Developing a Mobile Application to Educate

Adults about how to Prevent Child Sexual Abuse

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November 30, 2016

Abstract

Child sexual abuse is a major issue in society, with 1 in 10 children being sexually abused before the age of 18. Increased use of prevention programs directed towards children and adults has resulted in a gradual decline in prevalence, but a quick and widely available resource is needed to spread awareness and preventative behavior. This study serves to answer the question of whether a mobile application can be created to effectively educate adults about child sexual abuse. The researcher created mobile applications for Apple and Android devices and implemented a pre-test and post-test to gauge a gain in knowledge. The information to teach users was adapted from the 5 Steps to Prevention by Darkness to Light. 42 participants between 15 and 17 years of age downloaded the app and completed the surveys, reading through the information in between. On average, there was a 148.6% increase in accuracy between the 8 question pre-test and post-test, and the majority of users reported that the app made them more aware of child sexual abuse. Results from this study could have implications on the awareness of the public about child sexual abuse and the modes in which future prevention programs are delivered.

Chapter I: Introduction

Child sexual abuse includes the entire spectrum of sexual crimes committed against children under the age of eighteen. It affects a vast number of children across the globe each year and has been a topic for prevention for decades. While progress has been made, enhanced, more efficient, and more accessible methods of prevention must be developed to continue reducing prevalence.

The Topic

Child sexual abuse (CSA) has been a major international problem for decades, but has recently seen a slight decline in both male and female cases. However, Finkelhor (2009) stated that 3.2% of children were sexually victimized in 2002, and Townsend and Rheingold (2013) estimated that one in ten children are sexually abused before they turn eighteen, often leading to future problems in adulthood including mood disorders including depression, anxiety disorders such as post-traumatic stress disorder, and substance disorders like alcohol or drug problems (Molnar, Buka, & Kessler, 2001). Existing preventative measures mainly include offender management, but they have proven weak in actually preventing abuse, instead punishing offenders after the fact. In reality, in most cases of CSA, the victim knows the abuser, so adults must be able to recognize the signs and know how to report. In order to lower rates of child sexual abuse, a widely dispersible training program must be used to educate adults about protecting children from the dangers of CSA.

The Research Problem

Recently, varying types of educational prevention programs have been implemented in schools to train students how to recognize unsafe and inappropriate situations and protect themselves from CSA. Finkelhor (2009) found that students of all ages who received some form

of preventative education were six to seven times more likely to show protective behavior than children who did not. However, these programs have received criticism for being ineffective at teaching children and immoral for placing too much responsibility on children to protect themselves (Finkelhor, 2009). In addition, parent and educator focused programs such as Darkness to Light's *Stewards of Children,* have been made available across the country and have strong research supporting their success (Mendelson & Letourneau, 2015; Townsend & Haviland, 2016). Since, according to Pareda, Forns, and Gomez-Benito (2009), child sexual abuse is an international problem, with nations across the world requiring improved prevention education, an easily distributable resource including information directed towards adults, training them how to protect their community's children and teach them how to avoid dangerous situations, must be developed. This resource will help especially in developing countries, where the rates of CSA are highest. This thesis will investigate the efficacy of a mobile application that trains adults how to prevent CSA in order to develop the most effective, efficient, and inexpensive mode of preventative education.

Purpose of the Study

The purpose of this study is to develop an educational prevention program that increases knowledge about child sexual abuse and how to prevent it. A more effective, efficient, dispersible, and less expensive program would contribute to an increase in child sexual abuse reports, or an increase in knowledge about what is effective in teaching prevention. The governing question guiding this thesis is; Can a mobile application be created to educate adults about child sexual abuse and the 5 steps to prevention created by Darkness to Light? The *Stewards of Children* training, expanded from the 5 steps, has been found to increase reports to authorities by more than 250%, according to Townsend and Haviland (2016). This thesis aims to

continue and strengthen this effect by bringing the training to a wider range of users by mobilizing it to phones and devices. The primary field of study for this thesis is the relatively new field of prevention, classified under psychology. Combined with this is the field of computer science, primarily mobile app development, used to create a reliable and user-friendly interface to learn in. The most important sub question needed for this project is what content the program should contain to train adults most effectively. In addition, the question of whether or not a mobile application be an effective method of teaching information will be determined through this study. Creating a new, mobile educational prevention app will allow for widespread distribution of a free program to developing countries with low socioeconomic standing which have the highest rates of CSA according to Pareda et al. (2009) that can teach adults how to recognize signs of abuse and react appropriately.

Methods and Evaluation

This experiment was modeled from a study by Tutty, who examined the efficacy of the "Who Do You Tell" child-focused educational prevention program (1997). The study used the 33-item Children's Knowledge of Abuse Questionnaire – Revised (CKAQ-R) as a pretest and posttest to test a gain in knowledge. This thesis, however, edited this examination to direct it towards an older test group, with more preexisting knowledge of abuse, as well as include the development of the education resource, and the evaluation of it.

Methods

This study used a pretest and posttest design to find if there is a positive gain in knowledge after using the educational prevention application. The researcher used a deductive approach to measure if the app is effective based on the results of individual tests, using

quantitative data of the test-takers' scores. In addition, this was a creative thesis, including the development of the app, as well as the analysis of its efficacy.

Materials

The application used in this study was created in Android Studio for all android based devices, and X-Code for Apple phones and tablets. Android Studio uses the java programming language for functionality and XML for appearance. In X-Code, the Swift language will be used to develop the app. In addition, the application was tested and debugged as it was developed using Android emulators provided by the Genymotion service to ensure that it works with varying sizes of phones and tablets. Meanwhile, X-Code provides iPhone and iPad emulators within the developing platform.

Procedures

First, the framework of the mobile application was developed using the resources above. Then, the content, such as videos and text information, were researched, compiled, and implemented into the app. Last, the pretest and posttest elements were added to the first startup, guiding the user through all parts of the training in between the tests, and ensuring that the posttest is taken following the walkthrough. Once the app is complete, a sample of high school students provided data by running through app and taking the tests.

Evaluation

The success of this thesis will be determined by the results of the pretests and posttests administered to testing participants while using the app. Success will depend on the number of participants who exhibited a substantial gain in knowledge between tests. The researcher will know if the answer to the question, whether or not a mobile application can be developed to educate people about child sexual abuse and how to prevent it, is valid if a large percentage of

participants answered a greater number of relevant questions correctly the second time they took

the test, after moving through the app. The data, the difference of the scores of pretest and

posttest of the participants, will be analyzed to find by how much the app increased knowledge

and interpreted to determine the app's success. The meaning of the answer to the governing

question will be found if the app is deemed successful. This would mean that the app is ready to

be released on respective platform app stores and will have a positive impact on the fight against

child sexual abuse.

Implications

If the pretest and posttest difference in scores reveal a positive shift, it means that the app

is an effective teaching method for delivering information about child sexual abuse. Specifically,

it reveals that general facts about the issue, as well as specific knowledge such as how to report a

suspected case of sexual abuse, can be learned through reading through the app. Last, an increase

in score shows that mobile applications themselves can be successful modes of delivering

information and teaching users.

Significance

If the tests are successful, the app can be released to the public and have a positive effect

on the fight against child sexual abuse. More people can have access to information that they

would like to learn about the issue and can fulfil their part in preventing it. In addition, other

mobile app developers can use their abilities to teach individuals about issues important to them,

and the general public can have increased accessibility to information they want to learn.

Applicability

The app will allow far more people to become educated about child sexual abuse. Adults,

including parents, youth-serving professionals, and organizations will have access to education

about how to prevent child sexual abuse. The app may extend beyond the local community, and

the billions of individuals across the world with access to an app store can learn information

about child sexual abuse, and help prevent it, wherever they live.

Chapter II: Review of Literature

Although the prevalence of child sexual abuse (CSA) has been slowly declining (Finkelhor & Jones, 2012), it remains a large problem across the world, due to its hidden nature and profound side-effects. Due to extremely low disclosure rates (London, Bruck, Ceci, & Shuman, 2003), an alternative prevention program must be developed to better educate adults on how to protect their community's children, recognize signs, symptoms, and situations of abuse, and respond appropriately.

This review of literature discusses the facts and impacts of child sexual abuse, as well as current efforts to prevent it. The research reviewed focuses on the prevalence of CSA, the effects of sexual abuse, ways that children tell, and current efforts to prevent this issue. These studies use varying definitions of child sexual abuse but come to similar conclusions supported by each of the researcher's data and analysis. Questions answered by the studies reviewed include: How many children are affected and victimized annually, what is the global rate of this issue, and which countries have the biggest problem? Prevalence data is extremely scarce in this field, as finding a reliable rate is difficult, considering a large amount of child victims never disclose that they were abused (London et al., 2003). In addition, estimates for prevalence vary greatly in countries around the world according to Pareda et al. (2009), in part due to the wide variety in definitions of child sexual abuse. For the purpose of this study, child sexual abuse will be defined as the entire spectrum of sexual abuse committed against persons under the age of eighteen. Additional questions include, what is the cost to society as a result of this type of abuse, what short term and long term side-affects manifest as a result of sexual abuse, and how can these be used to recognize abuse? The financial costs of child sexual abuse are derived from necessities for the victim and family, as well as indirect costs (Wang & Holton, 2007). These expenses can

cost American tax payers billions annually (Fang, Brown, Florence, & Mercy 2012) and emphasize the need to strengthened prevention efforts across the country. Also highlighting this need are the profound side-effects of CSA, which can include life-long depression and substance abuse (Kilpatrick et al., 2003). These side-effects should be learned and used to notice changes in a child's behavior to recognize potential abuse. Also, what current efforts have been taken to prevent this issue, have these efforts made a substantial impact, and are child focused or adult focused programs more effective in training the community to protect children from child sexual abuse? For years, sexual abuse prevention programs have been implemented in schools and institutions across the country with varying levels of success. These trainings, focused on helping children protect themselves, have little research supporting their value, and are controversial for the pressure and guilt they impose on children. On the other hand, adult focused programs aimed at parents and educators, focus on teaching adults in the community how to notice potential signs of abuse, and how to report it if they suspect abuse is occurring. While there are far fewer of these, this type of training has stronger research and has been shown to be effective in increasing the number of incidents reported. Finally, perpetrator focused prevention, looks to change non-pedophilic abusers cope with issues or stress they may have that might cause abuse to occur. This review will find which aspects of each of these programs contribute most to its success or failure. However, since the available research is limited, and the definition for success of a particular training varies, the data will have to be adjusted to find if a certain characteristic is actually important in the program. Last, can a mobile application be developed to train groups of all ages about child sexual abuse and how to prevent it? This part of the review will examine various sources pertaining to mobile apps that work to prevent an issue. The research regarding

what makes this app successful will be examined and compared to find the most important characteristics of a mobile app for child sexual abuse prevention.

This review addresses each major problem in sections and compares the literature related to each topic. First, basic facts such as prevalence, global effects, individual side-effects, and perpetrator characteristics are discussed. Next, current prevention efforts such as lecture training and online courses and their research are evaluated. This review then looks at research pertaining to mobile app solutions to better deliver child sexual abuse training.

Child Sexual Abuse Statistics

In the issue of child sexual abuse, there are a number of patterns and statistics relevant to a variety of aspects of the topic. Some of these, for example, the magnitude, economic impact, and side-effects of CSA, reveal the size and importance of preventing this abuse, while others such as disclosure facts, perpetrator characteristics, and reporting abuse, show how. The patterns derived from research detailed here can be used to develop prevention strategies to help train adults and children how to protect their community from the dangers and impacts of CSA.

The Scale of the Problem

Townsend and Rheingold (2013) found that roughly one in ten children will be sexually abused before the age of eighteen. More specifically, "about 1 in 7 girls and 1 in 25 boys will be sexually abused before they turn 18" (Townsend & Rheingold, 2013, p. 21). This statistic includes contact abuse only, but child sexual abuse is often defined as the entire spectrum of sexual crimes and offenses committed on children under eighteen, while other times this definition only includes one specific type of sexual abuse. As such, Pareda et al. (2009) found a wide range of prevalence rates from numerous studies, most of which used different definitions of what child sexual abuse is. These rates varied from "0 to 53% in women and from 0 to 60% in

men" (p. 336). Even so, this number, as Finkelhor and Jones (2012) found, has significantly

declined from the 1990s, but only in self-reported cases. There is not enough information to

conclude why this decline, but Townsend and Rheingold (2013) postulate that it is due to the rise

in referrals to Children's Advocacy Centers from law enforcement and the Child Protective

Service.

Economic Impact

Fang et al. (2012) revealed that the approximate cost per victim of child abuse in

$210,012, which is largely paid by tax payers. This can include medical treatment, law

enforcement costs, mental health care, and the child welfare services system. With around

63,000 cases of child sexual abuse in 2010 (Finkelhor & Jones, 2012), this costs the country

billions annually. Furthermore, Wang and Holton (2007) found that the whole spectrum of child

abuse and neglect directly costs the United States $33,101,302,133 per year, and indirect costs

are estimated to sum to $70,652,715,359. Using Fang's et al. (2012) estimated costs and

Finkelhor and Jones's (2012) estimated prevalence, child sexual abuse accounts for about $13

billion of the direct costs found by Wang and Holton (2007) in the United States each year.

Disclosure of CSA

One reason estimates of child sexual abuse prevalence vary across research is that only

about 38% of child victims disclose that they were abused (London et al., 2003). Similarly,

Smith et al. (2007) found that 47% of 288 victims did not disclose for over five years following

abuse, and other studies with representative samples agree that two thirds of child sexual abuse

cases are never reported to social services or law enforcement (Hanson et al., 2003). This delay

is part of the three patterns of disclosure that London et al. (2003) detailed as delay, denial, and

recantation. As seen by the low immediate disclosure rate, most children delay their disclosure

until many years after the fact, and some never tell. This research reveals the importance of developing an alternative method protecting children, through educating the adult population how to notice the indications that sexual abuse may be occurring and how to respond in an appropriate and responsible manner.

Perpetrator Characteristics

Finkelhor and Ormrod (2012) reported that 90% of children who are victims of CSA know their abuser, while only 10% are abused by a stranger. He also found that about 30% of victims are abused by a family member, and 40% by another child. Snyder (2000) agreed, adding that the younger the victim, the more likely the abuser is a family member, with 50% of cases when the child is under six years of age. In addition, Finkelhor and Ormrod (2012) also found that roughly 60% of perpetrators was a trusted friend of the victim's family. Similarly, Finkelhor, Ormrod, and Chaffin (2009) reported that only about 1 in 5 child sexual abuse perpetrators had 10 to 40 victims, while the majority, roughly 70%, had between 1 and 9 victims. Another important characteristic of perpetrators is that they are not all pedophiles. Finkelhor and Ormrod (2012) found that 40% of victims are abused by older, more powerful children. Similar to the correlation Synder (2000) found, Finkelhor and Ormrod (2012) added that the younger the victim, the more likely their abuser is another juvenile. In addition, Synder (2000) added that juveniles are the offenders in 43% of sexual assaults on children under the age of six, and of these offenders, only 14% are under 12, reflecting Finkelhor and Ormrod's (2012) findings that juvenile abusers are typically older. These characteristics are important in identifying potentially dangerous situations, such as the example of. having a younger child be supervised by and older child.

Consequences of CSA

One reason child sexual abuse is a large issue of global concern is the lasting side-effects of abuse throughout life, as well as the immediate consequences of abuse. Molnar, Buka, and Kessler (2001), for example, found that "78% of the women and 82% of the men reporting CSA met criteria for at least 1 lifetime disorder" (p. 757). These include mood disorders like depression, anxiety disorders such as posttraumatic stress disorder and social phobias, and substance disorders like alcohol or drug problems. Similarly, Kilpatrick et al. (2003), revealed that about "16% of boys and 19% of girls met criteria for at least 1 diagnosis" (p. 692) of posttraumatic stress disorder (PTSD), a major depressive episode (MDE), or substance abuse/dependence (SA/D). There are also many immediate side-effects of CSA. Victims who experience depression or anxiety during childhood as a result of sexual abuse may also experience behavioral problems like aggression and opposition (Broman-Fulks et al., 2007). In addition, age-inappropriate sexual behavior is a strong indication that sexual abuse is occurring, according to Noll, Trickett, and Putman (2003), stating that victims of CSA are far more likely to have sexual behavior problems. Not only this, Kilpatrick et al. (2003), found that adolescents who were sexually abused were up to three times more likely to have substance dependency in adolescence than children who were not abused. This substance abuse can lead to academic issues, as well as delinquency and bad behavior (Siegal & Williams, 2003). This behavior can continue well into adulthood, according to Simpson and Miller (2002), reporting that female adult survivors are two times as likely to develop substance abuse problems, and men are 2.6 times more likely to report it over the general population. Similarly, Siegal and Williams (2003) found that adult survivors are twice as likely to be detained for a property offense as well as a

violent offense. These side effects make preventing abuse important to avoid long term consequences on children.

Where Abuse Occurs

Child sexual abuse most often occurs under specific circumstances, that can be used to develop training on how to avoid such situations. Synder (2000) found that 81% of cases occur in one on one situations. Similarly, most incidents occur inside a household, either the victim's or perpetrator's, summing to 84% of sexual abuse against children under twelve (Synder, 2000). In addition, Wolak, Finkelor, and Mitchell (2006) reported that internet sex crimes constituted only a small part of the whole problem, finding that arrests for internet crimes only accounted for 1.2% of arrests for all sexual crimes committed against children. Still, 1 in 25 children received some kind of online sexual solicitation where the perpetrator tried to make offline contact (Wolak, Finkelhor, Mitchell, & Ybarra, 2008). This shows that while internet sex crimes account for only a small part of the entire issue, it still is a significant force in creating potential in person sexual abuse.

At-Risk Children

Many factors are involved in increasing or decreasing a child's risk of being a victim of sexual abuse, including their age, race, gender, family, and personality. Sedlak et al. (2010) found that children living with two married biological parents have a far lower risk of CSA, while those living with no parent are 10 times more likely to be abused. In addition, Finkelhor (1994) revealed that females are 5 times more likely abused than males; however, Synder (2000) reported that the age of the male plays an important role, as of all victims aged 12 to 17, males accounted for only 8% of cases, while under 12, they made up about a quarter of all sexual abuse cases. Finkelhor (1994) agrees that age plays an important role, finding that children are most

vulnerable from ages 7 to 13. Synder's (2000) data confirm this finding, adding that 20% of

children are sexually abused before they reach 8 years old. Race also is a large factor in a child's

risk for sexual abuse. According to Sedlak et al. (2010), African American children are almost

twice likely to be sexually abused than Caucasian children, while Hispanic children have only a

slightly greater risk than white children. Their research also found that the risk is tripled if the

child's parent or parents are not in the labor force or whose family is of low socioeconomic

status (Sedlak et al., 2010). This information is useful in developing a plan to avoid dangerous

situations for children.

Reporting CSA

Since only 38% of children themselves disclose that they have been sexually abused

(London et al., 2003), and about 40% of those reports are to a close friend (Broman-Fulks et al.,

2007), rather than a trusted adult, most CSA cases never actually reach law enforcement. Sedlak

et al. (2010) found that child protective services (CPS) investigated around 55% of all cases

reported to them, while the others were never investigated due to a lack of substantial evidence.

Sedlak et al. (2010) also discovered that only 20% of incidents reported by school staff were

investigated by the CPS while school personnel recognized "the maltreatment of 52% of the

children with Harm Standard maltreatment and 39% of those with Endangerment Standard

maltreatment" (p. 37). Yet still, a quarter of all teachers have received no training or guidelines

of reporting in their state (Sedlak et al., 2010). This kind of training is important in teaching

educators how to responsibly report a possible case of sexual abuse. In terms of arrest, Synder

(2000) found that while the rate of conviction is relatively high, only about 30% of CSA cases

result in arrests, and are 32% more likely to involve older children victims. A teacher's ability to

know when to report when they recognize potential abuse is crucial in ensuring that the CPS can

investigate as many cases as possible.

<div align="center">**Preventing Child Sexual Abuse**</div>

For decades there have been numerous attempts to develop a child sexual abuse

prevention program that trains both children and adults to prevent abuse. For the most part, these

programs were directed towards children in schools, teaching them how to avoid dangerous

situations and keeping themselves safe. However, many of these teaching programs have been

criticized for putting too much pressure on children and scaring them. These programs lack

strong research but are nonetheless used nationwide as a tool to decrease the risk of sexual abuse.

Less common, but more researched programs are adult focused trainings. These aim to train

parents and educators how to recognize signs of abuse and how to react responsibly. Finally,

there are a few experimental programs aimed at helping perpetrators who may have abused

mistakenly and are not pedophiles; however, these programs have little solid research, and as

such will not be discussed in this review. This section reviews the research pertaining to these

three focused groups and their modes of delivery and compares their successes and downfalls.

Child-Focused Programs

In a study by Brassard and Fiorvanti (2014), the researchers found that in developing an

abuse prevention program directed at children, presentations with active participation, frequent

sessions of longer durations, and family involvement all contributed to a higher success rate. In

addition, Brassard and Fiorvanti (2014) stressed the importance of not only questionnaires

assessing knowledge but also testing newly skills, in the form of interviews or simulations and

measuring the child's response to dangerous situations. A number of tools have been

standardized to consistently measure the effects of a child-focused program. In particular, the

Children's Safety Knowledge and Skills Questionnaire (Kraizer, 1981), the *Choice of Safety*

Strategy Questionnaire (Taal & Edelaar, 1997), and the "*What If" Situations Test* (Wurtele,

Hughes, & Owens, 1998) have been frequently chosen to gauge a child's progress in knowledge

about and response to dangerous situations where sexual abuse may occur. Similarly, Walsh,

Zwi, Woolfenden, and Shlonsky (2015) reported that of the six possible outcome measures,

including protective behaviors, knowledge regarding sexual abuse in general or prevention

concepts, retention of both protective behaviors, as well as knowledge, psychological harm such

as anxiety in the child or parent, and disclosure of abuse following the programs, all effects

excluding harm, which was found to have no effect, favored a child-focused training. Brassard

and Fiorvanti (2014) found that both the *Safe Child Program* (Kraizer & Coalition for Children,

1994-2005) and the *Stay Safe Program* (Cullen, MacIntyre, & Lawlor, 1998) increased

children's self-esteem and aided in a more open relationship between teachers and students, in

addition to knowledge gains in both students and educators. However, despite these positive

effects, it has been suggested and is a common parental concern that abuse training puts too

much pressure on children to protect themselves and disclose abuse (Taal, 1997; Tutty, 1997).

For example, a child who has been abused, and is then trained how to resist such abuse, would

feel guilty for falling into that situation and not disclosing. Both Oldfield (1996) and Hazzard

(1991) agree that there is no increase in anxiety in a group of young students involved in a

prevention program. On the other hand, Hebert (2001) reported strong negative effects in 13% to

25% of children as being more fearful of strangers. In addition, 13% showed increased

dependency behaviors, 15% were more aggressive towards peers and 29% towards siblings, and

less than 5% experienced nightmares, bedwetting, or reluctance to go to school. These potential

consequences, although not common, stress the importance of not causing stress or anxiety when

teaching children about child sexual abuse. Rather, if a program is to be effective, it must ensure

them that they are not alone in protecting themselves, but that there are a few things they can do

to help. Instead, some say, parents should be responsible for learning how to protect their

children and communicate safe practices to them. As such, new programs, aimed towards

educating adults how to keep their community's children safe, have been developed in some

areas. Still, child focused programs remain widely utilized, but it is important to teach and affirm

that it is safe to disclose and it is not the child's fault if abuse does occur. Otherwise,

unintentional victimization can occur and harm the child more than the training helps.

Adult-Focused Programs

While there are far fewer programs aimed at training adults about CSA than those

directed towards children, they have been strongly researched and have less controversy

surrounding them. It is generally accepted that adult-focused prevention programs are successful

in increasing reports and making schools safer. In a recent study, Rheingold et al. (2014) found

that Darkness to Light's *Stewards of Children* training program increased not only knowledge

about child sexual abuse based on the CSA Knowledge Questionnaire but also attitudes towards

sexual abuse, based on the CSA Myth Scale (Collings, 1997), and prevention behaviors,

including engaging in primary prevention (defined as actively preventing possibly dangerous

situations), talking to a child or adult about CSA, making changes to policy, and calling a CSA

hotline or making a report to authorities. Similarly, other researchers found that the same training

program resulted in a "283% increase in reports of child sexual abuse to authorities in the year

after training" (Townsend & Haviland, 2016, p. 5). Since reports to law enforcement and Child

Protective Services Agencies are meant to act as a call to investigate rather than an accusation, as

more reports are made, more children's safety can be secured.

Mobile Applications for Prevention

Ever since smartphones became a widespread commodity used by a large part of the population, mobile applications have been used for a variety of purposes, including entertainment, news, and education. Many movements to prevent common societal issues have taken to Apple's and Google's app stores to help spread the word about their problem. While no such applications exist pertaining to child sexual abuse, this section aims to find what aspects of prevention applications make them successful in spreading their message and achieving a mass audience.

First, Gong and Tarasewich (2004) reported a series of interface guidelines for mobile devices including, enabling users to use shortcuts to navigate through the app quickly, offering informative information, designing "dialogs to yield closure" (p. 3752), and support internal center of control. The researchers argue that users want to move through the app quickly and efficiently, finding the information they want to see as fast as possible. This point stresses the importance of shortcuts. A mobile prevention app should allow the user to see all the information available, while offering ease of navigation and quick response time. There should also be a clear structure to the application, in order to indicate that the user has seen all of the information there is to see. Still however, the user should be in complete control of where they navigate and should not be directed where in the app they should go next. Gong and Tarasewich (2004) also found that consistency in design, easy reversal of actions, error prevention, and reduced "short-term memory load" (p. 3753). These additional guidelines focus primarily on the structure of an app. A user is more likely to return to the information in the application if there is a clear, consistent structure and can easily go back, enhancing the app's flow and speed. It should have a simple design, and not require remembering where each section can be found. Key problems that arise

in mobile app development, according to Shahbudin and Chua (2013), include fast evolution of mobile devices, mobile constraints, efficiency issues, and unstructured designs (p. 1). First, smartphones continue to evolve extremely quickly, resulting in differing "sizes, display resolutions, operating systems, processor speed, memory size, and battery life" (p. 1). As such, a mobile application must be able to adapt to changing phones, particularly in screen size and resolution. Mobile phones also have limited computing power compared to computers, and different phones can have vastly different capabilities. To compensate, applications should be optimized to use as little processing power as possible to avoid crashing and freezing. Similarly, Shahbudin and Chua (2013) advise that apps can be designed to consume less memory and battery by performing as little work as possible on the actual device, and instead do heavy tasks on the server (p. 2). Finally, unstructured designs that may include code duplication increase the download size of the app and create maintenance issues. Instead, an app should have a clear structure to keep the amount of code needed at a minimum. Taking these factors into account in developing a mobile application is important in ensuring that the app runs smoothly on all devices, while downloading quickly and not using unnecessary battery. In addition, Angel (2014) reported that a prevention application must build skills rather than simply provide information and must give support to its readers in order to encourage them to continue reading. An app that solely increases awareness or knowledge will have little to no effect on the decline of child sexual abuse. Rather, it must provide the tools and teach the skills needed to exercise preventative behavior in the real world. Last, a necessity for the reader's involvement in prevention must be presented to inspire active participation in the program. The reader must be constantly aware of the need for their help in fighting child sexual abuse in order in order for them to receive the most out of their learning experience from the resource.

Chapter III: Methods

This study aimed to increase knowledge about the issues of child sexual abuse and the

effort to prevent it, and answer the question can a mobile application be an effective method of

training adults about this issue. Child sexual abuse is a major problem to be addressed, affecting

millions across the world. In one study, Townsend and Rheingold (2013) estimated that 1 in 10

children will be sexually abused before the age of 18, and Pareda et al. (2009) confirmed that this

is an international issue, with rates far higher in many other nations. A widely dispersible

program is needed in the fight to prevent sexual abuse, and a mobile application is a quick,

efficient, and free source of information available to anyone who may need it. This study used a

creative experiment and tested using a pretest and posttest survey to measure a potential gain in

knowledge. It was based off of the "Who Do You Tell" child-focused program analysis by Tutty

(1997). This used the 33-item Children's Knowledge of Abuse Questionnaire – Revised (CKAQ-

R) to quantitatively gauge a gain in knowledge in children about the subject of CSA.

Participants

In conducting this study, the researcher collected survey results taken from two school

classes. The app was downloaded by 42 students over the course of two days. Participants were

of random race, ethnicity, and socioeconomic background. Students in these classes ranged from

15 to 17 years old. In addition, the participants all received the same tests and training to

measure the app's teaching capabilities.

Measures

Materials necessary for this study, included the mobile application that was developed by

the researcher intended to train individuals about child sexual abuse. Programs needed for the

development of this application included Android Studio and the Java language for Android

based devices, and X-Code and Swift for Apple based devices. To collect and measure the data,

pretest and posttest results were delivered through Surveymonkey software. The subjects' pretest

and posttest results were then scored to measure an increase in knowledge between tests.

Procedures

First, the overall architecture in which information and videos were implemented was

developed in both Android Studio, using the Java language, and X-Code, optimized for Swift, by

the researcher throughout the summer. Next, the 5 Steps to Prevention, the overall guide of the

Stewards of Children educational program created by Darkness to Light, was analyzed and

composed into a body of information to be presented to the user, including bullet points and

paragraphs for each step. In addition, concise videos created by Darkness to Light were compiled

and implemented into the app. Then, a pretest and posttest survey was created using the relevant

information present in the app. Questions were multiple choice, true or false, and fill in the

blank, asking participants to repeat what they learned while viewing the app. For example, one

question was "how many children are sexually abused before the age of 18?" with the potential

responses of "a) 1 in 8, b) 1 in 10, c) 1 in 20, or d) 1 in 50." The questions could not be common

knowledge and must have been clearly stated in the app. Finally, two school classes were

selected, totaling 42 students combined. Participants downloaded the app and took the tests,

before and after reading through the app to gauge a gain in knowledge. The app's success was

determined through analyzing the positive gains in scores between pretest and posttest. This

information can be displayed through a simple graph showing the improvement the app brought

about.

Evaluation

The success of the study will be determined based on the gain in knowledge of participants after reading through the information in the mobile application. If the participants' results improve significantly from pretest to posttest, the researcher will know that the app is an effective mode of teaching facts regarding child sexual abuse and its prevention. The data will be known to be valid since the participants were numerous and had limited knowledge regarding the subject prior to learning the information. If there is a positive gain in knowledge, the governing question of whether an application can aid in the training of adults, will be confirmed, and the app will be released the public and have a beneficial effect on the fight against CSA.

Conclusions

The data collected from the surveys will either confirm or negate the hypothesis based off of the change in results between pretest and posttest. If there is a positive gain in knowledge, the hypothesis that an app can effectively deliver information will be accepted; however, if there is a consistently negative or unsubstantial gain in score, then the hypothesis will be rejected, as the application failed to teach the information. If accepted, the researcher will know that the app can be released to the public and have a positive effect on the fight against child sexual abuse.

Chapter IV: Data Collected and Evaluation

This chapter reviews the data collected during the pre-test and post-test surveys. The 42 participants downloaded the app, took the pre-test, examined the information in the app, and completed the post-test. Data for each participant was collected for each question. It includes a question by question analysis of the change in score between tests. In addition, questions asking for users' opinions at the end of the post-test were collected.

Change in Scores

This section examines the change in score between pre-test and post-test surveys. Each participant took the test before viewing the app and after five minutes of using it. Using this data, the researcher can find the increase or decrease in correct responses for each question.

Table I

Pre-test and Post-test Percent Correct per Question

Number	Question	Pre-test score	Post-test score	Percent change
1	How many children will be sexually abused before the age of 18?	42.9%	92.9%	116.6%
2	Of all sexual abuse cases, what percentage are children the victims?	42.9%	95.2%	121.9%
3	How much more likely is a child to be raped than an adult?	23.9%	92.9%	288.7%
4	The process by which an offender gradually draws a victim into a sexual relationship in secrecy is known as...	11.9%	85.7%	620.2%
5	True or False: Children are often sexually abused by other children.	66.7%	76.2%	14.24%
6	True or False: Perpetrators are usually random strangers.	78.6%	85.7%	9.0%

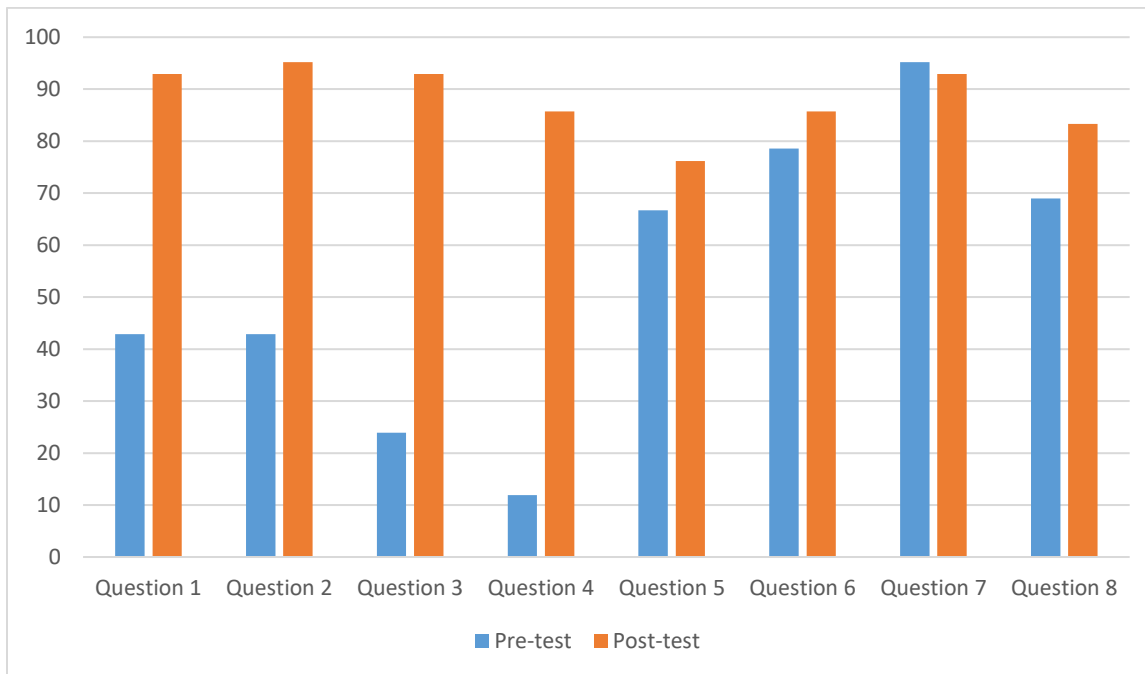| 7 | True or False: Most children never disclose their abuse. | 95.2% | 92.9% | -2.4% |
| 8 | All of the following are ways to minimize opportunity except... | 69.0% | 83.3% | 20.7% |

Figure 1

Changes in Score Between Pre-test and Post-test

Table I compares the percent of participants that answered each question correctly in the pre-test versus the post-test and calculates the percent change between the two. Figure 1 plots these changes side by side. In general, there is a significant increase from pre-test to post-test, averaging 148.6%. There is an exception in question 7, where there was a -2.4% change in score. This outlier can be due to the wording of the question, prompting volunteers to assume the correct answer. The largest percent increase occurred in question 4, the only free response question. This gap is because of the inability to guess when users did not know the answer. For

the true or false questions, numbers 5, 6, and 7, participants scored far higher on the pre-test when compared to the multiple choice questions. This trend is attributed to the ability to guess with a 50% chance, as well as wording that pushes users towards the correct answer.

Opinion Questions

In addition to questions testing users' knowledge, two additional questions in the post-test asked for participants' opinions about their experience. The first question asked if "this app made you more aware of child sexual abuse," and the second questioned whether "you would recommend this app to a friend." These allow the researcher to determine if the users had a positive experience and learned something from the app.

Table II

Responses to "This app made you more aware of child sexual abuse."

Answer Options	Response Percent	Response Count
Strongly Agree	40.5%	17
Agree	45.2%	19
Neutral	14.3%	6
Disagree	0.0%	0
Strongly Disagree	0.0%	0

Table III

Responses to "Would you recommend this app to a friend?"

Answer Options	Response Percent	Response Count

Very Likely	35.7%	15
Likely	28.6%	12
Neutral	21.4%	6
Not Likely	9.5%	4
Highly unlikely	4.8%	2

As Table II shows, the majority of participants agreed that the app made them more aware of child sexual abuse, while 6 remained neutral, and none disagreed. These results reveal that the majority of users had little former knowledge of child sexual abuse, and the app introduced them to the overall ideas at a minimum. For the second question in Table III, 27 users totaling 64.3% responded that they were either very likely or likely to recommend the app, while only 6 users, or 14.3%, answered that they were not likely or highly unlikely. These responses shows that many participants felt that the information within the app should be shared, which is an important aspect in order to teach as many people as possible about child sexual abuse.

Chapter V: Implications, Limitations, and Further Research

To determine the efficacy of a mobile app in teaching about child sexual abuse, users completed a pre-test, read through the information, and took a post-test. The pre-test and post-test survey results revealed an increase in score in all questions except one. This trend proves that the app was successful in educating individuals about basic facts regarding child sexual abuse as well as good prevention strategies.

Implications

The results of the data collection support the hypothesis that a mobile application can be developed to educate individuals so they are more knowledgeable about child sexual abuse. Important facts about recognizing dangerous situations and reacting responsibly were effectively illustrated to users of the app. The greater implications of these results could be enormous. As more people download the app, either as a supplement to a sexual abuse training program or simply after finding it online, the public could slowly become more aware about the prevalence of child sexual and be more vigilant about where it could be occurring. In addition, more individuals would feel comfortable reporting potential abuse, knowing that they are acting in a responsible manner. Together, these effects could have a small yet significant effect on the gradual decline of child sexual abuse.

Limitations

One limitation of this thesis was the time frame for collecting data from volunteers. Due to the short amount of time available, users had to take the post-test immediately after reading through the information in the app. Ideally, they would have taken the test immediately after and then again after a month. This way, the researcher would know if the information learned by using the app were retained for more than a short period of time.

Further Research

Further studies analyzing the efficacy of the mobile application developed for this thesis must be conducted to fully understand the extent of its effects. Becoming more aware or knowledgeable about child sexual abuse is important, but often this does not directly translate to preventative behavior. If the app were to be truly effective, it must be able to convince users to act differently when faced with an intimidating situation such as witnessing or suspecting child sexual abuse. Additional research testing if individuals who have used the app responded differently in these types of scenarios is crucial in determining how effective the app actually is. In addition, more studies could be conducted to find how long users retain their knowledge gained from the app, and how they could be convinced to return to it. It is important in finding the efficacy of a learning source to examine how well users retain their knowledge, and, in the case of mobile applications, how users can be drawn back to it. Push notifications, social media, and customization can all draw individuals back to use the app again, and it would be useful to know which are most effective.

Conclusion

This study has found that a mobile application containing information about child sexual abuse and its prevention is effective in increasing knowledge about the subject. This means that more people will be able to have access to this important information wherever they are, resulting in a more well-informed public that knows how to react responsibly to suspected child sexual abuse. Finally, the results show that this app has the potential to impact the decline of child sexual abuse in a positive way.

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