Bully-victim >= 2.5

TEACHERSINTERVENE	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
1	1.411765	17	0.870260	2.555556	18	1.041618	1.941176	17	1.248529
2	2.882353	17	1.166316	2.235294	17	0.903425	1.470588	17	0.799816
3	1.793103	58	1.072113	2.344828	58	1.291697	1.679245	53	0.893859
4	2.771429	35	1.330319	2.500000	36	1.298351	1.583333	36	0.769972
5	2.468085	47	1.442387	3.100000	50	1.035098	2.260000	50	1.258603
All Grps	2.241379	174	1.312153	2.597765	179	1.201682	1.832370	173	1.051407

TEACHERSINTERVENE	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)
1	2.888889	18	1.182663	2.437500	16	1.314978	2.611111	18	1.685191
2	2.705882	17	1.263166	2.470588	17	0.943242	2.294118	17	1.159995
3	3.224138	58	0.955925	1.581818	55	1.012714	1.431034	58	0.900528
4	2.972222	36	1.055221	2.000000	36	1.069045	1.527778	36	0.774084
5	3.300000	50	1.265718	1.367347	49	0.858630	1.840000	50	1.113186
All Grps	3.111732	179	1.126208	1.774566	173	1.073486	1.765363	179	1.122160

TEACHERSINTERVENE	UNCOMFORTABLEIM (Mean)	UNCOMFORTABLEIM (N)	UNCOMFORTABLEIM (SD)	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	AFRAIDTOGOONLINE (Mean)	AFRAIDTOGOONLINE (N)	AFRAIDTOGOONLINE (SD)
1	1.500000	18	1.043185	1.888889	18	1.182663	1.111111	18	0.471405
2	2.764706	17	1.200490	2.941176	17	1.344925	1.647059	17	1.114741
3	2.368421	57	1.079543	1.655172	58	1.018284	1.568966	58	1.027893
4	2.638889	36	1.290687	1.361111	36	0.542627	1.548387	31	0.809885
5	3.104167	48	1.519232	1.540000	50	0.930438	1.510204	49	0.819615
All Grps	2.573864	176	1.333180	1.709497	179	1.051734	1.508671	173	0.899732

TEACHERSINTERVENE	ONLINETHREAT (Mean)	ONLINETHREAT (N)	ONLINETHREAT (SD)	POSTEDONLINE (Mean)	POSTEDONLINE (N)	POSTEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)
1	1.222222	18	0.548319	1.687500	16	0.946485	1.444444	18	0.704792
2	1.647059	17	1.455214	1.352941	17	0.701888	2.117647	17	0.696631
3	1.218182	55	0.658025	1.517241	58	0.821667	1.724138	58	1.005129
4	1.583333	36	0.906327	1.527778	36	0.736250	2.000000	32	1.319824
5	1.260000	50	0.828325	1.920000	50	1.397374	2.540000	50	1.248836
All Grps	1.346591	176	0.861421	1.632768	177	1.014469	2.017143	175	1.147082

TEACHERSINTERVENE	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)	SENTEMAIL (Mean)	SENTEMAIL (N)	SENTEMAIL (SD)	POSTEDONTHEIRSOCIALMEDIA (Mean)	POSTEDONTHEIRSOCIALMEDIA (N)	POSTEDONTHEIRSOCIALMEDIA (SD)
1	2.388889	18	1.092159	1.222222	18	0.427793	1.222222	18	0.548319
2	3.294118	17	1.212678	2.294118	17	1.159995	1.625000	16	0.500000
3	2.551724	58	0.920953	1.654545	55	0.798568	1.206897	58	0.486975
4	2.611111	36	1.419814	1.485714	35	0.742469	1.750000	36	1.204159
5	3.060000	50	1.132272	2.100000	50	1.073807	1.760000	50	1.041192
All Grps	2.759777	179	1.162790	1.765714	175	0.938923	1.511236	178	0.884511
TEACHERSINTERVENE	**PICTUREWITHOUTPERMISSION (Mean)**	**PICTUREWITHOUTPERMISSION (N)**	**PICTUREWITHOUTPERMISSION (SD)**						
1	1.666667	18	1.371989						
2	1.352941	17	0.606339						
3	1.637931	58	0.911876						
4	1.500000	36	1.055597						
5	2.560000	50	1.387407						
All Grps	1.843575	179	1.198361						

KEY	
LEVEL OF INTERVENTION	**MEANING**
1	Strongly Disagree
2	Disagree
3	Somehow (Fairly) Agree
4	Agree
5	Strongly Agree

Breakdown Table of Descriptive Statistics by Family Intervention

Breakdown Table of Descriptive Statistics Smallest N for any variable: 162; Include condition: Bully-victim >= 2.5									
FAMILYINTERVENES	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
1	1.777778	9.000000	0.971825	1.333333	9.000000	0.707107	1.333333	9.000000	0.500000
2	2.200000	35.000000	1.367694	2.527778	36.000000	1.319873	2.000000	33.000000	1.030776
3	1.645161	31.000000	0.838586	2.647059	34.000000	1.124988	1.562500	32.000000	0.800705
4	2.148936	47.000000	1.459284	2.872340	47.000000	1.095783	1.659574	47.000000	0.787859
5	2.809524	42.000000	1.194256	2.738095	42.000000	1.190604	2.341463	41.000000	1.424952
All Grps	2.213415	164.00000	1.300143	2.636905	168.00000	1.195929	1.864198	162.00000	1.066172
FAMILYINTERVENES	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)
1	3.333333	9.000000	1.414214	2.000000	9.000000	1.118034	2.111111	9.000000	1.691482
2	3.194444	36.000000	0.980363	2.028571	35.000000	1.248192	1.777778	36.000000	0.988826
3	2.911765	34.000000	0.712131	1.406250	32.000000	0.756024	2.088235	34.000000	1.544642
4	2.829787	47.000000	1.166920	2.181818	44.000000	1.262569	1.723404	47.000000	0.799514
5	3.357143	42.000000	1.358289	1.333333	42.000000	0.721336	1.547619	42.000000	0.992714
All Grps	3.083333	168.00000	1.128916	1.765432	162.00000	1.095123	1.785714	168.00000	1.127463
FAMILYINTERVENES	UNCOMFORTABLEIM (Mean)	UNCOMFORTABLEIM (N)	UNCOMFORTABLEIM (SD)	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	AFRAIDTOGOONLINE (Mean)	AFRAIDTOGOONLINE (N)	AFRAIDTOGOONLINE (SD)
1	2.000000	9.000000	1.414214	2.000000	9.000000	1.118034	1.888889	9.000000	1.166667
2	2.371429	35.000000	1.238731	1.722222	36.000000	1.256096	1.333333	36.000000	0.676123
3	2.764706	34.000000	1.393901	1.441176	34.000000	0.785905	1.147059	34.000000	0.500445
4	2.600000	45.000000	1.286291	1.617021	47.000000	1.225689	1.361702	47.000000	0.845076
5	2.785714	42.000000	1.423423	1.928571	42.000000	0.894232	2.121951	41.000000	1.076920
All Grps	2.600000	165.00000	1.342549	1.702381	168.00000	1.075361	1.526946	167.00000	0.910543
FAMILYINTERVENES	ONLINETHREAT (Mean)	ONLINETHREAT (N)	ONLINETHREAT (SD)	POSTEDONLINE (Mean)	POSTEDONLINE (N)	POSTEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)
1	1.555556	9.000000	1.013794	1.714286	7.000000	0.755929	2.000000	9.000000	0.866025
2	1.303030	33.000000	0.769937	2.027778	36.000000	1.463579	2.194444	36.000000	1.369451
3	1.058824	34.000000	0.238833	1.852941	34.000000	1.076818	1.882353	34.000000	0.879556
4	1.255319	47.000000	0.988369	1.404255	47.000000	0.741900	1.914894	47.000000	1.138836
5	1.547619	42.000000	0.967833	1.500000	42.000000	0.773021	2.023810	42.000000	1.136707
All Grps	1.315152	165.00000	0.846845	1.668675	166.00000	1.035073	2.000000	168.00000	1.126704

FAMILYINTERVENES	SENTSMS (Mean)	SENTSMS (N)	SENTSMS (SD)	SENTEMAIL (Mean)	SENTEMAIL (N)	SENTEMAIL (SD)	POSTEDONTHEIRSOCIALMEDIA (Mean)	POSTEDONTHEIRSOCIALMEDIA (N)	POSTEDONTHEIRSOCIALMEDIA (SD)
1	2.444444	9.000000	1.333333	2.000000	9.000000	1.224745	1.444444	9.000000	0.726483
2	3.138889	36.000000	1.312637	1.416667	36.000000	0.806226	1.555556	36.000000	0.998411
3	2.647059	34.000000	0.917254	1.823529	34.000000	0.833779	1.323529	34.000000	0.588814
4	3.000000	47.000000	1.318761	1.909091	44.000000	1.030199	1.695652	46.000000	1.092796
5	2.452381	42.000000	0.916046	1.904762	42.000000	0.983015	1.452381	42.000000	0.832346
All Grps	2.791667	168.00000	1.172817	1.787879	165.00000	0.955012	1.514970	167.00000	0.904182

FAMILYINTERVENES	PICTUREWITHOUTPERMISSION (Mean)	PICTUREWITHOUTPERMISSION (N)	PICTUREWITHOUTPERMISSION (SD)
1	1.222222	9.000000	0.440959
2	1.888889	36.000000	1.389302
3	2.147059	34.000000	1.373612
4	1.702128	47.000000	1.196279
5	1.976190	42.000000	1.023816
All Grps	1.875000	168.00000	1.219539

KEY	
LEVEL OF INTERVENTION	**MEANING**
1	Strongly Disagree
2	Disagree
3	Somehow (Fairly) Agree
4	Agree
5	Strongly Agree

Breakdown Table of Descriptive Statistics by Friend Intervention

Breakdown Table of Descriptive Statistics; Smallest N for any variable: 158; Include condition: Bully-victim >= 2.5

FRIEND SINTERVENE	BEENMADEFUNOF (Mean)	BEENMADEFUNOF (N)	BEENMADEFUNOF (SD)	KNOWNEMAILMADEYOUANGRY (Mean)	KNOWNEMAILMADEYOUANGRY (N)	KNOWNEMAILMADEYOUANGRY (SD)	UNKNOWNEMAILMADEYOUANGRY (Mean)	UNKNOWNEMAILMADEYOUANGRY (N)	UNKNOWNEMAILMADEYOUANGRY (SD)
1	1.571429	21	0.925820	1.960000	25	1.098484	1.560000	25	0.916515
2	2.962963	27	1.652073	2.703704	27	1.409168	1.518519	27	0.642733
3	2.085106	47	1.282487	2.829787	47	0.892460	2.170213	47	1.166920
4	2.142857	42	1.180563	2.333333	42	1.004057	1.609756	41	0.737497
5	2.173913	23	1.192864	3.086957	23	1.202764	1.722222	18	0.826442
All Grps	2.193750	160	1.319886	2.585366	164	1.139919	1.765823	158	0.938679

FRIEND SINTERVENE	HARDTIMEPHONECALL (Mean)	HARDTIMEPHONECALL (N)	HARDTIMEPHONECALL (SD)	UNCOMFORTABLESOCIALMEDIAPOST (Mean)	UNCOMFORTABLESOCIALMEDIAPOST (N)	UNCOMFORTABLESOCIALMEDIAPOST (SD)	UNCOMFORTABLEWEBPAGEPOST (Mean)	UNCOMFORTABLEWEBPAGEPOST (N)	UNCOMFORTABLEWEBPAGEPOST (SD)
1	3.640000	25	1.075484	1.640000	25	1.350309	1.760000	25	1.300000
2	2.703704	27	1.265361	1.740741	27	0.984206	1.444444	27	0.506370
3	2.787234	47	1.061913	1.659574	47	1.005995	1.446809	47	0.829052
4	2.904762	42	0.932071	1.902439	41	0.969662	2.166667	42	1.305087
5	3.652174	23	1.027295	1.888889	18	1.409584	1.869565	23	1.391675
All Grps	3.054878	164	1.120107	1.759494	158	1.096784	1.737805	164	1.123441

FRIEND SINTERVENE	UNCOMFORTABLEIM (Mean)	UNCOMFORTABLEIM (N)	UNCOMFORTABLEIM (SD)	BULLIEDONLINE (Mean)	BULLIEDONLINE (N)	BULLIEDONLINE (SD)	AFRAIDTOGOONLINE (Mean)	AFRAIDTOGOONLINE (N)	AFRAIDTOGOONLINE (SD)
1	2.200000	25	1.500000	1.240000	25	0.663325	1.333333	24	0.701964
2	2.925926	27	1.356634	1.296296	27	0.608581	1.333333	27	0.733799
3	2.446809	47	1.500848	1.978723	47	1.132319	1.638298	47	0.870420
4	2.500000	40	1.176697	1.904762	42	1.185471	1.571429	42	0.940754
5	3.000000	22	1.112697	1.869565	23	1.324742	1.565217	23	1.079818
All Grps	2.577640	161	1.363084	1.719512	164	1.082764	1.515337	163	0.877397

FRIEND SINTERVENE	ONLINETHREAT (Mean)	ONLINETHREAT (N)	ONLINETHREAT (SD)	POSTEDONLINE (Mean)	POSTEDONLINE (N)	POSTEDONLINE (SD)	POSTEDABOUTSOMEONE (Mean)	POSTEDABOUTSOMEONE (N)	POSTEDABOUTSOMEONE (SD)
1	1.363636	22	0.789542	1.760000	25	1.300000	1.440000	25	1.003328
2	1.518519	27	0.893152	1.592593	27	0.797074	2.000000	27	1.300887
3	1.148936	47	0.550838	1.468085	47	0.747490	2.297872	47	1.266884
4	1.333333	42	0.954237	1.700000	40	1.264911	2.190476	42	1.017843
5	1.217391	23	0.850482	2.000000	23	1.044466	1.869565	23	0.919701

All Grps	1.298137	161	0.805021	1.666667	162	1.039589	2.030488	164	1.153409
FRIEND SINTERVENE	**SENTSMS (Mean)**	**SENTSMS (N)**	**SENTSMS (SD)**	**SENTEMAIL (Mean)**	**SENTEMAIL (N)**	**SENTEMAIL (SD)**	**POSTEDONTHEIRSOCIALMEDIA (Mean)**	**POSTEDONTHEIRSOCIALMEDIA (N)**	**POSTEDONTHEIRSOCIALMEDIA (SD)**
1	1.920000	25	1.115049	1.200000	25	0.645497	1.160000	25	0.553775
2	2.703704	27	1.488800	1.370370	27	0.687702	1.666667	27	1.330124
3	2.914894	47	0.996293	2.127660	47	0.991639	1.638298	47	0.845076
4	3.333333	42	1.096928	1.976190	42	1.023816	1.780488	41	0.935740
5	2.478261	23	0.845822	1.600000	20	0.820783	1.086957	23	0.288104
All Grps	2.774390	164	1.194703	1.751553	161	0.948888	1.527607	163	0.911605
FRIEND SINTERVENE	**PICTUREWITHOUTPERMISSION (Mean)**	**PICTUREWITHOUTPERMISSION (N)**	**PICTUREWITHOUTPERMISSION (SD)**						
1	1.560000	25	1.044031						
2	1.629630	27	1.079464						
3	2.042553	47	1.301461						
4	1.880952	42	1.272646						
5	2.130435	23	1.358621						
All Grps	1.871951	164	1.234253						

KEY	
LEVEL OF INTERVENTION	**MEANING**
1	Strongly Disagree
2	Disagree
3	Somehow (Fairly) Agree
4	Agree
5	Strongly Agree